COURSES

2022-2023

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Clarkson University is making a special effort to identify for employment opportunities and participation in its educational programs a broad spectrum of candidates including women, minorities, and people with disabilities.

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Business - School of Business - Subject: Accounting

AC 1(2 - 4) **Course ID:007962** **2015-06-30**
Accounting Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

AC 2(2 - 4) **Course ID:007963** **2015-06-30**
Accounting Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

AC 202(3) **Course ID:007317** **2022-02-10**
Financial Accounting
In this course students will gain the fundamental knowledge of analyzing, recording, classifying, and summarizing accounting information into financial statements. These financial statements are important both inside and outside of the reporting entity, as they aid business managers, creditors, and investors in making many types of business decisions. This course will allow students to become proficient in preparing financial statements in accordance with Generally Accepted Accounting Principles by developing their ability to identify and interpret financial transactions, classify and record business transactions in a financial accounting system, and complete the accounting cycle.
Components: Lecture
Attributes: Offered Fall and Spring

AC 203(3) **Course ID:012743** **2022-02-10**
Managerial Accounting
The purpose of this course is to provide future managers with an introduction to and an appreciation of the vast array of tools and techniques that comprise managerial accounting. Managerial accounting information is used widely in an organization, from pricing products to allocating company resources. This course develops your understanding of procedures, methods, and information gathering techniques that managers and other business professionals use to analyze financial data in order to make managerial decisions and budget/forecast results of operations.
Components: Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: AC202

AC 205(3) **Course ID:007318** **2016-01-04**
Introduction to Financial and Managerial Accounting
[Cross-listed with EM 205] An introductory survey of accounting information to guide and improve decision making. Many course topics involve cost planning and control techniques used to evaluate and improve the financial performance of organizations and/or products.
Components: Lecture
Course Equivalents: EM 205
Attributes: Offered Each Term

AC 305(3) **Course ID:007321** **2016-11-04**
Cost Accounting
Cost accounting information is used for both internal and external reporting purposes and plays a vital role within an organization as a basis for making sound business decisions. This course is an extension of Managerial Accounting with its primary objective to develop an in-depth understanding of cost accounting tools and techniques at an advanced cost accounting level. More specifically, students will learn fundamental cost analysis principles, generalizations and theories and gain in-depth factual knowledge of various product costing management systems (terminology, classifications, methods & trends), and learn various cost allocation methods. Overall, students are introduced to various methods to assist in decision-making, both operational and strategic within the organization developing their skills, competencies, and points of view needed by accounting professions.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AC203 or EM205 or AC205

Business - School of Business - Subject: Accounting

AC 311(3) **Course ID:011275** **2016-09-09**
Intermediate Financial Accounting I
First course in a two-course sequence in financial reporting at the professional level. Seeks to develop student's' understanding of the environment in which financial reporting choices are made and how they impact financial statement information. The course integrates the perspectives of accounting, corporate finance, and economics to help understand how business transactions get reported and their decision implications. Examines the principles and practices of external financial reporting, with particular emphasis on balance sheet valuation and income determination. Reviews basic accounting concepts and the essentials of the accounting process. Covers the measurement and disclosure problems associated with such topics as cash, receivables, inventories, long-lived assets, and intangibles.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AC203

AC 312(3) **Course ID:010178** **2016-01-04**
Intermediate Financial Accounting II
Continues the two-course sequence begun in AC 311 by exploring additional coverage of generally accepted accounting principles such as current liabilities, long-term debt, stockholders' equity, earnings per share, accounting for income taxes, accounting changes, and the Statement of Cash Flows. Pro forma 'as if' disclosures, earnings, and financial statements are introduced as well as present value techniques to accounting valuations.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AC 311

AC 407(3) **Course ID:007323** **2015-06-10**
Taxation of Business Entities
Emphasis is placed on federal income tax responsibilities of individual taxpayers and small businesses. Topics covered include tax planning, compliance, sales taxes, and payroll taxes.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Must have junior or senior standing.

AC 421(3) **Course ID:007325** **2016-09-09**
Accounting Information Systems
The course covers the design and installation of accounting systems that provide relevant and reliable information. Special emphasis is given to potential risks of errors or irregularities and the need for systems control. Projects may include analysis, design and implementation of an accounting system.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AC305 or AC203.

AC 431(3) **Course ID:007326** **2016-11-08**
Advanced Accounting: Investment and Ownership Interests
This course examines the theory and practice of accounting for business combinations, consolidated financial statements, partnerships, foreign currency transactions, and foreign inter-company investments. Additional topics may also be covered. Current issues in these areas will also be discussed.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: AC311

AC 436(3) **Course ID:007327** **2016-11-08**
Auditing
A study of the independent auditor's examination of his or her clients' recording of events, periodic adjustments and formal statements. Topics will include the auditor's opinion, sampling as used in auditing, auditing and the computer.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AC311, senior standing and at least a C average in all previous accounting courses take

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Business - School of Business - Subject: Accounting

AC 487(1 - 3) **Course ID:007328** **2017-01-13**
Special Project in Accounting
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member. Prerequisites: junior standing, grade of at least C in all Clarkson accounting courses, and consent of the instructor.
Components: Research
Attributes: Given When Needed

AC 490(1 - 3) **Course ID:007329** **2016-04-04** **Instructor Consent Required**
Internship in Accounting
An unpaid internship that is related to the student’s professional goals.
Components: Independent Study
Attributes: Given When Needed

AC 603(2) **Course ID:007332** **2015-06-30**
Management Accounting
[Cross-listed with AC 604] The purpose of this module is to build on the students' knowledge of basic accounting concepts, to enhance their ability to properly evaluate and use accounting data for internal planning, control and decision making. Topics include financial statement analysis; management control; agency costs and organizational behavior; goals and strategies; information economics; responsibility center, profit center and investment center accounting; divisional control and transfer pricing; multinational corporations and foreign currency translation. Consideration is also given to usefulness of information contained in general purpose financial statements.
Components: Discussion, Lecture
Course Equivalents: AC 604, AC 604
Attributes: Offered Fall Term
Requirement Group: Restriction: Admission to the MBA program required

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Business - CRC Business - Subject: Accounting

AC 604(3) **Course ID:007333** **2018-11-29**
Financial and Managerial Accounting for Decision Making
[Cross-listed with AC 603] This course covers Financial and Managerial Accounting concepts for MBA students. The financial accounting portion; covers the fundamentals of the accounting cycle and the evaluation of the major financial statements for external reporting purpose. Furthermore, develop the ability to analyze the financial statements. The managerial cost accounting portion will cover job costing, process costing, cost-volume-profit analysis, budgeting and pro-forma financial statement development, flexible budgets and standard costing systems, cost allocation and responsibility accounting, and tools for short-term business decisions. The overall objective of the course is to develop students' ability to construct accounting reports, understand accounting reports and make decisions from such accounting information.
Components: Lecture
Same As Offering: AC 604
Course Equivalents: AC 603
Attributes: Offered Summer Term

AC 604(3) **Course ID:007333** **2018-11-29**
Financial and Managerial Accounting for Decision Making
[Cross-listed with AC 603] This course covers Financial and Managerial Accounting concepts for MBA students. The financial accounting portion; covers the fundamentals of the accounting cycle and the evaluation of the major financial statements for external reporting purpose. Furthermore, develop the ability to analyze the financial statements. The managerial cost accounting portion will cover job costing, process costing, cost-volume-profit analysis, budgeting and pro-forma financial statement development, flexible budgets and standard costing systems, cost allocation and responsibility accounting, and tools for short-term business decisions. The overall objective of the course is to develop students' ability to construct accounting reports, understand accounting reports and make decisions from such accounting information.
Components: Lecture
Same As Offering: AC 604
Course Equivalents: AC 603
Attributes: Offered Summer Term

AC 610(3) **Course ID:012541** **2017-07-14**
Fraud and Forensic Accounting
[Formerly MBA 610] This MBA course is designed as a seminar. The primary goal of this course is to assist students in recognizing fraud, which will aid in the prevention and detection of fraud. This course will focus on the professional responsibility of accountants to act ethically. The course materials will discuss what a fraud is, how frauds can be committed, how frauds can be uncovered, and what accountants and business executives can do to prevent frauds from occurring in their organizations. We will use a variety of materials that were provided by the Association of Certified Fraud Examiners. In addition, students will analyze fraud case studies.
Components: Lecture
Attributes: Offered Spring Term

AC 613(3) **Course ID:012544** **2016-07-25**
Advanced Auditing and Research
[Formerly MBA 613] This course is an advanced case and research-oriented study of topics in Auditing. Through a series of cases and related research, students will engage in the practice of auditing using real-world situations as the foundation for technical and theoretical discussions of issues facing the contemporary auditor. Cases will be chosen to reflect current and emerging topics in the practice of public accounting, financial auditing, fraud investigation, and forensic accounting. Auditing communications tools and software-based audit techniques will also be emphasized.
Components: Lecture
Attributes: Offered Fall Term

Business - School of Business - Subject: Accounting

AC 620(3) **Course ID:013020** **2019-11-01**
Accounting Analytics
Understanding how to use data to formulate and solve business problems provides an opportunity for the accounting professional to become a forward-thinking strategic partner in the organization. This course is designed to prepare students with the necessary tools and skills needed to perform data analytics successfully. Based on case studies, students are required to think through the steps needed to provide data-driven insights and recommendations. Labs provide multiple datasets and tutorials. Students will conduct data analysis using Excel and Access (including SQL). The course will develop a student's data analytics mindset (critical thinking skills), that is the development of students' ability to ask questions that can be answered using data.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IA 530 or equivalent.

AC 623(3) **Course ID:007337** **2021-11-18**
Financial Statement Analysis
This course helps students utilize the information contained in financial statements to make decisions. It specifically discusses (1) institutional forces underlying the provision of financial statement data, (2) properties of numbers derived from financial statements, (3) key aspects of decisions using financial statement information and the environment in which they are made, (4) design of information appropriate to these decisions. The objective is to allow the student to employ these factors to exploit fully the richness of the information contained in financial statements, while appreciating its limits.
Components: Lecture
Attributes: Given When Needed

AC 630(2) **Course ID:009698** **2016-08-27**
Cost Management
A graduate level course covering basic concepts and techniques of cost management. Topics include basic cost management concepts, cost-volume-profit analysis, strategy and the master budget, the role of costs in pricing decisions, job and activity based costing (ABC) costing systems, relevant costs for decision making, operational and management control systems, target costing, value engineering, theory of constraints, the Balanced Scorecard, and the management and control of quality. Explores the analysis and presentation of information from a behavioral as well as a quantitative perspective. Introduces basic financial and sustainability concepts and reporting issues.
Components: Lecture

AC 636(3) **Course ID:007339** **2017-03-17**
Auditing
An examination of auditing standards and procedures currently followed by independent public accountants. Ethics, audit evidence and reporting standards are also considered.
Components: Lecture
Same As Offering: AC 636
Attributes: Given When Needed
Requirement Group: Prerequisites: AC 603 and AC 623 or the equivalent of these courses.

Business - CRC Business - Subject: Accounting

AC 636(3) **Course ID:007339** **2017-03-17**
Auditing
An examination of auditing standards and procedures currently followed by independent public accountants. Ethics, audit evidence and reporting standards are also considered.

Components: Lecture
Same As Offering: AC 636
Attributes: Given When Needed

Business - School of Business - Subject: Accounting

AC 648(3) **Course ID:007341** **2015-06-30**
Seminar in Accounting Information Systems & Auditing
A graduate level introduction to accounting information systems. Coverage includes the basic systems methodology and terminology necessary to prepare students for any of the professional accounting examinations. Emphasis is on the design, internal control mechanisms, documentation and audit problems associated with specific accounting subsystems, i.e. payroll, general ledger, inventory-production or procurement-receivables. The course introduces students to three typical aspects of information technology (IT) systems and audits: audits of computerized information systems, the computer facility, and the process of developing and implementing accounting information systems. A major course segment involves a detailed study, including hands-on experience using commercial software of at least one specific subsystem.
Components: Seminar
Attributes: Offered Spring Term

AC 650(3) **Course ID:011322** **2015-07-08**
Accounting Research & Theory
Introduces graduate students to accounting research and theory. Focuses on how research can help address management, uniformity and disclosure issues that regularly arise in business. Investigates ethical perspectives and emerging issues. Evaluates policy formulation of accounting standards and their impact on financial reporting. Students research, analyze, develop and present proposed solutions to accounting and related business cases encountered in practice.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AC404 or equivalent

AC 687(1 - 3) **Course ID:007342** **2021-07-26** **Instructor Consent Required**
Special Projects in Accounting
An investigation of a problem undertaken by the student which is acceptable to and under the guidance of the faculty member and chairperson. The course provides an opportunity for the student to investigate and analyze a problem area of accounting in depth on an independent study basis.
Requirement: Instructor and Program Chair permission
Components: Independent Study
Same As Offering: AC 687
Attributes: Given When Needed

Business - Economics & Financial Studies - Subject: Accounting

AC 687(1 - 3) **Course ID:007342** **2021-07-26** **Instructor Consent Required**
Special Projects in Accounting
An investigation of a problem undertaken by the student which is acceptable to and under the guidance of the faculty member and chairperson. The course provides an opportunity for the student to investigate and analyze a problem area of accounting in depth on an independent study basis.
Requirement: Instructor and Program Chair permission
Components: Independent Study
Same As Offering: AC 687
Attributes: Given When Needed

Engineering - Mechanical & Aerospace Eng - Subject: Aeronautical Engineering

AE 1(2 - 4) **Course ID:007964** **2015-01-13**
Mechanical and Aeronautical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

AE 2(2 - 4) **Course ID:007965** **2015-01-13**
Mechanical and Areonautical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective.
Components: Independent Study
Attributes: Transfer Credit Only

AE 201(1) **Course ID:010193** **2022-03-18**
Measurement & Instrumentation
[Cross-listed with ME 201] This course provides an introduction to measurement and instrumentation in mechanical and aerospace engineering. Fundamental components of mechanical measurement systems are studied through laboratory experiments. Tests include electromechanical instruments, circuits, actuators, controls, and data acquisition systems. First order uncertainty analysis is performed and empirical results are compared with engineering principles from material science, statics, strength of materials, rigid body dynamics and electrical science.
Components: Lecture
Course Equivalents: ME 201
Attributes: Two communication units, Offered Spring Term
Requirement Group: Corequisites: ES220, ES222, ES223

AE 212(3) **Course ID:007347** **2021-11-04**
Introduction to Engineering Design
This course lays the foundation for the design curriculum of the MAE Department. Students are introduced to how to solve complex, open-ended engineering problems. Core topics covered are: the design process; engineering ethics and professional responsibilities; design for safety; mathematical and computer modeling; and written, oral and graphical communication. These topics are presented within the framework of at least two open-ended design projects which students must propose and accomplish through the completion of the preliminary design phase including a design report and presentation slides for each project.
Components: Lecture
Course Equivalents: CE 212, ME 212
Attributes: Offered Fall Term
Requirement Group: Prerequisite: ES100. Co-Requisite: ES220.

AE 301(1) **Course ID:010195** **2022-04-13**
Experimental Methods
This is a hands-on experimental methods course with applications in aerospace engineering. Experiments involve flow visualization, airfoil wing pressure, air duct friction, aircraft structural stress and strain, lift and drag force, air velocity, wing vibration and wind tunnel testing. Course topics include workplace safety, test procedures, calibration, measurement uncertainty, error propagation, design of experiments, data acquisition, sampling, data analysis, and technical report writing.
Components: Lecture
Course Equivalents: ME 301
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisite: AE201 or ME201

AE 342(3) **Course ID:012886** **2021-10-13**
Introduction to Numerical Methods with Application
The goal of this course is to introduce the techniques needed for the numerical solution of ordinary and partial differential equations. These techniques will include the formulation of physical problems for numerical simulations, discretization and solution methods, and use of commercial software for solving engineering problems governed by differential equations. Specific topics covered are numberical differentiation, integration, interpolation, and associated errors, the solution of systems of non-linear algebraic equations, and the solution of initial and boundary value problems using finite difference and finite element methods.
Components: Laboratory, Lecture
Course Equivalents: ME 342
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: ES 100, or HP102 and HP103, or EM120 and EM121, or CS141, and MA 232 Corequisites: ES 2

Engineering - Mechanical & Aerospace Eng - Subject: Aeronautical Engineering

AE 350(3) **Course ID:007348** **2017-07-06**
Aircraft Structural Analysis
[Cross-listed with ME 350] Properties of wing sections. Beam-column moments; torsion of thin-walled and skin-stringer multiple-cell sections; non-symmetrical bending of skin-stringer wing sections; flexural shear in open and closed thin-walled and skin-stringer sections; loads and stresses in rib system; cut-outs and shear lag; modified beam theory for wing design; deflection by energy method; fundamentals of static aeroelasticity.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES 222 and ES223

AE 365(3) **Course ID:007349** **2017-02-24** **Instructor Consent Required**
Independent Projects I
[Cross-listed with ME 365] An opportunity for the student to become involved singly, or with a group, working on a special project under the guidance of a faculty member. Topics are often suggested by the faculty but suggestions from the students are encouraged. By permission of adviser only.
Components: Independent Study
Course Equivalents: ME 365
Attributes: Offered Each Term

AE 366(3) **Course ID:007350** **2017-02-24** **Instructor Consent Required**
Independent Projects II
[Cross-listed with ME 366] Continuation of AE 365.
Components: Independent Study
Course Equivalents: ME 366
Attributes: Offered Each Term

AE 401(1) **Course ID:010197** **2014-11-20**
Advanced Experimental Methods in Mechanical and Aeronautical Engineering
[Cross-listed with ME 401] This course covers advanced experimental methods including Fourier analysis filtering, computer data acquisition. Experiments demonstrate principles of heat transfer, fluid mechanics, gas dynamics and aerodynamics. Experiments are documented using written memoranda and worksheets.
Components: Lecture
Course Equivalents: ME 401
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AE/ME201 or AE/ME301 Corequisites: AE425 or AE455

AE 425(3) **Course ID:007353** **2022-03-18**
Aerodynamics
Topics covered include: Wing aerodynamics, thin airfoil theory, source panel methods, and supersonic and subsonic finite wing theories. Boundary layer theory and flow separation will also be discussed.
Components: Lecture
Course Equivalents: ME 326
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES330, ES340 and MA231

AE 427(3) **Course ID:007354** **2016-09-13**
Design of Propulsion Systems
[Cross-listed with ME 427] The course covers the preliminary design of various propulsion devices of historical and modern significance including propellers, ramjets, turbojets and its variations and rockets and its variations and supersonic nozzles. These systems will be designed in the context of aircraft, watercraft and land vehicle applications. Detailed design on components such as turbine blades, diffusers, compresser stages, combustors, fans and two-dimensional supersonic nozzle shapes will be addressed. Many lessons will include examination of actual component hardware. Instruction on design methodology is combined with fluid and thermodynamic analysis techniques to form computational schemes for testing design variations. Design decisions will be based on matching application performances, optimizing, meeting application constraints and iterative selection. A series of engineering homework assignments and design projects will be used to learn about each system. Most work will be individual with one or two projects requiring teamwork.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: ME326 or ME431 or AE431, and ES340.

Engineering - Mechanical & Aerospace Eng - Subject: Aeronautical Engineering

AE 429(3) **Course ID:007356** **2015-01-20**
Aircraft Performance and Flight Mechanics
Fundamentals of propeller and jet aircraft performance. Steady and accelerated flight. Equations of motion. Level flight. Gliding, climbing, driftdown. Takeoff and landing. FAR requirements. Range and endurance. Payload-range diagrams. Maneuvering. V-n diagram. Turning and pull-ups. Stall and spin behavior. Energy methods.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Corequisites: AE425.

AE 430(3) **Course ID:007357** **2017-02-24**
Stability and Control of Aerospace Vehicles
[Cross-listed with ME 430] An introduction to atmosphere flight vehicle dynamics. Static stability and control. Equations of motion. Dynamic stability and control. Classical control theory. Transfer functions and block diagrams. Routh's criterion, Root locus techniques, Bode plots. Modern control theory. State space techniques. Observability, and controllability. Flying qualities, ratings and regulations. Application to aircraft autopilot design.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AE455/ME455 or AE324/ME324, MA231, and MA232.

AE 431(3) **Course ID:007358** **2019-06-07**
Gas Dynamics
The fundamental theories of modern compressible flow and their applications to aerodynamics are introduced. Topics include steady and unsteady supersonic flows, transonic flows, high-temperature gas dynamics, numerical methods and nozzle design.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES330, ES340 and MA 232 or equivalent.

AE 443(3) **Course ID:007359** **2017-02-24**
Optimal Engineering
[Cross-listed with ME 443] An introduction to the optimal design of mechanical systems. This course involves the application of mathematical optimization techniques, including linear and nonlinear methods, to the design of devices and systems of interest to mechanical engineers. Emphasis is placed on the formulation of problems which can be solved by these techniques. Use is made of currently available optimal design computer programs.
Components: Lecture
Course Equivalents: ME 443
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AE/ME350 or ME341.

AE 450(3) **Course ID:007360** **2017-01-13**
Aircraft Design I
An introduction to basic methodology and decisions surrounding aircraft design leading to the conceptual and preliminary design of an aircraft. Topics include preliminary sizing, requirements and constraints, mission definition, layout, stability and performance estimation, structural issues, economics, trade studies, and ethical implications of the design and decision process.
Components: Research
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: AE212, AE425, AE429, AE458 Corequisites: AE430, AE431
Req. Designation: Technology

AE 451(3) **Course ID:007361** **2020-01-01**
Aircraft Design II
Continuation of concepts introduced in Aircraft Design I on the basic methodology and decisions surrounding aircraft design with a focus on the specific design of an aircraft in the context of a company type of environment. The course is supplemented by lectures on various topics including conceptual design issues, detailed system considerations, trade studies, propulsion integration, structural issues, CFD methods, testing considerations, cost, and manufacturing.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AE450 Corequisites: AE427
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Aeronautical Engineering

AE 455(3) **Course ID:007363** **2017-02-24**
Mechanical Vibrations and Control
[Cross-listed with ME 455] Fundamentals, free vibration, harmonically excited vibration, transient vibration, multi-degree freedom systems, vibration measurements, introduction to control theory, linear feedback control, vibration control, adaptive and optimal control, numerical methods.
Components: Lecture
Course Equivalents: ME 455
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES223
Req. Designation: Technology

AE 457(3) **Course ID:007364** **2017-02-24**
Composite Mechanics and Design
[Cross-listed with ME 457, CE 421] Nature of composite materials. Classification and characteristics of composite materials, mechanical behavior of composite materials. Macromechanical and micromechanical elastic behavior of unidirectional lamina. Constitutive and transformation relations. Strength of unidirectional lamina. Composite failure theory. Mechanics of multidirectional structural laminates. Lamination theory. Strength and failure analysis of multidirectional laminates. Effect of temperature and moisture.
Components: Lecture
Course Equivalents: ME 457
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES222 and ES260
Req. Designation: Technology

AE 458(3) **Course ID:007365** **2017-07-06**
Design of Aircraft Structures
Properties of fuselage sections; modified beam theory for fuselage design; linear elastic plate theory and analyses; linear elastic shell theory and analyses; numerical techniques for complex structures; failure modes of plates and shells; introduction to composite materials; design techniques for plates and shells
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AE350.
Req. Designation: Technology

AE 459(3) **Course ID:013129** **2021-10-11**
Space Robotics
This course establishes principles underpinning space robotics with a thorough and modern approach; chapters build from general physical foundations through an extensive treatment of control systems, perception challenges, and conservation principles in dynamics. After introducing the principles and governing dynamic equations of space robotic systems, the latter part of the course focuses on real-life applications related to space systems including space mechanics and the dynamics of space vehicles. It introduces supervised and unsupervised machine learning (ML) algorithms including implementations of ML techniques for perception challenges that can be applied to a wide range of space vehicles and robotic systems. Applications of dynamics and control theory to real spacecraft systems are also covered. After completing this course, the students will be able to apply basic robotic and machine learning techniques in space robotic systems.
Components: Lecture
Course Equivalents: ME 559
Attributes: Offered Spring Term
Req. Designation: Technology

AE 460(3) **Course ID:012922** **2019-01-14**
Introduction to Spacecraft Engineering
One-semester elective course offered to Juniors and Seniors in the ME or AE programs. Introduces the major engineering subsystems and disciplines required to design and operate a space satellite e.g. configuration and structure, electrical power subsystem, attitude control subsystem etc. Also basic orbital mechanics, launch vehicles, space environment including ionizing radiation and Sun-Earth-spacecraft geometries, ground operations; overall mission and spacecraft system engineering.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ME212 or AE212
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Aeronautical Engineering

AE 465(3) **Course ID:007366** **2017-02-24** **Instructor Consent Required**
Advanced Independent Projects I
[Cross-listed with ME 465] An opportunity for the advanced student to undertake an independent investigation in a mechanical engineering field of his or her own choice. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, involve laboratory experiments, or involve analytical work by permission of adviser only.
Components: Independent Study
Course Equivalents: ME 465
Attributes: Offered Spring Term
Req. Designation: Technology

AE 466(3) **Course ID:007367** **2020-09-04**
Aircraft Accidents: Causes and Consequences
This course explores key accidents in aerospace history from technical, professional, and organizational perspectives. Students will complete hands-on analyses that apply content from the aeronautical engineering program. Topics include aviation regulations, professional ethics, human factors, and systems considerations.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AE 458, AE 425, AE 429, AE 430, AE 450, AE 427
Req. Designation: Technology

AE 470(3) **Course ID:007869** **2022-01-12**
Orbital Mechanics
[Cross-Listed ME570] This course provides an overview of the fundamentals of orbital mechanics. Beginning from kinematics and rigid body dynamics, students are introduced to topics in orbital and attitude dynamics and control. In orbital dynamics and control, core topics covered include: the two-body problem, orbital motion, Kepler’s Laws, orbital elements, orbital perturbations, orbital maneuvers, interplanetary trajectories, and the restricted three-body problem. In attitude dynamics and control, core topics covered include: attitude stabilization, torques on a spacecraft, torque-free motion, spin and dual-spin stabilization, gravity-gradient stabilization, and active attitude control.
Components: Lecture
Course Equivalents: ME 570
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES223, AE/ME324, and MA330 or equivalents
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: American Studies

AMST 1(2 - 4) **Course ID:011750** **2015-01-13**
American Studies Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Anthropology

ANTH 1(2 - 4) **Course ID:010821** **2015-01-13**
Anthropology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

ANTH 2(2 - 4) **Course ID:010817** **2015-01-13**
Anthropology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

ANTH 201(3) **Course ID:011800** **2015-03-05**
Introduction to Cultural Anthropology
Using case studies examining a number of different cultures, the course gives students the opportunity to explore the similarities and differences of cultures around the world by showing them the varieties of ways in which humans organize their lives and understand their worlds. The course also introduces students to the concepts and methods that anthropologists use to describe and understand those similarities and differences, providing them with the tools to better understand the complexity and the diversity of the human condition. The course gives students an introduction to the basic theoretical concepts and methods used in social analysis and it provides them the opportunity to see the use of those tools in a variety of specific, ethnographic cases drawn from a range of societies and cultures.
Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Anthropology

ANTH 220(3) **Course ID:011410** **2019-09-11**
Understanding the Americas
When does America begin? With Columbus, with the arrival of the Mayflower, or with the arrival of hunters coming from Asia through the Bering Strait? The Americas are continents with a complex history before European arrival, and a complex history since then, in which commonalities and experiences between the peoples of the Americas are often overlooked. In contrast to the European Union, countries in the Americas are enforcing their borders to stem the huge population flows from desperate regions into more prosperous regions. In this course, we will be looking at the origins and experiences that tie the peoples of the Americas together as well as tear them apart. We will be reading an eclectic mix of fiction and nonfiction.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Science, Technology and Society, University Course
Req. Designation: Technology

ANTH 225(3) **Course ID:011411** **2015-03-03**
Global Perspectives on Sexuality
Sexuality if often thought of a one of the most private aspects of life. Yet, it is also the subject of politics, commerce and public imagination at the state and global level. Exploring such topics as Human Trafficking, HIV/AIDS, Cybersex, and the emergence of new sexual identifies, this course examines sexuality in a global context.
Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Anthropology

ANTH 230(3) **Course ID:008523** **2017-10-23**
Introduction to Race and Ethnicity
[Formerly LC315/Cross-Listed with SOC230] Variations in phenotype--skin color--have always existed, but has 'race'? What are the bases of racial identity in the contemporary United States? How have they changed? How are 'race' and 'ethnicity' related? In this course we will address broader questions about race by focusing on contemporary racial and ethnic divisions and by examining the history of these concepts in the Western Hemisphere.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Anthropology

ANTH 235(3) **Course ID:011261** **2022-02-11**
Europe Through Film and Fiction
This introductory Anthropology course introduces students to the diversity of European cultures through film and fiction, and through various themes, including love across cultures, post Cold War transitions, the expansion of the European Union, the growing integration between European states, cultural conflicts, and the rise of anti-immigrant movements and politics in wide swaths of Europe.

Components: Lecture
Attributes: One communication unit, Cultures and Societies, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Anthropology

ANTH 238(3) **Course ID:010807** **2018-09-17**
Men and Masculinities
[Formerly LC393] Over the last few decades, manhood has come under attack. Instead of warrior heroes like John Wayne and James Bond, TV shows today feature a good number of losers like Homer Simpson and Frazier and numerous men's movements have emerged centered on such issues as 'male bonding' and atonement. At the same time, other aspects of popular culture bombard us with an image of men as muscle-packed, mean, lean fighting machines or as exploitative pimps. While the average size of men's muscles seemed to have increased dramatically, what has happened to men's sense of self, how they see each other, and how they see women? Is this all the result of feminists attacking men as being domineering, oppressive chauvinists? Or is this a period of sorely needed male self-reflection? In this discussion-based course we take a critical look at the role of manhood in our society and elsewhere, by looking at how it is represented in popular culture, and lived in such institutions as sports, schools and college, military, prisons, marriage, politics or work, and
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

ANTH 240(3) **Course ID:012844** **2017-10-11**
The Diversity of the U.S. in Ethnographic Perspective
The United States is often referred to as a ‘melting pot’ of cultures. This metaphor is said to represent the ways in which people of diverse racial and ethnic backgrounds make up the American nation. As components of diversity in the U.S., race and ethnicity are understood in varied ways. Racial and ethnic conflict, clashes, disparities, and inequalities sometimes manifest themselves across professions, housing, access to opportunities, and livelihoods in general. But a closer look can unveil the remarkably creative ways in which different groups of people establish meaningful connections to bridge differences, allowing productive syntheses to emerge in social, cultural, political, religious, and economic realms. This course offers a window into some of these clashes and collaborations through engaging readings and audiovisual materials putting U.S. diversity into context. Anthropologists and other social scientists usually call such a window an ethnographic one. In other words, the course will help you put diversity into perspective by bringing you
Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Given When Needed
Req. Designation: Technology

ANTH 255(3) **Course ID:012887** **2019-09-30**
Culture and the Environment
[Cross-listed with ANTH555] As our world faces ever-more urgent challenges related to climate change and environmental instability, the very categories of “nature,” “environment,” and “climate” deserve critical and innovative thought. Central to this rethinking is a consideration of the cultural, political, and economic aspects of these terms, thereby creating space for careful critiques and alternative engagements. Anthropologists have long been active in examining cultural beliefs and practices related to environments. Today, these perspectives are changing to reflect a better understanding of human relationships with non-human actors and processes. This class provides an introduction to Environmental Anthropology, with particular attention to the power and politics of knowledge production about environments and climates. It begins with a historical look at the sub-discipline, followed by a discussion of more recent theoretical and methodological approaches to rethinking how we study and engage with the environment.
Components: Lecture
Course Equivalents: ANTH 555
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Offered Fall and Spring
Req. Designation: Technology

ANTH 285(3) **Course ID:010809** **2019-09-11**
Food and Society or What to Think About What You Eat
[Cross-listed with SOC 285] [Formerly LC 397, ANTH 385] Food is central to how we understand ourselves and our world. This class examines the cultural politics of food, exploring the social, political, and economic implications of global food production and consumption. We will examine the nature and history of contemporary food networks and the impacts of these patterns on our society, economy, health, and environment. In so doing, we will use food as a lens through which to understand larger relationships and processes, from social inequality to climate change.
Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Anthropology

ANTH 311(3) **Course ID:012843** **2020-01-15**
Ethnography
[Cross-listed with ANTH511] Ethnographic methods, the key research methodology of cultural anthropologists, are now used in a wide variety of disciplines, such as education, to health, environment, business, to name just a few. An exploration of anthropological research and writing through the analytical and practical study of “fieldwork” and “ethnography”, this course examines a variety of anthropological research methods and genres of representation, and teaches students how to conduct an ethnographic fieldwork project of their own. This course is in large part a workshop in which students will learn and mobilize various ethnographic methods and techniques, identify a research project and conduct ethnographic fieldwork. The culminating experience of the course is the writing of a 10-15 pages mini ethnography, based on the fieldnotes that students are writing.
Components: Lecture
Course Equivalents: ANTH 511
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

ANTH 320(3) **Course ID:010455** **2020-09-22**
Racial Inequality in the United States
[Formerly LC356] What is the status of racial equality today, four decades after the civil rights struggle? Have we ceased to judge people 'by the color of their skin,' have we achieved a society where all members share 'equal opportunities' to succeed? Has the 'appreciation of cultural diversity' in America abolished notions of white superiority and practices of white privilege? Or have we returned, albeit in a more invisible form, to the hypocrisy of the 1896 Apartheid doctrine of 'separate but equal'? Or, is racism permanent and racial inequality a critical element in the fabric of American society? This course attempts to arrive at an understanding of how systems of racial inequality are maintained in a seemingly democratic system that allegedly upholds the civil rights of all its citizens. We will first assess the extent of racial inequality in the contemporary US and then review current theories that explain the persistence of inequality. Facing the paradox of explaining the social reality of race while asserting its biological
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Offered Spring Term
Req. Designation: Technology

ANTH 325(3) **Course ID:011484** **2022-02-11**
Sex and Commerce
This course, designed for upper division students who have been taking courses on sexuality and/or gender, examines in depth the commercial aspects of sex. From looking at the concept of marriage as an economic transaction, to the ways in which sex is sold or is used as a vehicle to sell, this course provides an in depth discussion of the question of pornography, sex-trafficking, and prostitution. It raises fundamental questions about sexuality, love, and gender.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

ANTH 332(3) **Course ID:010202** **2020-09-22**
Cities and Social Justice
[Formerly LP310] Understanding Cities: New York, Los Angeles, Berlin. For many Americans, cities have become synonymous with violence, poverty and decay, homelessness and racial tension, as well as excessive consumerism. But they are also places of intense cultural activities. In any case, cities are where most jobs are concentrated and where most of us will eventually live. Understanding how cities work and the problems they face is therefore critical for all of us. Using a comparative and international perspective, this course explores such issues as cities' management of natural and vital resources (f.ex. water or electricity), the built environment and its relationship to social identities and social engineering, global networks of cities in terms of labor markets, capital, and commodities, and their effects on urban lives, cities as sustainable environments, and last but not least, the cities as sites of social and racial in/justice. Students are to conduct team-based research projects that tackle real-life problems in one of the three cities or Potsdam
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Anthropology

ANTH 360(3) **Course ID:013123** **2021-09-14**
The Ethics of Eating
Walking through the grocery store, we're confronted by a range of ethical claims--from Fair Trade to Cage-Free, food companies ask us to demonstrate who we are and what we value. In this class, students learn about how eating is positioned as an (un)ethical act. Focusing on the methods and approaches of cultural anthropology, students explore food and eating in a variety of cultural contexts, with particular attention to the inequalities embedded in food systems. The course culminates with a research paper in which students themselves detail their own understanding of what it means to eat ethically.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Cultures and Societies, Offered Even Springs
Req. Designation: Technology

ANTH 499(0) **Course ID:010900** **2010-06-03**
Minor Portfolio
In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Credit Basis.
Components: Independent Study
Req. Designation: Technology

ANTH 511(3) **Course ID:013025** **2020-01-15**
Ethnography
[Cross-listed with ANTH311] This course will cover the same subject area and topics as ANTH311. Additional materials at the graduate level will be expected of those who register under this catalog number. (The attached syllabus includes the additional requirements for graduate students.)
Components: Lecture
Course Equivalents: ANTH 311
Attributes: Given When Needed
Req. Designation: Technology

ANTH 555(3) **Course ID:012969** **2019-09-30**
Culture and the Environment
[Cross-listed with ANTH255] This course will cover the same subject area and topics as ANTH 255. Additional materials at the graduate level will be expected of those who register under this catalog number. (The attached syllabus includes the additional requirements for graduate students.)
Components: Lecture
Course Equivalents: ANTH 255
Attributes: Given When Needed
Req. Designation: Technology

ANTH 585(3) **Course ID:011824** **2019-11-06** **Instructor Consent Required**
Food and Society or What to Think About What You Eat
This course will cover the same subject area and topics as ANTH 285. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ANTH 586(3) **Course ID:011859** **2015-03-05**
Food and Society or What to Think About What You Eat
[Cross-listed with EV 586, SOC 586] Patterns of food production and consumption have dramatic impact on individuals, societies, and the environment. In this class we will examine aspects of food consumption and production in the United States. We will examine the nature and history of contemporary patterns of consumption and production and the impacts of these patterns and changes on our health and our environment. Topics to be discussed include the role of food in American society, the transformation of eating habits over the 20th century--including the rise of processed and fast food and also ethnic and organic food and vegetarian alternatives--the nature and impact of industrial agriculture and of genetically modified organisms, and the political economy of food. Graduate students will have additional course work.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Visual and Performing Arts

ARTS 1(2 - 4) **Course ID:011787** **2015-01-13**
Art Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

ARTS 2(2 - 4) **Course ID:011565** **2015-01-13**
Art Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Knowledge Area requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

ARTS 100(3) **Course ID:011436** **2015-01-13**
Introduction to Art
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP Art History Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate Visual Arts Higher-Level Examination, or 3) satisfactory completion of a college-level introductory art appreciation or art history course.
Components: Independent Study
Attributes: Imaginative Arts, Transfer Credit Only
Req. Designation: Technology

ARTS 101(3) **Course ID:011437** **2015-01-13**
Introduction to Music Theory
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP Music Theory Exam or 2) satisfactory completion of a college-level introductory music theory course.
Components: Independent Study
Attributes: Imaginative Arts, Transfer Credit Only
Req. Designation: Technology

Other - Air, Space, and Cyberspace - Subject: Air, Space, & Cyberspace Studi

AS 101(1) **Course ID:008038** **2019-06-13**
Air Force Heritage and Values I
This is a survey course focusing on the organizational structure and missions of Air Force organizations, military customs and courtesies, officership and core values, and an introduction to written and oral communication skills. AFROTC cadets must take AS 103 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

AS 102(1) **Course ID:008039** **2019-06-13**
Air Force Heritage and Values II
This is a continuation of the overview of the organizational structure and missions of Air Force organizations, military customs and courtesies, officership, and core values to include further emphasis on basic communications principles. AFROTC cadets must take AS 104 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

AS 103(0) **Course ID:008040** **2015-02-12**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisites: AS101.
Req. Designation: Technology

AS 104(0) **Course ID:008041** **2015-01-20**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Corequisites: AS102.
Req. Designation: Technology

AS 201(1) **Course ID:008042** **2021-06-01**
Team and Leadership Fundamentals I
Team and Leadership Fundamentals is a survey course designed to provide a fundamental understanding of both leadership and team building. Communication skills are emphasized throughout the course. AFROTC cadets must take AS 203 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

AS 202(1) **Course ID:008043** **2021-06-01**
Team and Leadership Fundamentals II
This is a continuation of the AS 201 survey course designed to provide a fundamental understanding of both leadership and team building. Communication skills are emphasized throughout the course. AFROTC cadets must take AS 204 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AS201 or consent of the instructor.
Req. Designation: Technology

AS 203(0) **Course ID:008044** **2015-02-12**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisites: AS201.
Req. Designation: Technology

Other - Air, Space, and Cyberspace - Subject: Air, Space, & Cyberspace Studi

AS 204(0) **Course ID:008045** **2015-01-20**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Corequisites: AS202.
Req. Designation: Technology

AS 301(3) **Course ID:008046** **2019-06-13**
Leading People and Effective Communication I
This course is a study of leadership and quality management fundamentals, professional knowledge, leadership ethics, and communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts. AFROTC cadets must take AS 301 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AS202 or consent of the instructor.
Req. Designation: Technology

AS 302(3) **Course ID:008047** **2019-06-13**
Leading People and Effective Communication II
This is a continuation of the study of leadership and quality management fundamentals, professional knowledge, leadership ethics, and communication skills. AFROTC cadets must take AS 304 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AS301 or consent of the instructor.
Req. Designation: Technology

AS 303(0) **Course ID:008048** **2015-02-12**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies. This course provides advanced leadership experiences in officership activities, giving students the opportunity to apply leadership and management principles learned in AS 301.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisites: AS301.
Req. Designation: Technology

AS 304(0) **Course ID:008049** **2015-01-20**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies. This course provides advanced leadership experiences in officership activities, giving students the opportunity to apply leadership and management principles learned in AS 301 and AS 302.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Corequisites: AS302.
Req. Designation: Technology

AS 401(3) **Course ID:008050** **2019-06-13**
National Security, Leadership Responsibilities, and Commissioning Preparation I
This course covers the Armed Forces as an integral element of contemporary society with specific emphasis on the military profession, civil-military interaction, and the formulation, organization, and implementation of US national security policy. In addition, students study leadership and management, ethical decision making, and communication skills. AFROTC cadets must take AS 403 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AS302 or consent of the instructor.
Req. Designation: Technology

Other - Air, Space, and Cyberspace - Subject: Air, Space, & Cyberspace Studi

AS 402(3) **Course ID:008051** **2019-06-13**
National Security, Leadership Responsibilities, and Commissioning Preparation II
This is a continuation of the study of the military profession, civil-military interaction, and US national security policy. Midway through the course, the focus shifts to orient junior officers toward their first duty assignment in the Air Force. AFROTC cadets must take AS 404 Leadership Laboratory in conjunction with this course.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: AS401 or consent of the instructor.
Req. Designation: Technology

AS 403(0) **Course ID:008052** **2015-02-12**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies. This course provides advanced leadership experiences in officership activities, giving students the opportunity to apply leadership and management principles learned throughout their AFROTC experience.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisites: AS401.
Req. Designation: Technology

AS 404(0) **Course ID:008053** **2015-01-20**
Leadership Laboratory
Leadership Laboratory is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of US Air Force customs and courtesies. This course provides advanced leadership experiences in officership activities, giving students the opportunity to apply leadership and management principles learned throughout their AFROTC experience.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Corequisites: AS402.
Req. Designation: Technology

Business - School of Business - Subject: KEDGE Business School

BEM 1OPS(2.5) Course ID:012728 2016-01-02
Inventory Management
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 1OTH(2.5) Course ID:012724 2016-01-02
Contemporary International Politics
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 3OPS(2.5) Course ID:012733 2016-01-02
Operational Logistics Management
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 4ECO(2.5) Course ID:012726 2016-01-02
Derivatives
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 5MGT(2.5) Course ID:012729 2016-01-02
Management and Language
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 9FIN(2.5) Course ID:012727 2016-01-02
Equity Investments
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 10MGT(2.5) Course ID:012735 2016-01-02
Strategic Design Management
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 14STR(2.5) Course ID:012723 2016-01-02
Applied Sustainable Value Analysis in the Automobile Industry
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 18MGT(2.5) Course ID:012725 2016-01-02
Creating and Sustaining a Successful Enterprise
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

Business - School of Business - Subject: KEDGE Business School

BEM 26MKT(2.5) Course ID:012734 2016-01-02
Customer Relationship Management, Implementation and Application
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 28FIN(2.5) Course ID:012732 2016-01-02
World Financial Markets and Institutions
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

BEM 32MKT(2.5) Course ID:012730 2016-01-02
Marketing Strategy and Planning
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Laboratory
Req. Designation: Technology

BEM 49MGT(2.5) Course ID:012731 2016-01-02
Strategic Business Relationships
Course offered through Clarkson's MBA Exchange Program at Kedge Business School. Please contact Kedge Business School for a course description. http://www.kedgebs.com/en.
Components: Lecture
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 400(3) **Course ID:012903** **2018-10-23**
Responsible Conduct of Research
This course is designed to provide students with an introduction to the ethics of scientific research, including research involving human participants and animal subjects. The course will start with a discussion of responsible conduct of research (also known as research integrity and commonly referred to by the acronym RCR). As close to ninety percent of the work that research ethicists do focuses on the education, promotion and adjudication of RCR issues, these issues are applicable to all aspects of the research endeavor and all fields of scientific study. Understanding these issues and being able to apply the basic principles to critically analyze cases is thus an essential starting point for anyone interested in research and research ethics. The course will also delve briefly into some of the basic ethical, legal, and social issues surrounding research using animal subjects or human volunteers.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 410(3) **Course ID:012949** **2019-07-31** **Instructor Consent Required**
Biomedical Ethics
This online course covers seminal developments and areas of inquiry within biomedical ethics, starting with a look at the
history of medicine and ethics followed by a tracing of the foundational arguments related to areas of inquiry central to
biomedical ethics. This course will be taught simultaneously with the Master's level course of the same name (BIE 510:
Biomedical Ethics), with undergraduate students receiving additional training in critical thinking and moral reasoning.
Requirement: Approval of Bioethics Department Chair or Instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 500(3) **Course ID:012162** **2022-06-07**
Proseminar in Health and Human Values
An intensive week long introduction to historical and current topics in bioethics, taught seminar style with a clinical visit to Icahn School of Medicine at Mount Sinai in New York City. This overview of bioethics involves special seminars, case discussions and ethics rounds. There will also be training in the computer skills (demonstrations, workshops) essential to mastering distance learning.
Components: Seminar
Attributes: Offered Summer Term
Req. Designation: Technology

BIE 510(3) **Course ID:012163** **2020-08-18**
Biomedical Ethics
An advanced introduction to bioethics and clinical ethics focusing on such formalizations of medical morality as the Hippocratic Oath, the AMA codes, the Belmont Report and Beauchamp and Childress Principles, and the idea of casuistry. Major cases in bioethics will also be reviewed and the evolution of the core concepts and infrastructure of medical ethics and bioethics will be examined.
Components: Lecture
Same As Offering: BIE 510
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 510(3) **Course ID:012163** **2020-08-18**
Biomedical Ethics
An advanced introduction to bioethics and clinical ethics focusing on such formalizations of medical morality as the Hippocratic Oath, the AMA codes, the Belmont Report and Beauchamp and Childress Principles, and the idea of casuistry. Major cases in bioethics will also be reviewed and the evolution of the core concepts and infrastructure of medical ethics and bioethics will be examined.
Components: Lecture
Same As Offering: BIE 510
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 520(3) **Course ID:012164** **2016-07-01**
Healthcare Policy
This course provides an understanding of the public policy-making process and the political and regulatory environment in which healthcare organizations function. It also provides an understanding of managerial processes, politics, and structure of the healthcare organizations where ethical policies and practices are implemented and carried out on an ongoing basis. Policies for consideration include resource allocation, end-of life decision-making, accountability and performance measurement, and conflict of interest.
Components: Lecture
Attributes: Offered Winter Term
Req. Designation: Technology

BIE 525(3) **Course ID:012166** **2016-07-01**
Public Health Ethics
In this course, students learn about ethics and public health and the ways in which these two fields interconnect. The course focuses on ethical theory and the discipline and history of public health, using case studies to illustrate the application of ethical theory to public health practice.
Components: Lecture
Attributes: Offered Winter Term
Req. Designation: Technology

BIE 530(3) **Course ID:012167** **2016-07-25**
Bioethics and the Law
This course provides an introduction to the major legal issues and concepts arising in the field of bioethics. Emphasis will be placed on (1) mastery of key legal concepts and rules that pertain to bioethics (i.e., what the law is) and (2) demonstration of ability to critically analyze the law from a normative bioethical perspective (i.e., argue for what the law ought to be).
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 533(1.5) **Course ID:012168** **2016-07-01**
Neuroethics
The course will familiarize students with the most pertinent issues in Neuroethics, but will emphasize those issues which have some immediate application in clinical settings, such as criteria for brain death, the ethics of enhancement and justification of memory manipulation. The overall objective of the course is to demonstrate continuity between neuroethics and other areas of bioethics, and to identify the application of major ethical principles to this new branch of ethics.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

BIE 535(3) **Course ID:012169** **2022-06-07**
Medicine and Social Justice
This course examines issues of social justice in medicine, beginning with a review of classical (Aristotle) and contemporary (Rawls) works on political philosophy, ethics and justice. Students will also read some of the theoretical work of authors who focus their attention on justice in medicine (including Daniels and Menzel). Building on these philosophic underpinnings, students will then explore the issues that lie at the heart of justice in medicine: the right to health and healthcare, aggregation and utility, personal responsibility, prioritarianism, and the allocation of medical resources.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 545(3) **Course ID:012171** **2016-07-01**
Reproductive Ethics
The course examines the philosophical, ethical, and legal problems arising from assisted reproductive technologies. We begin with the notion of procreative liberty. Procreative liberty is conceived as the right to make one’s own reproductive decisions, whether to have or to avoid having offspring. We will not be discussing the right to avoid reproduction by contraception or abortion, as these topics would require a longer course, or even a course of its own. Instead, this course focuses on the right to reproduce: its nature, scope, and limits.
Components: Lecture
Attributes: Offered Even Summers
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 555(3) **Course ID:012174** **2019-07-22**
Research Ethics
This course is designed to teach students about the ethics of scientific research, particularly research involving human participants. Upon completion of the course, students should be able to: (a) discuss in depth the principles of bioethics and how these principles should be applied to the ethical design and conduct of research involving human participants or animal subjects; (b) identify, define, and analyze ethical issues in the context of novel and potentially problematic areas of scientific research; (c) identify, through case studies, ethical issues that arise in different contexts and begin to reason through an appropriate course of action. In addition, students will be taught basic practical skills in research, writing and reviewing articles, and providing training and education in bioethics.
Components: Lecture
Same As Offering: BIE 555
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 555(3) **Course ID:012174** **2019-07-22**
Research Ethics
This course is designed to teach students about the ethics of scientific research, particularly research involving human participants. Upon completion of the course, students should be able to: (a) discuss in depth the principles of bioethics and how these principles should be applied to the ethical design and conduct of research involving human participants or animal subjects; (b) identify, define, and analyze ethical issues in the context of novel and potentially problematic areas of scientific research; (c) identify, through case studies, ethical issues that arise in different contexts and begin to reason through an appropriate course of action. In addition, students will be taught basic practical skills in research, writing and reviewing articles, and providing training and education in bioethics.
Components: Lecture
Same As Offering: BIE 555
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 563(1.5) **Course ID:012175** **2016-07-01**
Pediatric Ethics
This course cover standards for surrogate decision making for children; ethical issues with respect to very premature neonates; withholding and withdrawing life sustaining care; genetic testing and screening; and adolescent confidentiality, truth-telling, and decision making. This course will include guest participation by members of the Icahn School of Medicine faculty, including experts in neonatology, adolescent health, genetics, and pediatric oncology.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

BIE 569(1.5) **Course ID:012180** **2022-06-07**
Statistical Methods in Healthcare
The purpose of this course is to cover statistical topics applicable to healthcare settings, not typically covered in an introductory statistics course. These topics include a review of descriptive and inferential statistics, study designs commonly applied in healthcare, measures of disease frequency and health risk, and power analysis.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 570(3) **Course ID:012181** **2022-06-07**
Bioethics Policy: Foundations
This course will address prospective rules designed to govern populations, as opposed to the individual patient-provider encounter or ethics review of scientific research protocols. Often, bioethics policies have the force of law (e.g., statute, agency regulation, court precedent); at other times, they are voluntarily adopted by institutions or groups (e.g., hospitals, insurers, IRBs, research funders, the AMA). In this course, we will focus on the moral philosophical and behavioral foundations of contemporary bioethics policy, drawing on concepts from philosophy, economics, and psychology that are increasingly used in domestic and international policymaking.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 573(1.5) **Course ID:012182** **2022-06-07**
Interpersonal Skills and Communication
This course will provide students with the opportunity to learn the basic components of communication, including active listening, effective vocal style, optimal elicitation of information and the ability to create partnerships with patients, research subjects, families, clinicians and researchers. Using a variety of formats and media, students will develop and practice the interpersonal skills necessary to communicate with clinical ethicists, research ethicists, policymakers and in our daily human interactions.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 574(1.5) **Course ID:012772** **2022-06-07**
Contemporary Issues in Bioethics
This course is designed to expose students to contemporary and breaking issues in bioethics. Topics covered will vary from year to year, as they will be drawn from acute issues spurring widespread discussion and assessment by the bioethics community.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 575(3) **Course ID:012183** **2016-07-01**
Bioethical Issues at the End of Life
This course examines some of the philosophical, ethical and policy programs arising at the end of life. It begins with a discussion of death itself, including what it means to say that someone is dead and the criteria for determining that death has occurred. Additional topics covered include advance directives, assisted death and whether or not people have a 'right to die.'
Components: Lecture
Attributes: Offered Even Summers
Req. Designation: Technology

BIE 576(1 - 3) **Course ID:012774** **2022-06-07**
Independent Study in Bioethics
This course will be used for one to three credits of independent study when needed.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

BIE 577(1.5) **Course ID:012997** **2022-06-07**
Managerial Epidemiology
[Cross listed with HC680] This course focuses on applying epidemiological concepts and methods in healthcare management. Epidemiology focuses on the distribution and determinants of health outcomes in populations. Topics covered include: formulating an epidemiological problem, measures of disease frequency and health risk, study designs, data sources, public health history and ethics, population health, and social determinants of health.
Components: Lecture
Course Equivalents: HC 680
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 578(1.5) **Course ID:013035** **2020-03-20**
Special Topics in Bioethics
Advanced topics in specialized aspects of bioethics.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 580(3) **Course ID:012184** **2022-06-07**
Research Ethics II
This course teaches students about the ethics and policies governing scientific research, particularly research involving human participants or animal subjects. This course builds upon the knowledge and themes introduced in BIE 555 (Research Ethics I). Research Ethics II covers these topics in greater depth and explores the key US and international laws and policies that regulate the design, conduct, and oversight of trials involving human participants or animal subjects. In addition, students examine in-depth specific areas or types of biomedical research that are potentially controversial or ethically problematic.
Components: Lecture
Attributes: Offered Winter Term
Requirement Group: Prerequisites: BIE555
Req. Designation: Technology

BIE 590(3) **Course ID:012185** **2022-06-07**
Clinical Ethics
This course deals with the practical applications of clinical ethics, including clinical ethics consulting and its recording and documentation, the work of ethics committees and IRBs, and other practical aspects of clinical ethics.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 610(3) **Course ID:012187** **2022-06-07**
Online Practicum in Clinical Ethics
[Formerly BIE 610C] This course is designed to help students develop many of the competencies required to perform clinical ethics consultation (CEC) at a basic level. Upon completion of the course, students should be able to: (a) assess their own strengths and weaknesses with respect to CEC competencies; (b) apply a systematic method to analyze and document CEC cases; (c) practice techniques to help avoid common CEC quality gaps; and (d) recognize complex cases for which advanced-level CEC competencies are required. While the course emphasizes process skills for CEC, students will also gain experience that will augment their clinical ethics content knowledge, emotional intelligence, and critical thinking.
Components: Practicum
Requirement Group: Prerequisites: BIE590
Req. Designation: Technology

BIE 611(3) **Course ID:012189** **2022-06-07**
Online Practicum in Research Ethics
[Formerly BIE 610R] A supervised practical experience in research ethics designed to teach specific skills. Exposes students to the process of ethical review of research involving human volunteers or animal subjects, and helps students develop some of the basic skills that a working research ethics professional needs. Through online discussion and participatory exercises, students gain a practical understanding of: (a) research ethics committee structure and function, (b) applicable state and federal regulations regarding the conduct of research involving human volunteers or animal subjects, and (c) relevant organizational and management skills needed to lead a research ethics committee. In addition, students learn practical skills in qualitative and quantitative research, report and grant writing, and bioethical training and education.
Components: Practicum
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BIE580
Req. Designation: Technology

BIE 612(3) **Course ID:012188** **2022-06-07**
Online Practicum in Policy
[Formerly BIE 610P] This course is designed as an opportunity for students to develop and refine the skills of policy analysis that they have learned in prior courses — in particular, in the prerequisites to this course — and to apply them to a range of current issues in bioethics policy. The course covers a broad range of policy issues in the biosciences, including both public and institutional bioethics policies.
Components: Practicum
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 620(3) **Course ID:012191** **2016-07-25**
On-Site Practicum in Clinical Ethics
[Formerly BIE 620C] A supervised practical experience in clinical ethics designed to teach skills in clinical ethics consultation.
Components: Practicum
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BIE 590 Corequisites: BIE610
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 621(3) **Course ID:012192** **2016-07-25**
On-Site Practicum in Research Ethics
[Formerly BIE 620R] A supervised practical experience. Helps students develop and refine the practical skills introduced in BIE 611 (Online Research Ethics Practicum) through hands-on experience. These skills include: teaching and education, review and oversight of institutional research projects involving human volunteers or animal subjects, and sound management of the research endeavor, including organizational management and policy analysis, arbitration, and mediation.
Components: Practicum
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BIE580 Corequisites: BIE611
Req. Designation: Technology

BIE 630(3) **Course ID:012194** **2017-02-17**
Masters Project I
The Master's project in bioethics involves three terms of independent research (under the direction of a faculty supervisor) culminating in a written document that addresses some aspect of clinical ethics, research ethics, or bioethics policy.
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

BIE 635(3) **Course ID:012793** **2017-02-17**
Master's Project II
The Master's project in bioethics involves three terms of independent research (under the direction of a faculty supervisor) culminating in a written document that addresses some aspect of clinical ethics, research ethics, or bioethics policy.
Components: Independent Study
Attributes: Offered Winter Term
Requirement Group: BIE 635 Prerequisites: BIE630
Req. Designation: Technology

BIE 640(3) **Course ID:012195** **2017-02-17**
Masters Project III
The Master's project in bioethics involves three terms of independent research (under the direction of a faculty supervisor) culminating in a written document that addresses some aspect of clinical ethics, research ethics, or bioethics policy.
Components: Independent Study
Attributes: Offered Spring Term
Requirement Group: BIE 640 Prerequisites: BIE630 and BIE635
Req. Designation: Technology

BIE 650(3) **Course ID:012196** **2016-07-25**
Capstone
Capstone practicum in which students demonstrate their mastery of clinical ethics, research ethics or bioethics policy. Each student presents their Masters Project.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 670(3) **Course ID:012810** **2017-03-26**
Proseminar in Biomedical Ethics (Spanish)
Onsite introduction to biomedical ethics, methodology and history, as well as the responsible conduct of research. Designed to orient trainees, to serve as a springboard for the Caribbean Research Ethics Education Initiative, and to introduce trainees to the subsequent online courses and the faculty that teach them.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

BIE 671(3) **Course ID:012802** **2017-03-26**
Responsible Conduct of Research (Spanish)
This online course provides trainees with an introduction to the ethics of scientific research, starting with a discussion of responsible conduct of research (commonly referred to by the acronym RCR).
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 672(3) **Course ID:012803** **2017-03-26**
Human Subjects Research (Spanish)
This online course builds upon some of the themes that were first introduced in Responsible Conduct of Research and provides trainees with additional experience in the design, conduct and oversight of trials involving human participants.
Components: Lecture
Attributes: Offered Winter Term
Req. Designation: Technology

BIE 673(3) **Course ID:012804** **2017-06-23**
Bioethics Policy and Pedagogy (Spanish)
The purpose of this online course is to provide students with basic skills in bioethics policy making and pedagogy. The first half of this course provides trainees with an understanding of the public policy making process and the political and regulatory environment in which researchers and research ethics committees function. The second half of the course is designed to give trainees practical experience in teaching bioethics and research ethics to adult learners, covering such topics as theories of active learning, knowledge taxonomies, course planning and development, assessment and grading, and observation and feedback.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

BIE 674(3) **Course ID:012805** **2017-03-27**
Online Practicum and Project (Spanish)
During this online course, trainees will carry out individual projects in their home countries and institutions, building off the knowledge and skills learned in Bioethics Policy and Pedagogy.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

BIE 675(3) **Course ID:012736** **2017-03-26**
Capstone (Spanish)
The purpose of this onsite course is to assess how well students have learned the knowledge and the practical skills necessary for functioning as policymakers and research ethics educators in their home countries, and in promoting institutional change.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

BIE 683(3) **Course ID:012807** **2017-04-17**
Bioethics Policy and Pedagogy (English)
The purpose of this online course is to provide students with basic skills in bioethics policy making and pedagogy. The first half of this course provides trainees with an understanding of the public policy making process and the political and regulatory environment in which researchers and research ethics committees function. The second half of the course is designed to give trainees practical experience in teaching bioethics and research ethics to adult learners, covering such topics as theories of active learning, knowledge taxonomies, course planning and development, assessment and grading, and observation and feedback.
Components: Laboratory
Attributes: Offered Winter Term
Req. Designation: Technology

BIE 684(3) **Course ID:012808** **2017-03-27**
Online Practicum and Project (English)
During this online course, trainees will carry out individual projects in their home countries and institutions, building off the knowledge and skills learned in Bioethics Policy and Pedagogy.
Components: Laboratory
Attributes: Offered Spring Term
Req. Designation: Technology

BIE 685(3) **Course ID:012809** **2017-03-27**
Capstone (English)
The purpose of this onsite course is to assess how well students have learned the knowledge and the practical skills necessary for functioning as policymakers and research ethics educators in their home countries, and in promoting institutional change.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - CRC Bioethics Program - Subject: Bioethics

BIE 693(3) **Course ID:012211** **2016-12-30**
International Rsrch Ethics I
In this online course, fellows will be able to identify and explain the prominent ethical, social and legal issues in research ethics and apply ethical and professional principles to those issues.
Components: Lecture
Attributes: Offered Winter Term
Req. Designation: Technology

BIE 694(3) **Course ID:012212** **2017-03-01**
International Research Ethics II
In this online course, a continuation of Research Ethics I, fellows will master the knowledge base that will allow them to function as ethicists on research ethics committees. They will understand the legal and ethical complexities of contemporary research issues occurring in their home countries and how the local prevailing approaches and standards compare and contrast to international ones.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Educational Biology

BIO 580(3) **Course ID:012225** **2021-10-08**
MAT Project in Biology (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?

Components: Seminar
Attributes: Offered Spring Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Business of Energy

BOE 606(0) **Course ID:013006** **2020-01-02**
MS-BOE Graduate Project - Studies
This non-credit Seminar project provides a capstone experience for Business of Energy MS students. The purpose is to further develop the student's communication, critical thinking, and interaction skills via a capstone experience on a Business of Energy topic that holds a special interest to the student. The candidate and faculty advisor agree on project scope and evaluation process. The candidate performs required analytical and/or experimental studies to complete a Graduate Project Paper and Presentation.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

BOE 610(3) **Course ID:012232** **2018-11-06**
Fundamentals of the Business of Energy
An initial umbrella course designed to acquaint the student with the complexities of the present-day power system and how we arrived at this point. It will include a brief history of the industry evolution and will encompass various fuels, types of generation, regulatory authorities, power transmission, distribution, control & dispatch, planning, power markets and revenue flows.
Components: Lecture
Same As Offering: BOE 610
Req. Designation: Technology

BOE 610(3) **Course ID:012232** **2018-11-06**
Fundamentals of the Business of Energy
An initial umbrella course designed to acquaint the student with the complexities of the present-day power system and how we arrived at this point. It will include a brief history of the industry evolution and will encompass various fuels, types of generation, regulatory authorities, power transmission, distribution, control & dispatch, planning, power markets and revenue flows.
Components: Lecture
Same As Offering: BOE 610
Req. Designation: Technology

BOE 611(3) **Course ID:012233** **2018-08-06**
Planning and Operations of Power Systems
Operations and planning of power systems will introduce and discuss the decision process regarding generation types, fuels and transmission. Comparisons will be introduced establishing the difference between traditional vertically integrated utilities and unbundled resource suppliers. The principles of electric power systems will be studied along with the impact of deregulation.
Components: Lecture
Same As Offering: BOE 611
Req. Designation: Technology

BOE 611(3) **Course ID:012233** **2018-08-06**
Planning and Operations of Power Systems
Operations and planning of power systems will introduce and discuss the decision process regarding generation types, fuels and transmission. Comparisons will be introduced establishing the difference between traditional vertically integrated utilities and unbundled resource suppliers. The principles of electric power systems will be studied along with the impact of deregulation.
Components: Lecture
Same As Offering: BOE 611
Req. Designation: Technology

BOE 612(3) **Course ID:012234** **2016-07-01**
Power Markets
This course will deal with the intricacies of the workings of the power markets (including gas). It will introduce and discuss the evolution from regulated pricing to market pricing. It will introduce and discuss market-based products necessary for reliable operation; hedging principles; and out-of-market products necessary for a fair and reliable market.
Components: Lecture
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Business of Energy

BOE 613(3) **Course ID:012235** **2020-09-23**
Regulation & Restructuring
This course will explore the history of legislation, regulation and regulatory authorities in the development of the power industry and its impact on the economy and consumers. The evolution of the relationships between regulators and the regulated; the restructuring of the natural gas and electric industry over the last three decades; and the current regulatory status of both the infrastructure and power markets will also be studied.
Components: Lecture
Same As Offering: BOE 613
Req. Designation: Technology

BOE 613(3) **Course ID:012235** **2020-09-23**
Regulation & Restructuring
This course will explore the history of legislation, regulation and regulatory authorities in the development of the power industry and its impact on the economy and consumers. The evolution of the relationships between regulators and the regulated; the restructuring of the natural gas and electric industry over the last three decades; and the current regulatory status of both the infrastructure and power markets will also be studied.
Components: Lecture
Same As Offering: BOE 613
Req. Designation: Technology

BOE 614(3) **Course ID:012236** **2016-08-27**
Electric Power Industry Economics and Finance
This course will evaluate the weaving thread of economics and finance as an integral part of operations and strategic planning in the complex energy industry. It will investigate supplier economics and finance under regulation and deregulation environments. It will evaluate market transactions, payment paths, settlements, capital requirements, financial instruments, and procedures that are identified with the industry. It will review economic issues confronting power transmission owners/providers under regulated models and merchant function models. The course will identify and encourage a knowledge-based review of new technologies and green energy as they relate to financial and economic decision making. Energy policies, metering technology, micro-grids, government influences, fuels and storage will all be explored as they relate to various present and future economic and financial models.
Components: Lecture
Same As Offering: BOE 614
Req. Designation: Technology

Business - CRC Engineering Programs - Subject: Business of Energy

BOE 614(3) **Course ID:012236** **2016-08-27**
Electric Power Industry Economics and Finance
This course will evaluate the weaving thread of economics and finance as an integral part of operations and strategic planning in the complex energy industry. It will investigate supplier economics and finance under regulation and deregulation environments. It will evaluate market transactions, payment paths, settlements, capital requirements, financial instruments, and procedures that are identified with the industry. It will review economic issues confronting power transmission owners/providers under regulated models and merchant function models. The course will identify and encourage a knowledge-based review of new technologies and green energy as they relate to financial and economic decision making. Energy policies, metering technology, micro-grids, government influences, fuels and storage will all be explored as they relate to various present and future economic and financial models.

Components: Lecture
Same As Offering: BOE 614
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Business of Energy

BOE 615(3) **Course ID:012237** **2016-07-01**
Challenges to Upgrading Aging Infrastructure
This course will examine and evaluate the changing energy horizon as the industry embraces expanding technology, renewable energy, smart grid technology, etc.; to be exercised upon an aging infrastructure. The student will see the critical need for system knowledge and planning to continue to meet the needs and reliability of a sophisticated complex industry struggling to meet the needs of its customers and economic growth.
Components: Lecture
Req. Designation: Technology

BOE 616(0) **Course ID:012854** **2020-01-02**
MS-BOE Graduate Project - Defense
This non-credit Seminar project provides a capstone experience for Business of Energy MS students. The candidate will deliver and defend results from studies documented in a Graduate Project Paper and Presentation. The candidate receives a pass/fail grade which appears on the official transcript.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

BOE 623(3) **Course ID:012973** **2019-10-18**
Statistical Methods for Reliability and Life Data Analysis
[Cross-listed with EE603 and ME578]
Reliability analysis is concerned with understanding the failure modes that affect an engineered product, estimating the expected life of the product under service conditions, and predicting the failure rate of the product
as a function of time in service. The primary response variable in reliability analysis is time to failure, which may
be measured in controlled laboratory experiments, or observed empirically from post-introduction studies of products “in the field”. The analysis of data for which the primary variable of interest is time to failure requires
specialized statistical concepts and tools; this course will cover some of the most useful approaches.
Components: Lecture
Course Equivalents: EE 603, EE 603, ME 578, ME 578
Attributes: Offered Winter Term
Requirement Group: Prerequisites: EE602, ME577, or CS506 or instructor consent.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Biomedical/Rehabilitation Eng

BR 200(3) **Course ID:011179** **2015-11-16**
Introduction to Biomedical & Rehabilitation Engineering, Science and Technology
Introductory course focused on biomedical and rehabilitation engineering, science and technology (BEST). With remarkable progress in medical technology for saving lives and improving quality of life, this cousre will focus on advances in biomedical engineering and its application to rehabilitation technology. Using ten most signification technological innovations, a quantitative focus will consider fundamental scientific bases and engineering concepts for devices and technologies as well as the societal context of which these innovations arose. We will explore various factors that impact the technological solution including culture, medical ethics, regulatory issues, economics and marketing. Students will focus on one specific problem, apply design principles and develop a solution while considering the factors which impact the design.
Components: Lecture
Attributes: Two communication units, Science, Technology and Society, Offered Each Term
Req. Designation: Technology

BR 400(3) **Course ID:010598** **2020-11-03**
Biomedical Engineering Fundamentals
[Cross-listed with BY 440, ES 402, EE400] This interdisciplinary course will introduce students to basic principles of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medicine and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal and image processing, biomechanics, and biomaterials.
Components: Lecture
Course Equivalents: BY 440, BR 500, BY 540, ES 402
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MA131/132, PH131/132, junior or senior standing.
Req. Designation: Technology

BR 450(3) **Course ID:011178** **2015-11-16**
BEST Capstone Design I
Biomedical Engineering, Science, and Technology (BEST) senior capstone design course. Students will be divided into multi-disciplinary teams charged with investigating a BEST-related open ended project. Students focus on one aspect of design/production/marketing appropriate for their background and be conversant on other area of the project, including design, human interface, regulatory, ethics, marketing and economics. Includes written reports and oral presentations
Components: Project Team
Attributes: Offered Fall Term
Req. Designation: Technology

BR 500(3) **Course ID:010661** **2014-11-24**
Biomedical Engineering Fundamentals
[Cross-listed with BY 540] This interdisciplinary course will introduce students to the fundamental and quantitative basics of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medical and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal, and image processing, biomechanics and biomaterials. Graduate students will be required to additionally write a comprehensive paper and present that paper in a short talk to the class. Prerequisites: MA131/132, PH131/132, junior or senior standing.
Components: Lecture
Course Equivalents: BY 440, BR 400, BY 540, ES 402
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Business & Marketing Education

BUS 527(3) **Course ID:013004** **2022-04-08**
Current Topics in Business and Marketing I
Students will investigate topics central to accounting, finance, and financial literacy for the preK-12 learner. Accounting and finance principles will be aligned to industry standards and New York state teaching and learning standards. The course is designed for MAT, Business and Marketing students.
Components: Seminar
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

BUS 562(3) **Course ID:013005** **2021-10-08**
Current Topics in Business and Marketing II
Current topics in the fields of business and marketing will be explored with attention paid to fundamental concepts as well as future trends. This course is designed for MAT, Business and Marketing students.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

BUS 574(3) **Course ID:013070** **2020-11-03**
Work Based Learning - Program Organization
This is the first of two courses that, when successfully completed, enable you to apply for an extension to your New York State Teacher Certification and allow you to place students in a variety of work based learning experiences including, internships, community based work experiences and cooperative work experiences.
Components: Field Studies
Attributes: Given When Needed
Req. Designation: Technology

BUS 575(3) **Course ID:013071** **2020-11-03**
Work Based Learning - Program Operation
This is the second of two courses that, when successfully completed, enable you to apply for an extension to your New York State Teacher Certification and allow you to place students in a variety of work based learning experiences including, internships, community based work experiences and cooperative work experiences.
Components: Field Studies
Attributes: Given When Needed
Req. Designation: Technology

BUS 580(3) **Course ID:013069** **2021-10-08**
MAT Project in Business and Marketing
The MAT project is a one term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification area. The course is intended to be custom-tailored to meet the specific needs of each individual intern. MAT projects are well grounded in research and theory, and include a strong and intensive applied aspect directly addressing the question: ""What would this look like in the classroom?""
Components: Seminar
Requirement Group: Must be enrolled in the MAT program
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 1(1 - 6) **Course ID:008054** **2022-06-07**
Biology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

BY 2(1 - 6) **Course ID:008055** **2022-06-07**
Biology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

BY 100(4) **Course ID:007379** **2015-01-19**
Biology Elective with Laboratory Experience
Credit for this course is awarded only on the basis of an incoming student's performance on the Biology Advanced Placement (AP) exam or in the International Baccalaureate (IB) Biology course. See the AP/IB policy for specifics. Biology, Biomolecular Science, and Environmental Science (EHS and ES&P) majors may not use credit for BY100 as one of their required Biology Electives.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

BY 110(3) **Course ID:009554** **2019-04-19**
Biology and Society
Definition of science, the scientific method, overview and scope of modern biology, introduction to biomolecules and cell structure, Mendelian inheritance and genetics, human physiology, evolution, and ecology. Course topics are presented from the perspective of current issues in biotechnology, medicine, and human impact on the biosphere. This course is intended for students who are not majoring in the biological sciences and my not be taken by students with credit for BY100 or BY140.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Restriction: Students may not enroll in this course if they have credit for BY140 or BY160.
Req. Designation: Technology

BY 112(1) **Course ID:007383** **2015-02-03**
Laboratory for Biology and Society
Companion laboratory course to BY110 introducing students to the scientific method of laboratory and field experimentation used by contemporary biologists.
Components: Laboratory
Attributes: Offered Each Term
Requirement Group: Corequisite: BY110.
Req. Designation: Technology

BY 115(3) **Course ID:012764** **2019-04-19**
Introduction to Environmental Sustainability
This course will provide students with a basic understanding of environmental science and sustainability concepts. Students will gain an understanding of the impacts that humans have on atmosphere, lithosphere, and hydrosphere. The course will also focus on sustainability concepts that are particularly relevant to business practices and engineering. Specific case studies will also be used to increase understanding of how businesses are tailoring their practices to meet sustainability goals. The course will be lecture based, and active learning exercises will be implemented to enhance understanding of sustainability concepts. Students will be evaluated through homeworks, examinations, and a group project.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Restriction: Students may not enroll in this course if they have credit for BY140 or BY160.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 120(3) **Course ID:009555** **2015-11-16**
Introduction to Biotechnology Sciences and their Applications
Students in today's competitive market often need to possess multifaceted knowledge and skills. The interdisciplinary structure of BY120 encourages collaborations across schools and fields. The syllabus is designed to meet the needs and spark the interest of non-biology majors in biotechnology. By creating a stimulating, lecture-based, solid foundation in basic molecular biology and providing insight into the innovative discipline of biotechnology, students will be inspired and encouraged to apply their own academic backgrounds in a creative manner to drive innovations and applications in this field forward and to investigate possible employment niches for themselves. Aside from covering the fundamentals, the lectures will venture into bioinformatics, DNA amplification and sequencing technologies, genetic engineering and gene expression systems, large scale production, molecular diagnostics, personalized medicine, commercial products, gene therapy, stem cells, transgenic animals and plants, synthetic biology, patenting, as well as
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 130(3) **Course ID:010309** **2015-01-23**
Contemporary Issues in Environmental Science
This course examines how human activity impacts the environment. Topics include air and water pollution, environmental systems management, industrial ecology and environmental policy with emphasis on the multidimensional aspects of currently environmental issues. Case studies of chemical exposures, life cycle assessments, and integrated resources management will be used to discuss the process of environmental decision making.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

BY 140(3) **Course ID:010155** **2015-09-18**
Biology I - Inheritance, Evolution, and Diversity
Introduction to the scientific method, mitotic and meiotic cell division, genetic inheritance, evolution of species, phylogenetics, systematics, paleobiology, survey of the tree of life, population biology, ecology and behavior.
Components: Discussion, Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 142(2) **Course ID:010157** **2015-02-12**
Biology I Laboratory
Companion laboratory course to BY140 providing practical exposure to the scientific method of hypothesis testing, presentation and statistical analysis of biological data, writing scientific reports and papers in the context of field and laboratory experimentation related to BY140.
Components: Laboratory
Attributes: One communication unit, Offered Fall Term
Requirement Group: Corequisite: BY140.
Req. Designation: Technology

BY 160(3) **Course ID:010156** **2015-09-18**
Biology II - Cellular and Molecular Biology
Introduction to biomolecules, organelles, and cytoarchitecture of cells, energy metabolism and photosynthesis, DNA replication, transcription of RNA, protein synthesis, gene regulation, development and differentiation with a view towards biotechnology.
Components: Discussion, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 162(2) **Course ID:010158** **2015-01-20**
Biology II Laboratory
Companion laboratory course to BY160 providing a hands-on experience to put your knowledge to the test. Here you will be introduced to the scientific method and you will be describing, analyzing, and reporting your results the way a scientist would in a real laboratory setting. Experiments include chemical properties of the molecules of life, enzymatic analyses, microscopy and microdissections, photosynthesis and respiration, mitosis and meiosis, Drosophila genetics, molecular biology of nucleic acids and bacteriology. You will be presenting your results both orally and in writing.
Components: Laboratory
Attributes: One communication unit, Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 214(3) **Course ID:007391** **2016-01-19**
Genetics
The overall goal of this course is to provide a comprehensive introduction to the science of genetics. Classical principles of Mendelian genetics will be covered, however, the emphasis will be placed on fundamentals of molecular genetics and recent advances. Major topics include gene structure and function, genetic recombination, genetic engineering, genomics, gene and chromosome mutations, regulation of gene transcription, cell cycle and cancer genetics, developmental genetics, and an introduction to population genetics.
Components: Lecture
Attributes: Science, Technology and Society, Offered Each Term
Requirement Group: Prerequisites: BY160 or consent of the instructor
Req. Designation: Technology

BY 218(3) **Course ID:013089** **2021-02-22**
Cell Biology
This course examines the fundamental principles of eukaryotic cell biology at the molecular level, with an emphasis on roles in human homeostasis and disease. Topics will include: structure and function of the plasma membrane, transmembrane transport, protein trafficking, the cytoskeleton, signal transduction pathways, cellular energetics, and the control of cell division and cellular proliferation. Students will be introduced to the process of experimental cell biology, methods, and data analysis in relation to societal issues.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: BY160 or Instructor Consent
Req. Designation: Technology

BY 220(3) **Course ID:013091** **2021-02-22**
Intro to Evolution
An introduction to evolutionary biology, in particular how scientists observe evolution, what drives it, and what we can learn from it. We will begin with a brief evolutionary history of life on earth - from the first microbes, to multicellular life, to the transition from water to land, dinosaurs, and the emergence of humans - exploring and interpreting the various types of evidence that support this history. We will focus on the basic processes that drive evolutionary change - mutation, natural selection, and genetic drift, as well as some additional complexities such as the evolutionary consequences of sex and ecological interactions, highlighting interesting and unique examples of biodiversity from across the tree of life, as well as applied examples from healthcare and environmental science. Note that BY 214 is not a prerequisite for this course.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: BY140
Req. Designation: Technology

BY 222(3) **Course ID:007393** **2015-02-12**
Ecology
Ecology is the study of factors that control the distribution and abundance of species in nature. Ecological interactions will be explored at the individual through ecosystem level in terrestrial, freshwater, and marine habitats. Emphasis will be on fundamental ecology, but applications to human-related problems will be explored.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisite: BY140 or Corequisite: BY140.
Req. Designation: Technology

BY 224(2) **Course ID:007394** **2015-02-12**
Ecology Laboratory
Field and laboratory exploration of physical, chemical, and biological factors influencing animal and plant species, populations, and communities in upstate New York. Students will learn field and laboratory techniques in ecology and general identification of some organismal groups. Course will include required field trips to surrounding habitats and laboratory experiments.
Components: Laboratory
Attributes: One communication unit, Offered Fall Term
Requirement Group: Corequisites: BY222
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 226(3) **Course ID:013082** **2021-09-06**
Plant Biotechnology
This course will provide knowledge and understanding of molecular biology in plants, focusing on biotechnological tools for crop improvement. Despite wide application of “omics” tools in applied plant research, a one-gene-at-a-time approach is still required for understanding the mechanisms of how gene expression is regulated and how gene products function. This course covers the basic principles and application of gene expression measurements, mechanisms of regulating gene expression, recombinant DNA technology and genetic transformation and their application to crop improvement, and genome editing with RNAi and CRISPR. This course will provide an opportunity for students to develop critical thinking on biotechnological tools for plant improvement by understanding experimental techniques and how they can be applied to revealing mechanisms that regulate gene expression.
Components: Lecture
Requirement Group: Prerequisite: BY 220
Req. Designation: Technology

BY 280(3) **Course ID:010176** **2016-04-19**
Environmental Science
This course will investigate the key concepts and principles of environmental science, emphasizing human impacts to the earth. The themes will include, energy flows through nature, and biogeochemical systems and how they have been perturbed by human activities. Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment. Quantitative analysis or air, soil, and water quality on local, regional, and global scales will be a significant component of the course. Emerging principles in environment science, including sustainability, industrial ecology, risk assessment, and the precautionary principle will be introduced. The course will prepare students to qualitatively and quantitatively analyze fluid and contaminant flow in varied biological and geologic systems.
Components: Lecture
Course Equivalents: EV 280
Attributes: Offered Fall Term
Requirement Group: Prerequisites: sophomore standing, CM131/CM132 or CM103/CM104, or consent of the instructor.
Req. Designation: Technology

BY 300(1) **Course ID:007396** **2015-02-03**
Recent Advances in Biological Research
The objective of this course is to present recent advances in biological and biomolecular research, and to describe opportunities for graduate study and undergraduate summer research. Students will receive one credit for attending biology seminars (6 per semester), reading a journal article prior to each presentation, writing short review of each seminar, and participating in discussions. This course can be taken for credit more than once.
Components: Lecture
Attributes: One communication unit, Offered Each Term
Requirement Group: Prerequisites: BY140 and BY160
Req. Designation: Technology

BY 302(3) **Course ID:007398** **2015-01-23**
Plant Science of Northern New York
Upon completion of the course, the student will be aware of the classification of plants, recognize and appreciate the life cycles of the main plant phyla, plant physiology, plant metabolism, understand the relationships among plant tissue and organ structures and function, and the plant community structure along environmental gradients in a temperate zone such as the region in northern New York.
Components: Lecture
Requirement Group: Prerequisites: BY 140 and BY 142
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 304(3) **Course ID:011482** **2015-01-23**
Introductory Zoology
In this course, we will conduct a diversity survey of animal life with emphasis on invertebrates. Course content will primarily consist of comparing the major animal phyla emphasizing integration of form, function, ecology, and phylogeny.

Components: Lecture
Attributes: Offered Spring When Needed
Requirement Group: Prerequisites: BY140/142 and BY160/162, or consent of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 305(3) **Course ID:013149** **2022-02-09**
Biochemistry for Health Sciences
This course provides the fundamental knowledge that is essential to the study of biochemistry at advanced levels. This course integrates biochemistry with physiology and cell biology and is aimed specifically at introductory health science students. It provides a general introduction to the biochemical basis of various cellular functions and their relevance to disease. Topics covered include structure, function and chemistry of biomolecules, energy metabolism, molecular genetics, the biochemistry of cancer, and recent biotechnology. The course is intended for health science students who have no previous background in sciences. It assumes no prior knowledge and covers some chemistry and molecular biology basics.

Components: Lecture
Course Equivalents: CM 305
Attributes: Offered Spring Term
Req. Designation: Technology

Inst for a Sustainable Environ - Biology - Subject: Biology

BY 309(3) **Course ID:007880** **2019-09-26**
Introduction to Environmental and Occupational Health
[Cross-listed with EHS309] Study of the recognition, evaluation and control of chemical, biological, radiological, physical and ergonomic hazards found in the work environment and surrounding community. Key aspects of the course will include hazard assessment, basic anatomy and physiology associated with routes of entry and toxicology of hazardous agents, environmental, health and safety regulations, exposure monitoring instrumentation, and effective controls to minimize the risk of illness or injury.
Components: Lecture
Course Equivalents: EHS 309
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM132 or CM104/106
Req. Designation: Technology

BY 312(3) **Course ID:011816** **2022-03-23** **Instructor Consent Required**
Adirondack Ecology and Environmental Science
[Cross-listed with EV 312] This course introduces ecological and environmental science concepts relevant for understanding the structure and function of terrestrial, aquatic, and human systems in the Adirondack Park. Students will learn to identify important plant and animal species representative of the Adirondack Mountains, and learn major features of ecological systems in the Park. The course will also provide the students an assessment of human impacts on the ecology of the Adirondack Park.
Enrollment is limited to those students participating in the Adirondack Semester Program.
Components: Lecture
Course Equivalents: EV 312
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 313(3) **Course ID:011376** **2015-03-05**
Biogeochemical Earth Systems Science
[Cross-listed with CE 313, EV 313] This course will investigate the key concepts and principles of environmental science emphasizing the earth's biogeochemical cycles and how they have been perturbed by human activities. Quantitative analysis or air, soil and water quality on local, regional and global scales will be a significant component of the course. Emerging principles in environmental science, including sustainability, industrial ecology, risk assessment and the precautionary principle will be introduced. In addition to the quantitative aspects, the course will consider the historical, social, and political contexts in which the practice of environmental science takes place.
Components: Lecture
Course Equivalents: EV 313, CE 313
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM132 (or CM104), or consent of the instructor
Req. Designation: Technology

BY 314(4) **Course ID:007401** **2014-11-19**
Bioinformatics
[Cross-listed with CM 314] This course and companion lab provides students with an introduction to the theory and methods of DNA and protein sequence analysis. Students receive experience retrieving information from sequence and genome databases. Methods of sequence alignments include dynamic programming and statistical methods of molecular evolutionary change are outlined. Emphasis is also placed on calculating the statistical significance of results. Protein structural alignments and displays, and structural prediction are covered. Gene prediction algorithms, methods of phylogenetic analysis and database similarity searching are explained. The course introduces students to the analysis of genomes for protein families and domains and to the analysis of gene expression patterns.
Components: Laboratory, Lecture
Requirement Group: Prerequisites: BY160 and BY214.
Req. Designation: Technology

BY 319(1) **Course ID:011492** **2014-11-19**
Current Readings in Animal Behavior
[Cross-listed with PY 319] The field of animal behavior is a rapidly advancing one, especially at the interface of neurobiology and cognition, and the interface of cognition and functional analysis of behavior (behavioral ecology and sociobiology). This one credit hour course is designed as a 'journal club' with a focus on the latest developments in theory and empirical research on animal behavior. The course is intended for any student who has a sincere interest in integrative animal behavior.
Components: Lecture
Course Equivalents: PY 319
Requirement Group: Prerequisites: BY222 or PY151
Req. Designation: Technology

BY 320(3) **Course ID:007404** **2015-01-20**
Microbiology
This course will provide a fundamental introduction to the study of microbial life forms. The diverse biology of these organisms will be reviewed and application to human health and society, the natural environment, and biotechnology will be emphasized. Upon completion of the course, students will be capable of assessing microbial growth and metabolism and understand its applications in natural and engineered environments.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY160, BY214 and CM132 or CM104 or consent of the instructor.
Req. Designation: Technology

BY 322(2) **Course ID:007405** **2015-01-20**
Microbiology Laboratory
Laboratory exercises will stress the classical techniques for handling bacteria and demonstrate concepts presented in the lecture series: both clinical and environmental aspects of applied microbiology will be explored. Upon completion of the course, students will be capable of safely manipulating microbes in a laboratory setting, as well as become competent in techniques used to observe and culture microbes.
Components: Laboratory
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: BY162, CM132 or CM104 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 324(3) **Course ID:012146** **2016-03-25**
Parasitology
The natural history, ecology and molecular biology of parasites are explored with an emphasis on life cycles, host/parasite interactions and evolution of parasitism. Basic principles of epidemiology, transmission, diagnosis, treatment and prevention are examined in parasites of medical, veterinary, and economic importance. Lectures will be supplemented by demonstrations of fixed materials and by exercises in identification and diagnoses.
Components: Lecture
Attributes: Offered Even Falls
Requirement Group: Prerequisite: BY 140 and BY 160
Req. Designation: Technology

BY 328(3) **Course ID:007408** **2015-03-03**
Conservation Biology
BY428 provides an overview of the core theory of conservation biology, and how conservation biology is applied for environmental conservation and management. Major topics of this course will include conservation prioritization, the problems of small population size on the long-term persistence of a species, conservation genetics, habitat fragmentation and nature reserve design, invasive species, consequences of extinctions on an ecosystem processes and community structure, and the possible effects on biodiversity of global climate change. A course emphasis will be on the challenge of translating the core lessons of conservation biology to effective policy and environmental management.
Prerequisites: BY222 or consent of the instructor.
Components: Lecture
Attributes: Science, Technology and Society, Offered Even Springs
Requirement Group: Prerequisites: BY222 or consent of instructor.
Req. Designation: Technology

BY 330(3) **Course ID:011412** **2020-08-25**
Great Lakes Water Protection
[Cross-listed with EV 330] The Laurentian Great Lakes contain 20% of the world's surface fresh water and serve both water supply and waste disposal services for over 30 million residents in the United States and Canada. Technological advances have controlled the outflow of the Great Lakes at the St. Lawrence River and this has brought with it social benefits and environmental costs. The United States and Canada share the management of this resource and have shared notable success controlling environmental consequences of development yet are faced with emerging issues. The LGL/SLR system will be examined from a multidisciplinary, multinational perspective to illustrate that a shared resource can be maintained. Students will be able to understand the forces (geomorphic, biological, chemical, social, economic, and political) that have shaped and impacted a globally significant resource.
Components: Lecture
Course Equivalents: EV 330
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Spring Term
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

BY 340(3) **Course ID:007409** **2015-03-05**
Behavioral Ecology and Sociobiology
[Cross-listed with PY 340] This course is concerned with the adaptive functions of animal behavior, emphasizing ecological and evolutionary perspectives. Topics covered include foraging behavior, sexual selection, social systems, parental care, and cooperation and conflict. One major focus will be on evaluating the arguments of proponents and critics of sociobiology on whether the field is useful at explaining human behavior.
Components: Lecture
Course Equivalents: PY 340
Attributes: Individual and Group Behavior, Offered Odd Springs
Requirement Group: Prerequisites: BY140 or PY151 or consent of instructor.
Req. Designation: Technology

BY 345(3) **Course ID:012884** **2018-09-17**
The Human Genome
This course explores our current understanding of genomics as applied to the human genome. We will begin with an introduction to genome structure and function, and then apply that knowledge to understanding patterns of human history and evolutionary adaptation, exploring the genetic causes of disease with genome-wide association studies, and discuss the multifaceted impacts of the personal genomics revolution.
Components: Lecture
Attributes: Science, Technology and Society, Offered Spring Term
Requirement Group: Prerequisites: BY140 or permission of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 350(3) **Course ID:007411** **2015-02-12**
Comparative Vertebrate Anatomy
This course compares anatomical structures throughout different classes of vertebrates. We begin by defining anatomical terms and identifying what constitutes a vertebrate. We will also learn how vertebrate organ systems develop and the physical constraints placed on development of these systems. The anatomical study will be broken down into major organ systems that will be discussed one at a time. For each of the organ systems, there will be a discussion of relevant structure and function followed a description of the major changes in form and function throughout vertebrate evolution. Since there are numerous classes of vertebrates, we will concentrate on representatives from some of the better studies examples.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY160 or consent of the instructor. Corequisite: BY352.
Req. Designation: Technology

BY 352(2) **Course ID:007412** **2015-02-12**
Comparative Vertebrate Anatomy Lab
Through the use of dissection and histological observation, we will observe and make direct comparisons of anatomical structures from representative vertebrates. The organ systems that are dissected in this course will follow the topics presented in BY350. After the first two introductory labs, you will dissect specific organ systems one at a time in each of your specimens. This will allow you to make direct comparisons between comparable structures in different vertebrates. The animals that will be dissected (Necturus – Mud Puppy, Dogfish shark, pigeon, and cat) are representative vertebrates chosen to illustrate changes to the organ systems as vertebrates became more complex.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY160 or consent of the instructor. Corequisite: BY350.
Req. Designation: Technology

BY 357(3) **Course ID:011519** **2014-11-19**
Human Cognitive Evolution
[Cross-listed with PY 357] Evolutionary psychology is concerned with the adaptive problems and selective pressures our ancestors encountered in their environments, the psychological mechanisms that evolved to help them solve those problems, and the way those evolved mechanisms function in current environments. This way of thinking about the brain, mind, and behavior is changing how scientists approach old topics, and is opening up new ones. This course will focus on current developments and selected topics in evolutionary psychology (e.g., foraging, mate choice, parental investment, cooperation and culture) and explore the evolution of cognition from a broad comparative perspective.
Components: Lecture
Course Equivalents: PY 357
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

BY 358(3) **Course ID:007413** **2014-11-20**
Animal Learning and Cognition
[Cross-listed with PY 358] This course focuses upon how animals acquire, process, store and recall information about their environment and social partners. Topics that will be examined include how animals perceive and classify stimuli; how they learn and remember; how they orient and navigate; how they measure time, number, and amount; how they acquire abstract concepts; how they perceive social relationships; and how they communicate. A diversity of invertebrate and vertebrate organisms will be included (sea slugs to primates!), and there will be an emphasis on understanding taxon-specific specializations as well as general patterns across animals.
Components: Lecture
Course Equivalents: PY 358
Requirement Group: Prerequisites: BY140 or PY151 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Biology

BY 359(3) **Course ID:012047** **2015-02-17**
Perception
Perception deals with our conscious experience of the world, ourselves and each other. This course will examine how perceptions are measured (psychophysics); how visual, auditory, touch and pain sensory stimulation is actively organized into conscious perceptions; developmental aspects of perception; the role of cognitive factors, such as attention; and how altered conscious states (e.g., achieved through meditation, hallucinogenic drugs) affect perception. Fundamental principles of perception discussed in this course will be used to explain how we experience the world, ourselves, and each other.

Components: Lecture
Course Equivalents: PY 359
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 360(3) **Course ID:007414** **2015-01-20**
Comparative Physiology
In this course, students will be instructed in all the main branches of modern animal physiology with a strong emphasis on the integration of physiological knowledge, ecology, and evolutionary biology. In addition to an in-depth treatment of mammalian physiology, students will be exposed to the various physiological systems that have evolved in other vertebrate, as well as invertebrate, animals. The primary goal is to understand how these physiological systems allow animals to survive in the environments that they inhabit.
Prerequisite: BY160 or consent of the instructor.
Components: Lecture
Course Equivalents: BY 560
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY160 or consent of instructor.
Req. Designation: Technology

BY 362(2) **Course ID:007415** **2015-01-20**
Comparative Physiology Laboratory
In this laboratory-based course, students will gain practical exposure to basic research techniques used in the study of animal physiology. Class activities include studying action potential propagation, the mammalian dive reflex, electrooculography and the physiological effects of exercise.
Components: Laboratory
Attributes: One communication unit, Offered Spring Term
Requirement Group: Corequisite: BY360.
Req. Designation: Technology

BY 363(3) **Course ID:012755** **2016-09-23**
Pharmacology of Infectious Disease
This course will introduce students to the basic principles of immunology and pharmacology with an emphasis on current treatment strategies employed to combat infectious disease. Students will learn how vaccines are used to prevent infection, in addition to the deployment of small molecule drugs and newer antibody-based therapies for the treatment of existing infectious disease. Course information will be disseminated to students in the form of lectures, readings from review and original research articles, and through group discussion that involves case studies and problem-based learning.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisites: BY160
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 368(1) **Course ID:011577** **2021-04-12** **Instructor Consent Required**
Mathematical Biology Seminar
[Cross-listed with MA 368] The objective of this course is to present recent advances in research that combines biological and mathematical analysis, and to describe opportunities for interdisciplinary summer research in biology and mathematics. Students will receive one credit for attending seminars (6 per semester), reading a journal article prior to each presentation, writing a short review of each seminar, and participating in discussions. This course can be taken for credit more than once.
Components: Seminar
Course Equivalents: MA 368
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 380(3 - 6) **Course ID:007886** **2015-08-18**
Techniques in Immunological Research
This course will provide students with a basic understanding of molecular, cellular and imaging techniques used at the Trudeau Institute to help researchers study the immune system. Students will learn principles and procedures relating to molecular biology, cellular biology, histology, flow cytometry, light microscopy, and cell sorting. The course will cover basic quantification of gene expression at the transcriptional and post-translational level. The course will also cover basic quantification of cell populations using flow cytometers to collect and analyze subpopulations of cells from tissues. Histology and light microscopy techniques will be used to locate similar cell populations within a tissue section. Students will gain confidence in the selection and application of the appropriate cell imaging techniques required to assess mammalian cell tissues.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Enrollment is limited to students participating in the Trudeau Semester.
Req. Designation: Technology

BY 385(3) **Course ID:012961** **2019-09-25**
Plant Biotechnology
This course will provide knowledge and understanding of plant biotechnological tools for plant improvement. Topics include the basic principles and application of tissue culture, recombinant DNA technology and genetic transformation and their application to crop improvement, genome editing with RNAi and CRISPR, and social and environmental impacts of biotechnology. This course will provide an opportunity for students to develop critical thinking on biotechnological tools for plant improvement.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY214
Req. Designation: Technology

BY 387(2) **Course ID:012960** **2019-09-25**
Plant Biotechnology Lab
This course will provide you with a hands-on experience and knowledge and understanding of plant biotechnological tools for plant improvement. During this course, you will drive one big project which transforms a dwarf Arabidopsis mutant. By doing this project, you will learn hormone physiology and the function of a green revolution gene. Topics include the basic principles and application of tissue culture, recombinant DNA technology and genetic transformation using both bacteria and Agrobacterium and their application to crop improvement. This course will provide an opportunity for students to develop critical thinking on biotechnological tools for plant improvement.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY162. Corequisite: BY385.
Req. Designation: Technology

BY 399(3) **Course ID:012994** **2019-11-13**
Sustainability & Environmental Conservation in Kenya
Students explore the economic, political, and social development of Kenya, and the environmental and social consequences of the Kenya's development path, with in focus on different strategies for environmental conservation, agriculture development., and infrastructure development. The objectives are to understand (1) how a model developing nation with an export and tourism-based economy functions, (2) what are the environmental and social consequences of development and (3) how an African nation's economy and its social & environmental welfare are linked to the political and economic policies of the US and other developed nations.
Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Offered Even Springs
Req. Designation: Technology

BY 400(1 - 4) **Course ID:007419** **2015-01-23** **Instructor Consent Required**
Directed Study in Bioscience
Students study specialized topics in bioscience not otherwise available in formal courses. Under supervision of a faculty member, a semester-long course of study tailored to professional interests is designed based on readings from relevant texts and primary literature.

Prerequisites: Consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 401(0) **Course ID:007420** **2016-03-23**
Professional Assessment
This course is designed to assess the professional development of biology majors by (1) completion of a standardized test to assess their level of knowledge in the field of biology, (2) submission of a professional resume, and (3) submission of a personal statement for graduate/professional school or employment.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: Senior standing or consent of the Biology Department Chair.
Req. Designation: Technology

BY 405(1 - 6) **Course ID:007424** **2017-01-13** **Instructor Consent Required**
Undergraduate Research in Bioscience
Students conduct an original bioscience research project based on investigation of a specific problem related to areas of faculty expertise. Research methodology may involve field, laboratory, computational, or theoretical approaches. Presentation of research results at a scientific meeting or local symposium is strongly encouraged.

Prerequisite: consent of the instructor.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Biology

BY 406(3) **Course ID:007425** **2020-09-02**
Biomedical Analysis and Instrumentation
[Cross-listed with CM 406] Biomedical Analysis and Instrumentation is a lecture course designed to provide advanced undergraduates and graduate students in basic sciences, biosciences and bioengineering disciplines with scientific and engineering aspects of instrumentation, sample analysis, measuring and processing signals from living organisms. Functioning and calibration of biomedical transducers and devices actually used in clinical practice for analyzing clinical biomarkers for disease diagnostics will be reviewed. Emerging research in bioinstrumentation, biomedical technologies, stand alone and wearable sensing devices, analytical method development and validation will be also be covered. Special emphasis will be placed on measurement principles of medical instrumentation used in health technologies ranging from laboratory scale to next generation wearables. Training in professional ethics, grant writing, patenting, innovation, entrepreneurial activities and FDA regulation for new device development, laboratory management, as well as communication

Components: Lecture
Course Equivalents: CM 406, CM 506, BY 506
Attributes: Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 410(1 - 6) **Course ID:007429** **2017-01-13** **Instructor Consent Required**
Undergraduate Thesis Research in Bioscience
A formal thesis project is arranged under supervision of a faculty member who guides the student in planning and execution of original research work and preparation of a written thesis. This course is primarily intended for junior or senior biology majors who wish to pursue graduate or professional studies in bioscience. Work done in satisfaction of the requirements for a degree will be assigned a grade when the thesis is submitted and approved.

Prerequisite: consent of the instructor.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

BY 412(4) **Course ID:007431** **2015-02-12**
Molecular Biology Laboratory
This course will provide students with a hands-on introduction to modern molecular biology techniques. Students will learn techniques such as bacterial transformation and plasmid DNA purification, restriction digest and gel electrophoresis, isolation of DNA and RNA from eukaryotic cells, Southern hybridization, reverse transcription, polymerase chain reaction, and cloning PCR products, and web-based analytical programs. The lectures and reading will cover the theory and applications of these molecular techniques.
Components: Laboratory
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: BY214 or consent of the instructor.
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Biology

BY 416(3) **Course ID:007433** **2022-01-26**
Principles of Toxicology and Epidemiology
[Cross-listed with EHS 518] See EHS 416 Occupational Toxicology for description.
Components: Lecture
Course Equivalents: EHS 416, EHS 518, BY 518
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EHS 309 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 419(3) **Course ID:007402** **2015-02-12**
Immunology
An overview of the immune system, with emphasis on current concepts and literature. Topics covered include: cells and tissues of the immune system; structure and function of antibodies; genetic basis of antibody diversity; humoral and cellular immunity; cellular interactions; major histocompatibility complex; the complement system; transplantation; tumor immunity.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: BY 140, BY 160 and BY 214, or consent of the instructor
Req. Designation: Technology

BY 420(3) **Course ID:007436** **2021-09-14**
Advanced Evolutionary Biology
An in-depth look into the mechanisms driving evolution at both the phenotypic and genomic level, and how an understanding of evolution is crucial for many applied problems in environmental science and human health. Topics include ecological drivers of evolution, how and why DNA sequences and genomes change, population genetics and evolutionary theory, the evolution of gene families and networks, and horizontal gene transfer. The processes driving evolution will also be explored using computer simulations and evolution experiments with microbes. Students registering in the graduate section of this course will be required to complete extended versions of assignments and exams.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY220 or permission of the instructor.
Req. Designation: Technology

BY 424(2) **Course ID:012788** **2020-04-15**
Experimental Evolution Laboratory
[Cross-listed with BY524] An introduction to experimental approaches used in evolutionary biology. Students will conduct lab experiments using microbes to investigate a range of topics in experimental evolution, observing and exploring evolution as it happens in real time. Topics explored will include adaptive diversification, the evolution of fitness trade-offs, evolutionary loss of redundant traits, and evolutionary rescue.
Components: Laboratory
Course Equivalents: BY 524
Attributes: Offered Fall Term
Requirement Group: Corequisites: BY420 and BY522
Req. Designation: Technology

BY 425(3) **Course ID:010432** **2015-03-05**
Biological Systems and Environmental Change
Human activities are resulting in dramatic global environmental change, in the forms of biodiversity loss, altered biogeochemical cycles, introduced invasive species, chemical toxification of the environment, climate change, unsustainable exploitation of natural resources, and habitat loss, degradation, and fragmentation. In this course, we will examine how these forms of environmental change disturb biological systems by critically reading key research papers, and discussing their implications for future research and policy action.
Components: Lecture
Course Equivalents: BY 525
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Odd Springs
Requirement Group: Prerequisites: BY222 or graduate standing.
Req. Designation: Technology

BY 427(3) **Course ID:012915** **2018-11-02**
Advanced Mass Spectrometry: Practical Applications
Practical Applications will introduce the students to mass spectrometry and its applications within different fields, including pharmaceutical and biotech industry, academia, government, forensics, etc. Various types of instruments will be discussed, as well as their their application within different fields. The course will then focus on different types of well-known “omics”, such as proteomics, metabolomics, glycomics, or lipidomics, but also on specialized types of “omics” such as peptidomics, post-translational modification-omics (PTM-omics), interactomics, foodomics, microbiomics, venomics, DNA- RNA- & Protein-adductomics, genomics, proteogenomics or transcriptomics. Particular applications of all these kinds of “omics” in biotechnology & pharmaceutical industry, healthcare, biowarfare and forensics will also be discussed.
Components: Lecture
Course Equivalents: CM 422, CM 522, BY 527
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM/BY460/560, or consent of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 428(3) **Course ID:012959** **2019-09-25**
Kinesiology
Knowledge of the correlates of structure and function is fundamental to the measurement and evaluation of human movement in movement science, health care professions, and product design. This course focuses on application of concepts of human movement to specific regions and joints of the human musculoskeletal system. Included are 1) application of the concepts of biological tissues and tissue mechanics in understanding non-pathological and pathological human movement of each joint and region, and 2) use of tools of measurement and evaluation in studying non-pathological and pathological human movement.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisites: BY471 and PH131 or PH141.
Req. Designation: Technology

BY 430(3) **Course ID:007399** **2017-01-13**
Developmental Biology
The course will focus on how an organism develops into a complex multicellular organism from a single cell. We will begin with the genetics of development and discuss mechanisms by which genes become sequentially activated as embryogensis proceeds. The mechanics and genetics of both invertebrate and vertebrate development will be discussed beginning with fertilization and ending as embryogensis is completed. We will also discuss some additional developmental events that occur during embryogensis and later in adults. Because of technological advances in developmental biology, topics in this field have also become important societal issues. Throughout the semester, we discuss the ethical implications of using these advances and their impact on society.
Components: Lecture
Course Equivalents: BY 510
Requirement Group: Prerequisites: BY160 or consent of the instructor
Req. Designation: Technology

BY 431(3) **Course ID:007439** **2014-12-05**
Limnology
Limnology is the study of physical, chemical, and biological properties of fresh water bodies, e.g. lakes, rivers, reservoirs, and wetlands. This introductory course will provide an array of topics that will, by the multi-disciplinary nature of limnology, call upon students' knowledge of biology, chemistry and physics and place them within the context of aquatic science. The focus of the instruction will be aquatic ecology at all levels of biological organization. Upon completion of the course, the student will be able to characterize the physical, chemical and biological/ecological properties of a freshwater through the selection and application of appropriate sampling methods. Some fieldwork will be required.
Components: Lecture
Requirement Group: Prerequisites: BY222 or CM132 or consent of the instructor. Corequisite: BY 432
Req. Designation: Technology

BY 432(2) **Course ID:011944** **2014-12-05**
Limnology Laboratory
This co-requisite of Limnology (aquatic science) will provide students the opportunity to engage in water sampling of regional lakes and rivers, analysis of samples in the laboratory, introduction to data synthesis, and report writing. Some fieldwork will be required.
Components: Laboratory
Requirement Group: Corequisite: BY431
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Biology

BY 440(3) **Course ID:007443** **2014-11-24**
Biomedical Engineering Fundamentals
[Cross-listed with BR 400, ES 402] This interdisciplinary course will introduce students to basic principles of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medicine and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal and image processing, biomechanics, and biomaterials.
Components: Lecture
Course Equivalents: BR 400, BR 500, BY 540, ES 402
Requirement Group: Prerequisites: MA131/132, PH131/132, junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 445(3) **Course ID:012827** **2017-08-15**
Biological Oceanography
The goal of this course is to introduce students to the fundamentals of ocean science through an integrative approach that emphasizes physical (circulation, tides & waves), chemical (biogeochemistry) and biological (marine life) principles. Through a series of inquiry based and computational exercises, an exploration of the scientific literature and the use of flipped classrooms, we will consider the future of the world's oceans in light of the contemporary challenges they face such as global climate change, pollution and an ever expanding aquaculture trade.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisites: BY140, BY160, and MA180 or MA131
Req. Designation: Technology

BY 448(3) **Course ID:007445** **2016-01-06**
Medical Microbiology
This course will systematically examine human pathogens with a focus on why the biologic properties of organisms are important to disease in humans, including the basic principles of the host immune response, laboratory diagnosis, bacteriology, virology, mycology and parasitology. This class will emphasize basic science with clinical practice to understand the clinical relevance of the organisms examined using clinical cases from literature reports to illustrate the epidemiology, diagnosis, and treatment of infectious diseases. The course will emphasize student interaction and exploration of the scientific literature.
Components: Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: BY 160 and BY 214 (or instructor approval)
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Biology

BY 450(3) **Course ID:007446** **2014-11-20**
Biochemistry I
[Cross-listed with CM 460] This course is a one semester introduction to the molecular basis of biological processes. The first part of the course will cover the structure and function of the four major classes of biomolecules - proteins, carbohydrates, lipids, and nucleic acids. The second part covers the organization and regulation of the major energy generating and biosynthetic pathways.
Components: Lecture
Course Equivalents: BY 650, CM 460, CM 560
Requirement Group: Prerequisites: CM241 or consent of the instructor.
Req. Designation: Technology

BY 451(3) **Course ID:007447** **2019-04-17**
Biochemistry II
[Cross-listed with CM 461] A continuation of Biochemistry I focusing on autotrophic and anabolic metabolism.
Components: Lecture
Course Equivalents: CM 461
Attributes: Offered Spring Term
Requirement Group: Prerequisite: BY450 or equivalent
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 452(3) **Course ID:011267** **2014-11-18**
Pharmacology
[Cross-listed with CM 452] The science of Pharmacology concerns the molecular mechanisms by which drugs act on the human body and the applications of drugs in clinical therapy. This course will introduce students to general principles of drug action and survey selected classes of drugs according to their physiological effects and uses in the treatment of certain diseases.
Components: Lecture
Requirement Group: Prerequisites: BY160 and CM241 or consent of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 453(2) **Course ID:012129** **2015-10-27**
Pharmacology Lab
The goal of this course is to facilitate a greater understanding of key concepts in pharmacodynamics, pharmacokinetics that are discuss in the lecture component and observe how they are applied in the context of the clinical environment. The lab will be simulation based, employing virtual organ bath experiments to derive and interpret dose-response curves, and virtual patient software to investigate drug pharmacokinetics and dosing strategies.

Components: Laboratory
Attributes: Offered Even Springs
Requirement Group: Corequisites: BY 160 and BY 452
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Biology

BY 454(3) **Course ID:007448** **2021-01-15**
Biological Psychology
[Cross-listed with PY 454] A comprehensive investigation of the neuroanatomical and neurophysiological foundations of behavior. Topics include, but are not limited to: perception, motivation, emotion, states of consciousness, learning, memory and mental illness.

Components: Lecture
Course Equivalents: PY 454
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 455(3) **Course ID:010884** **2016-01-19**
Cell and Molecular Biology of Cancer
This course will focus on the cellular and molecular alterations that cause human cancer. Topics include cell cycle regulations, oncogenes and tumor suppressor genes, cancer viruses, multistep tumorigenesis, invasion and metastasis, and new developments in cancer diagnosis and therapy. Emphasis will be placed on student interaction and exploring the scientific literature.

Components: Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: BY160 and BY214 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Biology

BY 458(3) **Course ID:010472** **2017-01-11**
Cognitive Neuroscience
[Cross-listed with PY 458] This course introduces a sampling of the theories and research concerning how various mental processes are accomplished within the brain. Emphasis will be placed on developing an understanding of both the physiological bases of the techniques and the issues involved in relating measures of brain activity to cognitive functioning. Students will be exposed to current topics of study in a number of areas of cognition: perception, language, memory, among others. In this course we will study a number of different techniques for studying the brain, including electrophysiological recording techniques, functional imaging techniques, and methods that involve brain lesions and disrupting neural activity.

Components: Lecture
Course Equivalents: PY 458
Attributes: Individual and Group Behavior, Science, Technology and Society
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 460(3) **Course ID:007449** **2014-11-20**
Neurobiology
[Cross-listed with PY 460] Neurons are electrically excitable cells that initiate or control many complex functions such as sensory perception, locomotion, memory, and learning. This course introduces the study of neuronal mechanisms at the cellular and molecular level. Topics include: membrane biophysics, ion channels, electrical signaling, synaptic transmission, glia, sensory transduction, neuromodulation, and neuronal plasticity.
Components: Lecture
Course Equivalents: BY 561, PY 460
Requirement Group: Prerequisites: BY160 or BY360 or consent of instructor.
Req. Designation: Technology

BY 465(3) **Course ID:012835** **2017-09-28**
Molecular and Genome Evolution
[Cross-Listed with BY565] An overview of the molecular underpinnings of evolution, and how those molecular changes can be used to characterize and understand the evolutionary history of genes, proteins and organisms. Topics include how and why DNA sequences and genomes change, molecular phylogenetics and evolutionary models, gene duplication and the evolution of gene families, and horizontal gene transfer. For BY 565, additional readings and an additional written and oral report will be required.
Components: Lecture
Course Equivalents: BY 565
Attributes: Offered Spring Term
Requirement Group: Prerequisite: BY420
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Biology

BY 470(3) **Course ID:007452** **2019-04-19**
Biochemistry & Biotechnology Laboratory
[Cross-listed with CM 470] This course is a one semester course in the fundamental laboratory approaches for biochemistry and biotechnology. While largely a hands-on course, laboratory experiments will be supplemented with lectures that integrate the theoretical and practical principals covered in the exercises. Topics include protein purification, characterization and analysis, enzyme kinetics and molecular modeling.

Components: Laboratory
Course Equivalents: CM 470
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: CM221 and CM223 or BY450/CM460 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 471(3) **Course ID:007453** **2018-10-23**
Anatomy and Physiology I
This course is the first course in a two semester sequence that studies the anatomy and physiology of the human body in detail. Topics covered in this semester include basic cellular activities, anatomy and physiology of skeletal, muscular, circulatory and lymphatic systems. This course is appropriate for students in the pre-PT program as well as pre-health majors in any other health-related field that require a two-semester Anatomy and Physiology sequence.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY 160 or by consent of the instructor Corequisite: BY 473
Req. Designation: Technology

BY 472(3) **Course ID:007454** **2015-01-20**
Anatomy and Physiology II
This course is the second course in a two semester sequence that studies the anatomy and physiology of the human body in detail. Topics covered in this semester include the anatomy and physiology of major organ systems as well as homeostasis. This course is appropriate for students in the pre-PT program as well as pre-health majors in any other health-related field that require a two-semester anatomy and physiology sequence.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY471 and BY473, or consent of the instructor. Corequisites: BY474.
Req. Designation: Technology

BY 473(2) **Course ID:007455** **2018-10-23**
Anatomy and Physiology I Lab
Companion laboratory course to Anatomy and Physiology I, introducing students to anatomical terminology and histology. The students will focus on anatomy of the human skeletal, muscular and circulatory systems.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY 160, or by permission of the instructor Co-requisite: BY471
Req. Designation: Technology

BY 474(2) **Course ID:007456** **2018-10-23**
Anatomy and Physiology II Laboratory
Companion laboratory course to Human Anatomy and Physiology II, introducing students to anatomical terminology, histology, and organ physiology. The students will focus on human physiology of the major organ systems and the technology used to analyze them.
Components: Laboratory
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisite: BY471 and BY473, or consent of the instructor. Co-requisite: BY472.
Req. Designation: Technology

BY 476(3) **Course ID:010508** **2019-12-02**
Current Topics in Biology & Medicine
[Cross-listed with BY576] This is a discussion-based seminar course that broadly examines advances and implications of modern biology of interest to society, scientists, and students planning a career in medicine, research, or teaching. Students are required to read a variety of current texts, participate in class discussions, and write a substantive essay. Example topics include the discovery of DNA, genome sequencing, applications of bioinformatics, the revolution in applied biotechnology, human physiology under extreme conditions, intellectual history of biology and medicine as explored by prominent science writers, the prognosis for life on earth.
Components: Lecture
Course Equivalents: BY 576
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: BY160 or BY214 or consent of instructor.
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 480(3) **Course ID:007400** **2015-03-03**
Advanced Cell Biology
This course will focus on understanding how cells function normally, and how cell dysfunction can cause human disease. Topics include DNA replication and repair, cell cycle control and cancer, cell communication and intracellular signaling, regulation of gene expression, the cell surface and the cytoskeleton. Current methods used in cell and molecular biology research will be discussed. The course will emphasize student interaction and exploration of the scientific literature.

Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: BY160/162 and BY214 or consent of the instructor.
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 482(3) **Course ID:011478** **2014-11-20**
Molecular Genetics
This course will provide students with detailed information on the structure, packages, and expression of genes within the genome of both prokaryotes and eukaryotes. Topics will include chromatin packaging and structure; DNA replication mutation and repair; transcription; RNA splicing; translation; and control of gene expression. Included with each of these topics will be primary research papers, which will discussed during class. During discussions, experiments in the papers will be analyzed as to how they work (focusing on current biotechnology) and critical analysis of the conclusions. Evaluation will involve exams based on material presented during the course as well as participation in discussions and written analysis of presented research papers. This course contains advanced topics and is designed primarily for graduate or advanced undergraduate students.

Components: Lecture
Course Equivalents: BY 582
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY160, BY214, BY450, CM103 or 131, and CM104 or 132.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Biology

BY 485(3) **Course ID:011198** **2014-11-20**
Neural Engineering
[Cross-listed with EE 485, ES 485] This course applies engineering principles to the study of neuroscience and to the design of devices or techniques intended to replace missing or augment existing functions such as seeing, hearing, speaking, and walking. The course provides a detailed overview of sensorimotor systems, neurophysiology, neuroanatomy, neuropathology and clinical neurology. The class sequences through the various sensory and movement systems, providing a quantitative basis for how the nervous systems works for these systems, for how it dysfunctions, for the disability produced, and finally for how function can be restored by neuroprostheses. Students will prepare and present a paper on a neural engineering topic.
Components: Lecture
Course Equivalents: EE 585, EE 485, ES 485
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 486(3) **Course ID:011809** **2015-02-12**
Molecular Biotechnology
Molecular biotechnology is a rapidly evolving scientific discipline impacting on many aspects of our daily life. This course will review basic concepts and methodologies in recombinant DNA technology, cover the use of molecular biotechnology for the production of useful products in areas of microbial, plant and animal biotechnology and address social and economic issues rising with the availability of these technologies.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY160 and BY214, or consent of the instructor.
Req. Designation: Technology

BY 488(3) **Course ID:011810** **2015-02-12**
Stem Cells and Regenerative Medicine
This course will cover biological and medical perspectives of stem cells from their fundamental basic biology and mechanisms of organ regeneration through the use of induced-pluripotent stem cells (iPSCs) for therapeutic benefit. It will deal with mammalian and human embryonic stem cells (hESCs) and focus on how iPSCs generate distinct fates during human development and how this can be used for regenerative therapy of common human diseases.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY160 and BY214, or consent of the instructor.
Req. Designation: Technology

BY 490(3) **Course ID:007459** **2015-03-05**
Term Integrated Project in Bioscience
This problem-based course will task students to analyze and suggest solutions to a complex problem in the field of infectious disease research. The course is intended to reinforce what they have learned in the other courses during the Trudeau Semester in Bioscience. Enrollment is limited to students participating in the Trudeau Semester.
Components: Project Team
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Given When Needed
Requirement Group: Enrollment is limited to students participating in the Trudeau Semester.
Req. Designation: Technology

BY 495(1 - 2) **Course ID:011277** **2015-01-23** **Instructor Consent Required**
Undergraduate Teaching Assistantship in Bioscience
Students obtain teaching experience by assisting a faculty member in teaching a lecture or laboratory course. Pedagogical activities may include leading laboratory or discussion sections, designing and testing laboratory exercises, and assisting in student assessment.

Prerequisites: Consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

BY 498(0) **Course ID:007463** **2015-08-19** **Instructor Consent Required**
Internship in Bioscience
During the fall semester, spring semester, or summer, a student must complete an off-campus professional experience directly related to a career in the basic or applied biosciences that meets the professional goals of the student and the Clarkson university-wide requirements for a professional experience. The experience should involve minimally 120 hours of training and work, and must be pre-approved by the student's faculty advisor or Chair of Biology. A formal report upon completion of the internship is required.
Prerequisites: Consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

BY 499(0) **Course ID:007464** **2015-08-18** **Instructor Consent Required**
Professional Experience in Bioscience
During the fall semester, spring semester, or summer, a student must complete a professional experience that is not necessarily directly bioscience-related, but clearly meets the professional goals of the student and the Clarkson university-wide requirements for a professional experience. The experience should involve minimally 120 hours of training and work, and must be pre-approved by the student's faculty advisor or Chair of Biology. A formal report upon completion of the internship is required.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Biology

BY 506(3) **Course ID:013051** **2020-09-02**
Biomedical Analysis and Instrumentation
[Cross-listed with CM 506] Biomedical Analysis and Instrumentation is a lecture course designed to provide advanced undergraduates and graduate students in basic sciences, biosciences and bioengineering disciplines with scientific and engineering aspects of instrumentation, sample analysis, measuring and processing signals from living organisms. Functioning and calibration of biomedical transducers and devices actually used in clinical practice for analyzing clinical biomarkers for disease diagnostics will be reviewed. Emerging research in bioinstrumentation, biomedical technologies, stand alone and wearable sensing devices, analytical method development and validation will be also be covered. Special emphasis will be placed on measurement principles of medical instrumentation used in health technologies ranging from laboratory scale to next generation wearables. Training in professional ethics, grant writing, patenting, innovation, entrepreneurial activities and FDA regulation for new device development, laboratory management, as well as communication

Components: Lecture
Course Equivalents: BY 406, CM 406, CM 506
Attributes: Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 510(3) **Course ID:007465** **2014-12-05**
Developmental Biology
This course will cover the same subject area and topics as that of BY 310. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Course Equivalents: BY 430
Req. Designation: Technology

BY 512(4) **Course ID:007486** **2016-12-22**
Molecular Biology Laboratory
This course will deal with the same subject area and topics as that of BY 412. Additional materials at the graduate level will be expected of those who register under this catalog number.
Prerequisites: graduate standing.
Components: Laboratory
Attributes: Offered Fall Term
Req. Designation: Technology

BY 514(4) **Course ID:007890** **2015-01-20**
Bioinformatics
This course and companion lab will cover the same subject area and topics as BY314. Additional materials at the graduate level will be expected of those who register under this catalog number.
Prerequisite: Graduate standing.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Biology

BY 518(3) **Course ID:010304** **2022-01-26**
Principles of Toxicology and Epidemiology
[Cross-listed with IH 416, BY 416, IH 518] This course covers the same topics as IH416 (BY416) and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: BY 416, EHS 416, EHS 518
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 519(3) **Course ID:007467** **2015-02-12**
Immunology
This course will cover the same subject area and topics as that of BY 419. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 520(3) **Course ID:007468** **2014-12-05**
Microbiology
This course will cover the same subject area and topics as that of BY 320. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Req. Designation: Technology

BY 522(3) **Course ID:007487** **2021-09-14**
Advanced Evolutionary Biology
[Cross-Listed with BY420] An in-depth look into the mechanisms driving evolution at both the phenotypic and genomic level, and how an understanding of evolution is crucial for many applied problems in environmental science and human health. Topics include ecological drivers of evolution, how and why DNA sequences and genomes change, population genetics and evolutionary theory, the evolution of gene families and networks, and horizontal gene transfer. The processes driving evolution will also be explored using computer simulations and evolution experiments with microbes. Students registering in the graduate section of this course will be required to complete extended versions of assignments and exams.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 524(2) **Course ID:012789** **2017-02-03**
Experimental Evolution Laboratory
[Cross-listed with BY424] An introduction to experimental approaches used in evolutionary biology. Students will conduct lab experiments using microbes to investigate a range of topics in experimental evolution, observing and exploring evolution as it happens in real time. Topics explored will include adaptive diversification, the evolution of fitness trade-offs, evolutionary loss of redundant traits, and evolutionary rescue.
Components: Laboratory
Course Equivalents: BY 424
Attributes: Offered Fall Term
Requirement Group: Prerequisites: BY522
Req. Designation: Technology

BY 525(3) **Course ID:010433** **2014-12-05**
Biological Systems and Environmental Change
Human activities are resulting in dramatic global environmental change, in the forms of biodiversity loss, altered biogeochemical cycles, introduced invasive species, chemical toxification of the environment, climate change, unsustainable exploitation of natural resources, and habitat loss, degradation, and fragmentation. In this course, we will examine how these forms of environmental change disturb biological systems by critically reading key research papers, and discussing their implications for future research and policy action.
Components: Lecture
Course Equivalents: BY 425
Req. Designation: Technology

BY 527(3) **Course ID:012916** **2018-11-02**
Advanced Mass Spectrometry
Practical Applications will introduce the students to mass spectrometry and its applications within different fields, including pharmaceutical and biotech industry, academia, government, forensics, etc. Various types of instruments will be discussed, as well as their their application within different fields. The course will then focus on different types of well-known “omics”, such as proteomics, metabolomics, glycomics, or lipidomics, but also on specialized types of “omics” such as peptidomics, post-translational modification-omics (PTM-omics), interactomics, foodomics, microbiomics, venomics, DNA- RNA- & Protein-adductomics, genomics, proteogenomics or transcriptomics. Particular applications of all these kinds of “omics” in biotechnology & pharmaceutical industry, healthcare, biowarfare and forensics will also be discussed.
Components: Lecture
Course Equivalents: CM 422, CM 522, BY 427
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM/BY460/560, or consent of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 528(3) **Course ID:011663** **2012-01-31**
Conservation Biology
BY528 provides a graduate-level overview of the core theory of conservation biology, and how conservation biology is applied for environmental conservation and management. Major topics of this course will include conservation prioritization, the problems of small population size on the long-term persistence of a species, conservation genetics, habitat fragmentation and nature reserve design, invasive species, consequences of extinctions on an ecosystem processes and community structure, and the possible effects on biodiversity of global climate change. A course emphasis will be on the challenge of translating the core lessons of conservation biology to effective policy and environmental management. BY528 students will do additional readings, mathematical simulation exercises, and recitations beyond BY428 students.
Prerequisite: Graduate Standing.
Components: Lecture
Req. Designation: Technology

BY 531(3) **Course ID:007471** **2014-12-05**
Limnology
Limnology (aquatic science) is the study of physical, chemical, and biological properties of fresh water bodies, e.g. lakes, rivers, reservoirs, and wetlands. This introductory course will provide an array of topics that will, by the multi-disciplinary nature of limnology, call upon students' knowledge of biology, chemistry and physics and place them within the context of aquatic science. The focus of the instruction will be aquatic ecology at all levels of biological organization. Upon completion of the course, the student will be able to characterize the physical, chemical and biological/ecological properties of freshwater through the selection and application of appropriate sampling methods. This course covers the same subject area as BY 431 and includes additional materials at the graduate level.
Prerequisite: BY222 or CM132 or consent of the instructor.
Components: Lecture
Requirement Group: Corequisite: BY 532
Req. Designation: Technology

BY 532(2) **Course ID:011956** **2014-12-05**
Limnology Laboratory
This co-requisite of Limnology (aquatic science) will provide students the opportunity to engage in water sampling of regional lakes and rivers, analysis of samples in the laboratory, introduction to data synthesis, and report writing. Some fieldwork will be required.
Components: Laboratory
Requirement Group: Corequisite: BY 531
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Biology

BY 540(3) **Course ID:010662** **2014-11-18**
Introduction to Biomedical Rehabilitation Engineering and Science
[Cross-listed with BR 500] This interdisciplinary course will introduce students to basic principles of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medicine and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal and image processing, biomechanics, and biomaterials.
Prerequisites: MA131/132, PH131/132, junior or senior standing.
Components: Lecture
Course Equivalents: BY 440, BR 400, BR 500, ES 402
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 548(3) **Course ID:007473** **2014-09-18**
Medical Microbiology
This course will cover the same subject area and topics as that of BY 448. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Req. Designation: Technology

BY 552(3) **Course ID:013112** **2021-06-01**
Pharmacology
This course will cover the same subject area and topics as that of BY 452. Graduate students will be required to do additional reading and submit a literature review concerning a topic of their choice, relating to the course material.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

BY 555(3) **Course ID:010885** **2016-08-15**
Cell and Molecular Biology of Cancer
This course will deal with the same subject area and topics as that of BY455. Additional materials at the graduate level will be expected of those who register under this catalog number.
Prerequisites: graduate standing.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 560(3) **Course ID:007475** **2015-01-20**
Comparative Physiology
In this course, graduate students will be instructed in all the main branches of modern animal physiology with a strong emphasis on the integration of physiological knowledge, ecology, and evolutionary biology. In addition to an in-depth treatment of mammalian physiology, graduate students will be exposed to the various physiological systems that have evolved in other vertebrate, as well as invertebrate, animals. In addition to meeting the demands of the BY360 course, graduate students will be required to do additional reading and submit a literature review concerning a topic of their choice relating to the course material.
Prerequisite: Graduate Standing.
Components: Lecture
Course Equivalents: BY 360
Attributes: Offered Spring Term
Req. Designation: Technology

BY 561(3) **Course ID:007491** **2016-11-01**
Neurobiology
This course will cover the same subject area and topics as that of BY 460. Additional materials at the graduate level will be expected of students who register under this catalog number.
Prerequisites: graduate standing.
Components: Lecture
Course Equivalents: BY 460, PY 460
Attributes: Offered Fall Term
Req. Designation: Technology

BY 565(3) **Course ID:012836** **2017-09-28**
Molecular and Genome Evolution
[Cross-Listed with BY465]An overview of the molecular underpinnings of evolution, and how those molecular changes can be used to characterize and understand the evolutionary history of genes, proteins and organisms. Topics include how and why DNA sequences and genomes change, molecular phylogenetics and evolutionary models, gene duplication and the evolution of gene families, and horizontal gene transfer. For BY 565, additional readings and an additional written and oral report will be required.
Components: Lecture
Course Equivalents: BY 465
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 571(3) **Course ID:012092** **2015-06-01**
Anatomy & Physiology I
This is the first semester of a two-semester sequence covering the basic principles of Human Anatomy and Physiology. The course will focus on the anatomical organization and physiology of the human body using a systems approach. Lectures will emphasize a basic understanding of how anatomical organization at the cell, tissue and organ level correlates with physiological processes. Clinical connections will be drawn wherever relevant. In addition to covering the same subject areas as that of BY471, some advanced topics will be discussed and the students will be given additional reading and writing assignments. This course can assist students in finding a relevant research question to pursue investigation in the field of biomedical science.
Prerequisite: Graduate standing, or permission of the instructor
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 572(3) **Course ID:012093** **2018-01-08**
Anatomy & Physiology II
This is the second semester of a two-semester sequence covering the basic principles of Human Anatomy and Physiology. The course will focus on the anatomical organization and physiology of the human body using a systems approach. Lectures will emphasize a basic understanding of how anatomical organization at the cell, tissue and organ level correlates with physiological processes. Clinical connections will be drawn wherever relevant. In addition to covering the same subject areas as that of BY472, some advanced topics will be discussed and the students will be given additional reading and writing assignments. This course can assist students in finding a relevant research question to pursue investigation in the field of biomedical science.
Prerequisites: Graduate standing, or permission of the instructor
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 573(2) **Course ID:012094** **2015-06-01**
Anatomy & Physiology I Laboratory
This is the first semester of a two-semester sequence covering the basic principles of Human Anatomy and Physiology. This is the corresponding laboratory for BY571 and will involve anatomical study using a computer-assisted methodology and demonstrations of anatomical models and specimens. In addition to covering the same subject areas as that of BY473, some advanced topics will be discussed and the students will be given additional reading and writing assignments.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisite: BY 571
Req. Designation: Technology

BY 574(2) **Course ID:012095** **2018-01-08**
Anatomy & Physiology II Laboratory
This is the corresponding laboratory for BY572. The laboratory exercises will focus on physiology and will involve study using a computer-assisted methodology. The students will learn the principles and methodologies of various physiological measurements including bioelectric signals, pulmonary function tests and nerve reflexes. The course will require students to submit a written project and give an oral presentation for successful completion. In addition to covering the same subject areas as that of BY474, some advanced topics will be discussed and the students will be given additional reading and writing assignments.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Corequisite: BY 572
Req. Designation: Technology

BY 576(3) **Course ID:010509** **2015-02-12**
Current Topics in Biology and Medicine
[Cross-listed with BY476] This course will cover the same subject area and topics as that of BY476. Additional materials at the graduate level will be expected of students who register under this catalog.
Prerequisites: graduate standing.
Components: Lecture
Course Equivalents: BY 476
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 580(3) **Course ID:007494** **2016-08-15**
Advanced Cell Biology
This course will cover the same subject area and topics as that of BY 480. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 582(3) **Course ID:011483** **2017-01-11**
Molecular Genetics
This course will provide students with detailed information on the structure, packages, and expression of genes within the genome of both prokaryotes and eukaryotes. Topics will include chromatin packaging and structure; DNA replication mutation and repair; transcription; RNA splicing; translation; and control of gene expression. Included with each of these topics will be primary research papers, which will discussed during class. During discussions, experiments in the papers will be analyzed as to how they work (focusing on current biotechnology) and critical analysis of the conclusions. Evaluation will involve exams based on material presented during the course as well as participation in discussions and written analysis of presented research papers. This course contains advanced topics and is designed primarily for graduate or advanced undergraduate students. Graduate students will do additional course work.

Components: Lecture
Course Equivalents: BY 482
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 586(3) **Course ID:011811** **2015-02-12**
Molecular Biotechnology
Molecular biotechnology is a rapidly evolving scientific discipline impacting on many aspects of our daily life. This course will review basic concepts and methodologies in recombinant DNA technology, cover the use of molecular biotechnology for the production of useful products in areas of microbial, plant and animal biotechnology and address social and economic issues rising with the availability of these technologies. Additional materials will be expected at the graduate level.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 588(3) **Course ID:011812** **2015-02-12**
Stem Cells and Regenerative Medicine
This course will cover biological and medical perspectives of stem cells from their fundamental basic biology and mechanisms of organ regeneration through the use of induced-pluripotent stem cells (iPSCs) for therapeutic benefit. It will deal with mammalian and human embryonic stem cells (hESCs) and focus on how iPSCs generate distinct fates during human development and how this can be used for regenerative therapy of common human diseases. Additional materials expected at the graduate level.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 600(1 - 4) **Course ID:007893** **2015-01-23** **Instructor Consent Required**
Directed Study in Bioscience
Students study advanced topics in bioscience not otherwise available in formal graduate courses. Under supervision of a faculty member, a semester-long course of study is designed based on readings from appropriate texts and primary literature.

Prerequisites: Graduate standing and consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

BY 604(3) **Course ID:012070** **2015-03-27**
Molecular Pharmacology
In this course, students will be introduced to the techniques used to study the structure and function of membrane receptor proteins, in particular those of two families that together comprise over 80% of pharmaceutical drug targets: ion channels and G protein-coupled receptors. Specifically, students will see how knowledge of a receptor's 3-dimensional structure and signal transduction mechanism aids understanding of drug action and can assist in the design of newer, better therapeutic agents.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

BY 608(2) **Course ID:007894** **2015-09-18**
Teaching in Biosciences
This course is intended to improve bioscience teaching training for graduate students. Graduate students will read literature based on the current state of biology education at the university level (e.g. AAAS Vision and Change in Undergraduate Biology Education). Students will also learn how to design undergraduate bioscience teaching labs, and effectively teach the labs. Activities will include writing a course syllabus, and designing and conducting an original lab activity with resources available on the Clarkson campus. The designed lab can be at the level of a freshman lab, or an upper level biology course. Students will need to consider how the lab will be conducted, what is expected for pre-lab and post-lab assignments, and how lab students will be evaluated. Other activities will include how to write effective laboratory protocols and learning to manage a bioscience laboratory.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

BY 610(3) **Course ID:007485** **2015-02-03**
Ecological Statistics and Experimental Design
Ecological statistics and experimental design covers a broad and eclectic area of applied statistics used in data description, exploratory data analysis, and statistical hypothesis testing used in environmental science. This course also introduces R as a powerful application for doing experimental design and statistics.
Components: Laboratory, Lecture
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 622(1) **Course ID:007488** **2020-09-16**
Graduate Seminar
Weekly meetings to discuss topics of current research interest and attendance of research seminars presented in the biology department. Each candidate for the IBB M.S. or IBB Ph.D. must enroll and participate in BY622 every semester of their degree and present at least one seminar or more for each calendar year that they are in the program. Prerequisite: graduate standing.

Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Biology

BY 650(3) **Course ID:007489** **2015-02-12**
Biochemistry I
[Cross-listed as CM 560] This course covers the same topics as BY 450 and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: BY 450, CM 460, CM 560
Attributes: Offered Fall Term
Req. Designation: Technology

BY 651(3) **Course ID:007490** **2014-11-20**
Biochemistry II
[Cross-listed with CM 561] This course will cover the same subject area and topics as that of BY 451. Additional materials at the graduate level will be expected of those who register under this catalog number. Prerequisites: graduate standing.
Components: Lecture
Course Equivalents: CM 561
Attributes: Offered Spring Term
Req. Designation: Technology

Science - Biology - Subject: Biology

BY 690(2) **Course ID:012739** **2016-09-05**
Critical Thinking and Research Proposal Development in Biology
This course provides a thorough coverage of the essential elements of research proposal writing, a skill that is required throughout one's scientific career but for which formal training is frequently lacking. After an introductory lecture that provides a general overview of the conceptualization and writing of a research proposal, students will be guided through a series of exercises designed to develop these critical skills. Subsequent meetings will be in the form of small tutorial groups with a faculty member leading discussion of primary literature and the outstanding questions in a particular field of research. Students will exchange their written reports with their peers to get feedback from their peers at different stages of draft preparation before submitting them to the faculty instructor for grading. Students will be encouraged to meet with their peers outside of class hours to discuss their reports/proposals. This course aims at preparing IB&B PhD students for their pre-proposal and full proposal writing, which are the written

Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Biology

BY 900(1 - 15) **Course ID:011278** **2015-02-03**
Thesis, Dissertation or Special Project in Bioscience
Student performs independent research toward a masters or doctorate degree under the guidance of a faculty thesis advisor. A graduate thesis committee monitors student progress and provides guidance toward completion of the project. Work done in satisfaction of the requirements for a degree will be assigned a grade when the thesis is submitted and approved.

Prerequisites: Graduate standing.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

BY 999(1 - 10) **Course ID:011095** **2015-01-13**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 1(2 - 4) **Course ID:008056** **2015-01-13**
Civil and Environmental Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. (Not offered at Clarkson, for transfer credit only.)
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CE 2(2 - 4) **Course ID:008057** **2015-01-13**
Civil and Environmental Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective. (Not offered at Clarkson, for transfer credit only.)
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CE 6(2 - 4) **Course ID:009721** **1901-01-01**
CEE Elective
Transfer Credit Only
Components: Lecture
Attributes: Engineering Foundation Curriculum Course, Transfer Credit Only

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CE 212(3) **Course ID:007499** **2022-04-27**
Introduction to Engineering Design
This course teaches students how to solve problems through an intentional process known as engineering design. Students learn the seven steps of the iterative engineering design process: Ask, Imagine, Plan, Create, Test, Improve, and Share. Students practice the iterative engineering design process by working with multidisciplinary peer groups to solve real-world engineering problems. This course emphasizes continuous improvement and sustainability in engineering design; the broader impacts of engineering innovation on the planet and society; and professional skills like collaboration, communication, critical thinking, and engineering ethics.
Components: Laboratory, Lecture
Course Equivalents: AE 212, ME 212
Attributes: 1.5 Design Credits, One communication unit, Offered Fall Term
Requirement Group: Prerequisites: Civil & Environmental Engineering at least Sophomore standing or consent of the instruc

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CE 301(3) **Course ID:007500** **2020-08-18**
Introduction to Geospatial Analysis and Geographic Information Systems
[Cross-listed with SC 301] An introductory course in the concepts and uses of Geographic Information Systems (GIS) including analysis of GIS-based local and global geographic datasets. Provides basic knowledge of GIS theory and applications using existing state-of-the-art GIS software and current spatial data resources. Applications include: overlay analysis, spatial data query, map generation and terrain surface analysis. Students will also learn the basics of GPS data collection, remote sensing, 3D visualization, probability, statistics, and error analysis.
Components: Laboratory, Lecture
Course Equivalents: SC 301
Attributes: Offered Each Term
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

CE 302(3) **Course ID:013047** **2022-06-07**
Surveying, Geodetic Control, and Engineering Measurements
Fundamentals of terrestrial surveying measurements include leveling, distances, and angle measurements to compute Orthometric heights relative to a vertical survey datum and 2-D Cartesian coordinates in a horizontal survey datum for engineering projects. Exposure to advanced surveying techniques including GPS, UAV, bathemetric survey, LIDaR, and use of Autodesk Civil3D will be covered.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Prerequisite: MA131
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 304(3) **Course ID:013043** **2020-08-18**
Introduction to Scheduling and Estimating
An introduction to the principles and theories of estimating and scheduling a construction project. Basic and advanced estimating and scheduling techniques will be discussed for both building and heavy/civil projects. The use of computers in estimating and scheduling will be highlighted in the course. Project: the student will estimate the cost of and submit a schedule for a medium sized building project given a complete set of contract documents and other project information. (2 credits of design)
Components: Lecture
Attributes: Two Design Credits, Offered Spring Term
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

CE 305(3) **Course ID:007507** **2018-06-13**
Construction Planning and Management
This course will focus on project planning, design services contracts, construction contract documents, construction management, labor relations, construction bonds and insurance, construction scheduling, estimating and bidding procedures, cost control, value engineering, and construction administration. Some topics will be presented by guest lecturers. (1 credit of design)
Components: Lecture
Attributes: One Design Credit, Offered Spring Term
Requirement Group: Requirement: Must have Sophomore or above standing.
Req. Designation: Technology

CE 310(3) **Course ID:007501** **2017-01-09**
Geotechnical Engineering I: Soil Mechanics
An introduction to geotechnical engineering. Identification, classification and engineering properties of soil. Topics include stress-strain and strength relationships, consolidation, permeability and compaction of soils. Related geotechnical design problems included. Laboratory experience included. (1 credit of design)
Components: Laboratory, Lecture
Attributes: One Design Credit, One communication unit, Offered Spring Term
Requirement Group: Prerequisites: ES222
Req. Designation: Technology

CE 313(3) **Course ID:011378** **2022-06-07**
Biogeochemical Earth Systems Science
[Cross-listed with EV 313, BY 313] This course will investigate the key concepts and principles of environmental science emphasizing the earth's biogeochemical cycles and how they have been perturbed by human activities. Quantitative analysis of air, soil and water quality on local, regional and global scales will be a significant component of the course. Emerging principles in environmental science, including sustainability, industrial ecology, risk assessment and the precautionary principle will be introduced. In addition to the quantitative aspects, the course will consider the historical, social, and political contexts in which the practice of environmental science takes place.
Components: Lecture
Course Equivalents: BY 313, EV 313
Attributes: Given When Needed
Requirement Group: Prerequisites: CM132 (or CM104), or consent of the instructor
Req. Designation: Technology

CE 315(3) **Course ID:007510** **2022-06-07**
Geology For Engineers
This course explores the fundamentals of geology with respect to civil engineering. Topics include rock and mineral types, soils, soil formation and properties, geologic structures and topography, active tectonics and earthquake hazards. In addition, the course will cover slope stability, landslides, sediments and sediment transport, groundwater, formation and use of earth materials, and alteration of rocks and minerals. Instruction is conducted through lecture and laboratory exercises.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CM 131 and PH 131 Corequisite: CM 132
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 316(3) **Course ID:013148** **2022-03-18**
Earth's Dynamic Climate: Science & Impacts
The course will present the scientific background, from a geologic perspective, behind the Earth's climate system, including drivers, processes and responses. Time will be spent examining proxy records to understand how we know about climates of the past. The second part of the course will use an earth science-based approach through the use of geologic principles to examine the past, present and potential impacts on earth systems and the societies constructed in various environments with a focus on how climate variations have and may impact civil and environmental engineering projects through applications of process geomorphology.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM131, PH131, or consent of instructor
Req. Designation: Technology

CE 320(3) **Course ID:007502** **2015-02-23**
Structural Analysis
Linear elastic analysis of structural systems including the computation of internal and external forces and displacements produced by the application of loads. Statically determinate and indeterminate systems are considered. Laboratory experience included. (1 credits of design)
Components: Laboratory, Lecture
Attributes: One Design Credit, One communication unit, Offered Fall Term
Requirement Group: Prerequisites: ES222
Req. Designation: Technology

CE 330(3) **Course ID:007503** **2018-07-13**
Water Resources Engineering I
An introduction to water resources engineering. Topics include flow in pressurized conduits, hydraulic machinery, open channel flow, design of wastewater flow systems, hydrological cycle, rainfall and runoff analysis. Laboratory experience included. (1 credit of design)
Components: Laboratory, Lecture
Attributes: One Design Credit, One communication unit, Offered Fall and Spring
Requirement Group: Prerequisite: ES330.
Req. Designation: Technology

CE 340(3) **Course ID:007504** **2018-07-13**
Introduction to Environmental Engineering
An introduction to the fundamentals of environmental engineering and science. Discussion of the role of engineering in current and emerging environmental issues. Topics include: materials balances, reactor flow models, and chemical fate and transport, with applications in natural and engineered environmental systems. (1 credit of design)
Components: Laboratory, Lecture
Attributes: One Design Credit, Offered Spring Term
Requirement Group: Prerequisites: MA131 and CM104 or CM132. Corequisite: MA232.
Req. Designation: Technology

CE 380(3) **Course ID:012771** **2016-11-01**
Fundamentals of Environmental Engineering
This course explores chemical and physical fundamentals in solving environmental engineering problems related to water quality, water and wastewater treatment, air pollution, solid and hazardous waste management, sustainability, and risk assessment. The importance of mass balances and the physical and chemical processes involved in transferring chemicals within and between air, water and soil will be studied. Laboratory experiences included. (1 credit of design).
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: CH210 or consent of instructor
Req. Designation: Technology

CE 404(3) **Course ID:010431** **2020-08-18**
Applications in Scheduling and Estimating
An application of estimating and scheduling for a construction project. Students will take part in an intensive, project-based scheduling and estimating effort leading up to and including regional level competition as part of the Associated Schools of Construction. Projects will include commercial building, heavy/civil works, pre-construction services, and design-build projects. As part of a team, participants will prepare bid or proposal documentation, develop detailed reports, and provide an oral presentation to a client panel. (This course includes 2 design credits)
Components: Lecture
Attributes: Two Design Credits, Offered Fall Term
Requirement Group: Prerequisites: CE 304, or consent of the instructor
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 406(3) **Course ID:007508** **2020-08-19**
Infrastructure Construction
This course develops the procedures for the design and construction for a heavy civil construction project. Estimating resources (labor, materials, and equipment selection) as well as determining the sequence and required planning for a horizontal construction effort and/or a foundation/retaining structure (including: contract documents, project reports, equipment rental rates and equipment brochures and other project information). Students will also develop a distinct project packet to execute a project of this type for presentation to the faculty, potential guests, and students. (2 credits of design)
Components: Lecture
Attributes: Two Design Credits, Offered Fall Term
Requirement Group: Prerequisites: CEE junior or senior standing.
Req. Designation: Technology

CE 408(3) **Course ID:011636** **2015-09-15**
Building Information Modeling (BIM) and Intergraded Project Delivery (IPD)
Course provides an introduction to the emerging field of building information modeling and integrated project management for construction projects. Course will cover basic techniques and methods to the use of current/state of the art computer aided design software including Autodesk Revit, and Autodesk Navisworks. (2 credits of design)
Components: Lecture
Attributes: Two Design Credits, Offered Each Term
Requirement Group: Prerequisites: CEE Junior or Senior standing
Req. Designation: Technology

CE 409(3) **Course ID:012026** **2015-03-09**
Fundamentals of Building Systems
An examination of building life support systems and technology of interest to civil engineers in the planning, operation, and maintenance of buildings. Topics include human comfort, electrical, mechanical, water and waste, transportation, lighting, and other systems necessary for building utilization. Special cases will be examined in integrated project delivery, sustainable design practices, and energy modeling.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

CE 410(3) **Course ID:012045** **2018-11-13**
Sustainable Infrastructure and Building
A study of the use of sustainability rating systems for infrastructure and building projects. Utilizing the USGBC LEED and the ISI Envision rating systems, this course will teach the fundamentals of sustainable building and acquaint students with the processes required to certify/verify projects to meet an independent rating standard. This course will prepare students to take the LEED GA and/or Envison ENV PV exams.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

CE 411(3) **Course ID:007509** **2022-06-07**
Construction Materials Engineering
Proper procedures for installation of major construction materials, including soil, concrete, steel, pipe, masonry units, etc. Material production including Portland cement concrete, concrete masonry units, bituminous concrete, and structural steel. Project specifications will be reviewed governing the above material, including methods of designing, testing and inspecting construction materials and completed installations. (2 credits of design)
Components: Lecture
Attributes: Two Design Credits, Offered Fall Term
Requirement Group: Prerequisites: Junior or Senior standing
Req. Designation: Technology

CE 415(3) **Course ID:007511** **2015-02-23**
Foundations, Stability, and Retaining Structures
Application of principles of soil mechanics to the design of shallow and deep foundations, retaining structures and slope stability. Bearing capacity theory and settlements. Interpretation of soil boring logs as related to geotechnical engineering design. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, Offered Fall Term
Requirement Group: Prerequisite: CE310.
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 420(3) **Course ID:007512** **2022-06-07**
Computational Methods of Structural Analysis
The matrix stiffness method, theory and implementation in MATLAB, for the analysis of trusses, beams, frames, and grids. Discussion of thermal effects, support settlements, nonlinear effects, and other modeling considerations.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CE320 with minimum grade of C or consent of the instructor.
Req. Designation: Technology

CE 430(3) **Course ID:007898** **2015-02-23**
Water Resources Engineering II
Hydraulic structures, design of open channels, flood routing, runoff models, design of stormwater management systems, groundwater hydrology, transport and mixing processes. (1 credit of design)
Components: Lecture
Attributes: One Design Credit, Offered Spring Term
Requirement Group: Prerequisite: CE330.
Req. Designation: Technology

CE 433(3) **Course ID:010510** **2021-11-09**
Human Exposure Analysis
Human exposure analysis is an emerging science concerned with how humans come into contact with chemicals in the environment via inhalation, ingestion, and dermal contact. The course focuses on scientific and engineering issues, including direct measurement and model constructs. Students gain an understanding of the complexities, uncertainties, and physical, chemical and biological issues relevant to human exposures resulting from the use and release of toxic compounds. Topics include human exposure analysis terminology, pollutant fate and transport, human activity patterns, occupational exposure, indoor air quality, dosimetry, and statistical and mechanistic tools for exposure assessment. For the final project, the students design and perform a small-scale human exposure study using monitoring instruments and/or exposure models. (2 credits of design.)
Components: Lecture
Course Equivalents: CE 533
Attributes: Two Design Credits, Offered Even Falls
Requirement Group: Prerequisites: Senior or graduate status in engineering or IH or consent of the instructor.
Req. Designation: Technology

CE 434(3) **Course ID:011708** **2021-11-09**
Sustainable Development Engineering
This course outlines the principles of sustainable engineering for improving sanitation and environmental health in developing communities both internationally and nationally. Topics include sustainable development and appropriate technologies for water and wastewater treatment, water storage and delivery, watershed management, solid waste management, and indoor air quality. The course highlights the importance of community participation and relationship building throughout the development and implementation of engineering projects. At least 2/3 of the course is dedicated to a team-based, sustainable development design project. (2 credits of design)
Components: Lecture
Course Equivalents: CE 534
Attributes: Two Design Credits, One communication unit, Science, Technology and Society, Offered Odd Falls
Requirement Group: Prerequisite: CE340 or consent of the instructor.
Req. Designation: Technology

CE 435(3) **Course ID:011393** **2022-01-27**
Groundwater Hydrology and Geochemistry
[Cross-listed with EV 435] This class provides fundamental understanding of the key physical and chemical processes impacting groundwater resources and quality. Emphasis is on groundwater geology, physical characteristics of flow, and geochemical properties of groundwater. Groundwater contamination and contaminant transport and modeling will be introduced. The course will prepare students to qualitatively and quantitatively analyze fluid and contaminant flow in varied geologic systems.
Components: Lecture
Attributes: One Design Credit, Given When Needed
Requirement Group: Prerequisites: CM132 (or CM104/106), and MA131, and (or EV/BY280)
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 441(3) **Course ID:007514** **2021-11-09**
Reinforced Concrete Design
The investigation and design of reinforced structural elements such as beams, slabs, columns and footings to meet ACI 318 code requirements. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, Offered Spring Term
Requirement Group: Prerequisite: ES 222; Corequisite: CE 320
Req. Designation: Technology

CE 442(3) **Course ID:007515** **2021-11-09**
Steel Design
Determination of loads for design; behavior and design of tension members, columns, beams, beam-columns, bolted connections, and welded connections; use of LRFD specifications and the Uniform Building Code. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, Offered Fall Term
Requirement Group: Prerequisite: CE320 or consent of the instructor.
Req. Designation: Technology

CE 448(3) **Course ID:010696** **2022-06-07**
Introduction to Architectural Engineering
This course will examine the integration of architecture and engineering disciplines in building design and will include introduction to the architectural design process; historical development of architecture/engineering; issues of structural, electrical, HVAC, plumbing, environmental, and acoustical engineering in buildings; economic, construction, and spatial maintenance considerations; professional practice and building codes. Students will be assigned graphic, freehand drawing/sketching, calculation and written exercises as well as a final project. (2 credits of design)
Components: Laboratory, Lecture
Attributes: Two Design Credits, Offered Fall Term
Requirement Group: Prerequisites: ES220 and CE212, or consent of instructor.
Req. Designation: Technology

CE 452(3) **Course ID:007907** **2022-06-07**
Advanced Strength of Materials
A study of properties of materials, general stress-strain relationships, modern strength theories, unsymmetrical bending, curved beams, beams on elastic foundations, and the equations of elasticity and plasticity (1 credit of design)
Components: Lecture
Course Equivalents: ME 452
Attributes: Given When Needed
Requirement Group: Prerequisites: ES222
Req. Designation: Technology

CE 453(3) **Course ID:010562** **2018-07-13**
Properties & Performance of Concrete Materials
This course explores the materials science aspects of properties and behavior of Portland Cement Concrete, including the properties of raw materials in concrete such as cement, aggregates, mineral and chemical admixtures, and fibers. Topics include: physical and chemical aspects of cement hydration and the role of binder types, the influence of type and morphology of hydrates, fresh and hardened concrete properties, introduction to fracture behavior of concrete, and concrete durability issues such as freezing and thawing, sulfate attack, and corrosion of
reinforcing steel. (1 credit of design)
Components: Lecture
Attributes: One Design Credit, Offered Spring Term
Requirement Group: Prerequisite: ES260.
Req. Designation: Technology

CE 461(3) **Course ID:007516** **2015-02-23**
Transportation Systems Design
Planning and design of transportation systems with emphasis on highway geometric design components, highway pavement, airport and other selected topics. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, Offered Fall Term
Requirement Group: Prerequisites: At least junior standing.
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 463(3) **Course ID:012829** **2018-07-13**
Railroad Engineering
[Cross Listed with CE563] This course focuses on principles of railroad transportation and covers the following topics: Railroad engineering efficiency, economics, and energy; Cost-benefit analyses of rail transportation systems; Route selection; Geometric design of railroad alignment; Train speed, power, and acceleration requirements; Railroad engineering materials characterization (rail, crosstie, ballast, sub-ballast, and subgrade); Subgrade design and construction and drainage; and High Speed Rail (HSR) design and construction.
Components: Lecture
Course Equivalents: CE 563
Attributes: Given When Needed
Req. Designation: Technology

CE 470(3) **Course ID:011710** **2021-01-25**
River Restoration
This course provides fundamental understanding of hydrologic, hydraulic, and geomorphic processes of river restoration systems and their ecological impacts. Topics include river hydraulics, sediment transport, fluvial geomorphology, aquatic habitats, channel design, reservoir sedimentation, dam removal/decommission, and fish passage. Emphasis will be given to fluvial geomorphology and hydraulic design of river restoration projects. Computer modeling of river hydraulics and morphodynamics with applications to river restoration design will be introduced.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CE330; or permission of the instructor.
Req. Designation: Technology

CE 477(3) **Course ID:007520** **2021-11-09**
Atmospheric Chemistry
[Cross-listed with CM 476] This course will cover the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities and reviews appropriate legislation; detailed descriptions of the chemistry of the carbon, nitrogen and sulfur cycles; characterization of the atmospheric aerosol and its role in heterogeneous reaction sand materials transport; stratospheric ozone and problems with its depletion; airborne radio-activity and its role in atmospheric ion chemistry.
Components: Lecture
Course Equivalents: CE 577, CH 576, CM 476, CM 576
Attributes: Offered Odd Springs
Requirement Group: Prerequisites: CM370 or CM371 or ES340.
Req. Designation: Technology

CE 478(3) **Course ID:007521** **2022-02-02**
Solid Waste Management and Landfill Design
This course provides a basic understanding of the essential concepts of solid waste management to include identification, collection, transport, processing and disposal of solid wastes. Emphasis is placed upon the legal requirements and practice resulting from the Resource Conservation and Recovery Act (RCRA) and applicable state law. Solid waste issues include characterization, generation, collection, routes, recycling, landfills, and siting. The design and operation of collection routes, transfer stations, Material Recovery Facilities (MRFs), and landfills are covered. Composting and thermal processing operations are also included. (2 credits of design)
Components: Lecture
Attributes: Two Design Credits, Offered Even Falls
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

CE 479(3) **Course ID:007522** **2022-06-07**
Water and Wastewater Treatment Design
A study of physical and chemical operations and biological processes utilized in the treatment of water and wastewater for municipalities and industry. The course emphasizes theoretical and design aspects of these processes.
Components: Lecture
Course Equivalents: CE 579
Attributes: Three Design Credits, One communication unit, Offered Fall Term
Requirement Group: Prerequisites: ES330, CE340, or consent of the instructor.
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 481(3) **Course ID:007524** **2022-02-02**
Hazardous Waste Management Engineering
This course is an introduction to the emerging field of hazardous waste management. This course provides an understanding of environmental regulations, management techniques to minimize the generation and disposal of hazardous wastes, and technologies to treat wastes and remediate disposal sites.
Components: Lecture
Attributes: 2.5 Design Credits, One communication unit, Offered Even Falls
Requirement Group: Prerequisite: CE340 or Corequisite: CE340.
Req. Designation: Technology

CE 482(3) **Course ID:010534** **2018-07-13**
Environmental Systems Analysis Design
This course presents the basic principles of systems analysis as applied to resource allocation and design problems commonly encountered in the field of environmental engineering. Central to the material covered is the concept of optimal problem solution and its use in choosing among alternative designs or policies. All students will complete a semester project; a greater level of quantitative analysis will be expected from students taking the course for graduate credit. (2 credits of design)
Components: Lecture
Course Equivalents: CE 582
Attributes: Two Design Credits, Offered Odd Falls
Requirement Group: Prerequisites: CE340 or CE579 or equivalent course, EC350, or consent of the instructor.
Req. Designation: Technology

CE 486(3) **Course ID:007525** **2018-07-13**
Industrial Ecology
An exploration of the methods necessary for designing and implementing changes in manufacturing processes to increase sustainability. This course will identify the impacts associated with resource consumption and environmental pollution, and present the quantitative tools necessary for assessing enviornmental impacts and to design for sustainability. Topics include: industrial ecology, life cycle analysis and the integration of the environment into economic activities. (1 credit of design)
Components: Lecture
Attributes: One Design Credit, Offered Even Falls
Requirement Group: Prerequisites: prior college level exposure to the concepts of mass and energy conservations, one of t

Req. Designation: Technology

CE 487(3) **Course ID:013147** **2022-06-07**
Environmental Engineering Laboratory
This course provides students laboratory experiences and develops students' abilities to conduct environmental relevant experimentation, analyze and interpret data, and write scientific laboratory reports. The content of lectures and experiments include theory and application of environmental laboratory methods for measurement of physical, chemical, and biological characteristics in natural and engineered environmental systems within air, water, and soil media. A final project emphasizes experimental design, and requires team work and oral presentations.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Requisites: CE 340, CE 380, and junior or higher standing, or instructor consent
Req. Designation: Technology

CE 490(3) **Course ID:007526** **2018-07-24**
Senior Design (Structures, Transportation, Geotechnical, Construction, Architectural/Facilities)
A comprehensive design of an open ended project related to structural, foundation/geotechnical, architectural/facilities and/or transportation design as well as construction management will be developed by teams of students. The design will be based on knowledge acquired in prior courses, professional ethics and engineering economics. Written reports and oral presentations about the design will be made to the faculty, potential guests, and student peers. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, One communication unit, Offered Spring Term
Requirement Group: Prerequisites: Senior standing Corequisites: CE310, and either CE441 or CE442 (or consent of the instr

Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 491(3) **Course ID:007527** **2015-03-09**
Senior Design (Water Resources, Environmental)
A comprehensive design of an open ended project related to water resource and environmental engineering design will be developed by teams of students. The design will be based on knowledge acquired in prior courses, professional ethics and engineering economics. Written reports and oral presentations about the design will be made to the faculty and student peers. (3 credits of design)
Components: Lecture
Attributes: Three Design Credits, One communication unit, Offered Spring Term
Requirement Group: Prerequisites: Senior standing and CE430, CE479, CE480, CE481, CE478 or CE586, or consent of instructo
Req. Designation: Technology

CE 495(1 - 3) **Course ID:007528** **2015-02-12**
Special Projects in Civil and Environmental Engineering
An individual project is undertaken by the student under the guidance of a staff member. A complete report is required.
Prerequisite: consent of the department chair.
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

CE 496(1 - 3) **Course ID:007529** **2015-01-20**
Special Projects in Civil and Environmental Engineering
An individual project is undertaken by the student under the guidance of a staff member. A complete report is required.
Prerequisite: consent of the department chair.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

CE 499(0) **Course ID:012880** **2022-06-07**
Fundamentals of Engineering Exam Preparation
This course provides preparation for students taking the NCEES Fundamentals of Engineering (FE) Exam. Topics covered will mirror the materials covered specific to the Civil Engineering and Environmental Engineering FE examinations. Lectures will be provided by faculty from across the department facilitated by the department office.
Components: Lecture
Attributes: Offered Fall and Spring
Req. Designation: Technology

CE 502(3) **Course ID:013048** **2020-08-25**
Applications in Geospatial Analytics, Science, & Engineering
[Cross-listed with SC 502, EV 502] This course will use techniques in geospatial analytics, science, and engineering to address applied challenges in various contextual situations. Geotagging, network analysis, spatial visualization, geospatial data manipulation, cartographic presentations, and other similar methods will be studied and applied to real-world or research applications. Students will develop a set of tools that enable completion of projects in the major field using geospatial capabilities.
Prerequisites: Graduate standing, CE 301, or consent of the instructor
Components: Lecture
Course Equivalents: SC 502, EV 502
Attributes: Offered Spring Term
Req. Designation: Technology

CE 505(3) **Course ID:013044** **2020-08-25**
Project Controls and Lean Methods in Construction
[Cross-listed with EM 505] This course will cover the use of construction project management controls typical in varying scales of projects. Using the Lean Construction model, the course will cover Lean as both a system and culture, while emphasizing the central place of project delivery processes. Topics in project controls will include: Goal Setting, Scheduling, Budgeting, Problem Solving, and Decision-Making.
Prerequisites: Graduate standing, CE 305, or consent of the instructor
Components: Lecture
Course Equivalents: EM 505
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 506(3) **Course ID:012138** **2016-02-26**
Advanced Construction Engineering
A study of emerging technologies, trend setting techniques, and new means and methods in construction engineering management. Topics include: emerging technologies which are intended to enhance the analysis, design, construction, performance, and asset management for construction engineering projects; lessons learned from construction sites covering infrastructure and building projects; construction equipment management and selection for construction applications; composite, hybrid, or new materials for construction applications, emerging trends in project delivery, project cost control, and procurement of construction services.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: Graduate standing required.
Req. Designation: Technology

CE 508(3) **Course ID:013046** **2022-06-07**
Building Information Modeling for Construction Prefabrication
This course goes beyond the basics of Building Information Modeling (BIM) moving models from conceptual into application, specifically in order to be able to prefabricate building elements. Students will work to create virtual elements that are then printed via 3D printer or shop prefabricated during the course. The course will cover advanced and emerging techniques and methods to the use of current/state of the art computer aided design software including Autodesk Revit.
Prerequisites: Graduate standing, CE 408, or consent of the instructor
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CE 510(3) **Course ID:012046** **2018-07-13**
Sustainable Infrastructure and Building
An application of the use of sustainability rating systems for infrastructure and building projects. Students will use the USGBC LEED and the ISI Envision systems to execute an analysis of a real or realistic project. Focusing on fundamentals of sustainable construction, this course will acquaint students with the processes required to certify/verify projects to meet an independent rating standard. This course will prepare students to take the LEED GA and/or Envison ENV PV exams
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CE 512(3) **Course ID:007531** **2022-01-26**
Structural Dynamics
Response of discrete/continuous systems to dynamic loading. Formulation/solution of problems of one or more degrees of freedom. Modal analysis. Numerical integration and transform techniques. Response of dynamic systems to base motion using response spectrum methods.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 513(3) **Course ID:011980** **2015-01-23**
Elastic Waves and Non-Destructive Tests
The course will include 3 modules: elastic waves, inversion, and applications to real-world problems. The module of elastic waves will cover stress propagation problems in elastic solids and waveguides. The module of inversion will include (i) the fundamentals on inverse theory, experimental data and signal processing, (ii) basic inversion methods (global and deterministic optimizations, simulated annealing and genetic algorithm, Gauss-Newton and gradient methods, etc.). Lastly, the module of real-world problems will consist of applications in site characterization, sinkhole detection, unknown foundation, bridge deck evaluation.
Prerequisites: Numerical Methods, Partial Differential Equations
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 515(3) **Course ID:007533** **2015-02-12**
Foundations, Stability, and Retaining Structures
Application of principles of soil mechanics to the design of shallow and deep foundations, retaining structures and slope stability. Interpretation of soil boring logs as related to geotechnical engineering design. Preparation of design templates using spreadsheets. (3 credits of design)
Prerequisite: CE310.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 517(3) **Course ID:007535** **2022-06-07**
Foundations and Ground Improvement
Introduction or review of soil mechanics and foundation engineering. Understanding of different ground improvement methods such as aggregate piers, vibro stone columns, dynamic compaction, wick drains, grouting, and deep soil mixing. Selection and design of ground improvement methods.
Components: Lecture
Attributes: Offered Fall When Needed
Req. Designation: Technology

CE 518(3) **Course ID:013083** **2022-06-07**
Soil Structure Interaction
Application of soil mechanics and foundation engineering to analyze load transfer of deep foundations. Development of p-y curves of laterally loaded piles and T-z and Q-z curves for axially loaded piles. Understanding of behaviors of grouped piles subjected to lateral and vertical loads. Calculation of vertical stiffness of pile foundations and natural frequency. Long-term performance prediction.
Components: Lecture
Requirement Group: Prerequisite: CE310 or consent of the instructor
Req. Designation: Technology

CE 520(3) **Course ID:007537** **2022-06-07**
Computational Methods of Structural Analysis
The matrix stiffness method, theory and implementation in MATLAB, for the analysis of trusses, beams, frames, and grids. Discussion of thermal effects, support settlements, nonlinear effects, and other modeling considerations.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Civil and Environmental Eng

CE 527(3) **Course ID:007541** **2019-03-08**
Advanced Fluid Mechanics
An introductory level graduate course in fluid mechanics. Spatial and material coordinates, kinematics of fluid motion, continuity and momentum equations, constitutive relations, simple solutions, potential flows, boundary layer theory, creeping flow, flow through porous media, particle motion, interfacial phenomena, turbulence.
Prerequisite: CH301 or ES330 or equivalents.
Components: Laboratory, Lecture
Course Equivalents: ME 527, ME 527
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CH301 or ES330 or equivalent
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 533(3) **Course ID:011815** **2018-07-13**
Human Exposure Analysis
Human exposure analysis is an emerging science concerned with how humans come into contact with chemicals in the environment via inhalation, ingestion, and dermal contact. The course focuses on scientific and engineering issues, including direct measurement and model constructs. Students gain an understanding of the complexities, uncertainties, and physical, chemical and biological issues relevant to human exposures resulting from the use and release of toxic compounds. Topics include human exposure analysis terminology, pollutant fate and transport, human activity patterns, occupational exposure, indoor air quality, dosimetry, and statistical and mechanistic tools for exposure assessment. For the final project, the students design and perform a small-scale human exposure study using monitoring instruments and/or exposure models. (2 credits of design.)
Components: Lecture
Course Equivalents: CE 433
Attributes: Offered Even Falls
Req. Designation: Technology

CE 534(3) **Course ID:011709** **2021-11-09**
Sustainable Development Engineering
This course outlines the principles of sustainable engineering for improving sanitation and environmental health in developing communities both internationally and nationally. Topics include sustainable development and appropriate technologies for water and wastewater treatment, water storage and delivery, watershed management, solid waste management, and indoor air quality. The course highlights the importance of community participation and relationship building throughout the development and implementation of engineering projects. At least 2/3 of the course is dedicated to a team-based, sustainable development design project. (2 credits of design)
Components: Lecture
Course Equivalents: CE 434
Attributes: Offered Odd Falls
Req. Designation: Technology

CE 535(3) **Course ID:011395** **2022-02-02**
Groundwater Hydrology and Geochemistry
[Cross-listed with EV 535] This class provides fundamental understanding of the key physical and chemical processes impacting groundwater resources and quality. Emphasis is on groundwater geology, physical characteristics of flow, and geochemical properties of groundwater. Groundwater contamination and contaminant transport and modeling will be introduced. The course will prepare students to qualitatively and quantitatively analyze fluid and contaminant flow in varied geologic systems.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Civil and Environmental Eng

CE 538(3) **Course ID:007542** **2014-11-20**
Finite Element Methods
[Cross-listed with MA 572, ME 515] This course is an introduction to the finite element method, from a mathematical as well as a modeling and applications point of view. The basic theory and implementation will be discussed in the context of continuum problems in linear elasticity, potential flow and plate modeling. If time permits, additional applications such as structures, electromagnetics, fluid mechanics, ground water and geotechnics will also be discussed. Topics include: weak formulations and the principle of virtual work, discretization and interpolation-function selection, assembly and solution of the system equations, error estimates and accuracy assessment. When taught in conjunction with CE 438/ME 453 the course requires additional independent work for those registered for the graduate course.
Prerequisite: MA232, MA339, or MA330, ES222, ES330 and the ability to program. Consent of the instructor may be used to replace some prerequisites.
Components: Lecture
Course Equivalents: MA 572, ME 515
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 541(3) **Course ID:013040** **2020-04-20**
Bridge Engineering
An introduction to bridge engineering. Topics will focus on highway bridge planning, design, construction and management with emphasis on structural engineering, hydraulic engineering, geotechnical engineering and economics. Bridge projects also are influenced heavily by issues such as maintenance of traffic, environmental considerations, public input, construction methods, materials, estimating and scheduling all of which will be covered in various degrees.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CE320
Req. Designation: Technology

CE 549(3) **Course ID:012025** **2015-03-05**
Experimental Methods in Structures
This course will introduce fundamental principles, procedures, and applications of experimental methods in structures. Topics covered in this course include sensors, data acquisition, vibration measurement, signal processing, similitude law, system identification, and structural modeling. Students will learn Labview programming to design a simple experiment. If time allows, state-of-the-art experimental methods such as hybrid simulation will be presented. The course consists of lectures and hands-on laboratory sessions.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 551(3) **Course ID:007549** **2022-02-02**
Theory of Elasticity
[Cross-listed with ME 551] A study of the mathematical theory of elasticity and its application to engineering problems; development of general stress-strain relationships, equations of equilibrium and compatibility; plane stress and plane strain; stress functions; applications to beam bending and torsion.
Prerequisite: ES222, CE/ME554 or consent of the instructor.
Components: Lecture
Course Equivalents: ME 551
Attributes: Given When Needed
Req. Designation: Technology

CE 552(3) **Course ID:007550** **2022-06-07**
Advanced Strength of Materials
Discussion and theory concerning properties of materials, general stress-strain relationships, modern strength theories, unsymmetrical bending, curved beams, beams on elastic foundations, the equations of elasticity and plasticity (1 credit of design)
Components: Lecture
Course Equivalents: ME 552
Attributes: Given When Needed
Req. Designation: Technology

CE 553(3) **Course ID:010520** **2018-07-13**
Properties and Performance of Concrete Materials
This course explores the materials science aspects of properties and behavior of Portland Cement Concrete, including the properties of raw materials in concrete such as cement, aggregates, mineral and chemical admixtures, and fibers. Topics include: physical and chemical aspects of cement hydration and the role of binder types, the influence of type and morphology of hydrates, fresh and hardened concrete properties, introduction to fracture behavior of concrete, and concrete durability issues such as freezing and thawing, sulfate attack, and corrosion of reinforcing steel.
Prerequisite: ES260.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CE 554(3) **Course ID:007551** **2014-11-18**
Continuum Mechanics
[Cross-listed with ME 554] The course involves the analysis of stress and deformation at a point and the derivation of the fundamental equations by applying the basic laws of conservation of mass, energy, and momentum and those of thermodynamics. Vector and cartesian tensors are reviewed. Relationships (constitutive laws) are then developed between stress, strain, and strain rate. The basic equations governing the behavior of any continuum and applications to solids and fluids are covered.
Components: Lecture
Course Equivalents: ME 554
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 555(3) **Course ID:010605** **2019-09-17**
Structural Damage Assessment, Rehabilitation, and Repair
An investigation of structural damage and methods applicable for assessing their capacity, durability, and future use. Additionally, evaluation and design of methods of practicable rehabilitation and/or repair of structural elements using traditional and non-traditional methods and materials. Case studies will often be used to assess structural damage. (1 credit of design)
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 563(3) **Course ID:012830** **2018-07-13**
Railroad Engineering
[Cross Listed with CE463]This course is designed to help students gain knowledge in following topics: Railroad engineering efficiency, economics, and energy; Cost-benefit analyses of rail transportation systems; Geometric design of railroad alignment; Train speed, power, and acceleration requirements; Railroad engineering materials characterization (rail, crosstie, ballast, sub-ballast, and subgrade); Subgrade design and construction and drainage; and High Speed Rail (HSR) design and construction. Graduate students are required to do an independent term project which allows them to study a particular area of railway engineering in more depth, and gives the students experience with the railroad engineering literature as well as more experience in technical communications (the term paper).
Components: Lecture
Course Equivalents: CE 463
Attributes: Given When Needed
Req. Designation: Technology

CE 569(3) **Course ID:011979** **2015-01-23**
Watershed Analysis
Conceptual and quantitative analysis of watershed processes will be introduced with an emphasis on modeling surface water hydrology and water resources management. Watershed modeling concepts including analysis of time series, spatially variable data, model calibration, and uncertainty analysis will be studied and demonstrated. The course will emphasize critical analysis of current hydrologic computational methods through literature review and hands-on use of watershed models.
Prerequisites: Hydrology/Water Resources Engineering
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 570(3) **Course ID:011711** **2021-01-25**
River Restoration
This course provides fundamental understanding of hydrologic, hydraulic, and geomorphic processes of river restoration systems and their ecological impacts. Topics include river hydraulics, sediment transport, fluvial geomorphology, aquatic habitats, channel design, reservoir sedimentation, dam removal/decommission, and fish passage. Emphasis will be given to fluvial geomorphology and hydraulic design of river restoration projects. Computer modeling of river hydraulics and morphodynamics with applications to river restoration design will be introduced.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CE330; or permission of the instructor.
Req. Designation: Technology

CE 571(3) **Course ID:011981** **2015-01-23**
Computational River Dynamics
This course covers basic principles and numerical methods for modeling free-surface turbulent flow, sediment transport and contaminant transport. Topics include mathematical description of free-surface flow and sediment transport, fundamentals of sediment transport, advanced numerical methods, one-, two- and three-dimensional models, domain decomposition and model integration, simulation of dam-break fluvial processes, simulation of vegetation effects on flow and sediment transport, cohesive sediment transport modeling, and contaminant transport modeling.
Prerequisites: Hydraulics, Numerical Methods, Sediment Transport
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 572(3) **Course ID:007553** **2019-04-19**
Advanced Open Channel Hydraulics
Introduction to open channel flows, uniform flow and flow resistance, energy and momentum principles, critical depth, gradually varied flow and water surface profiles, rapidly varied flow and channel controls, unsteady flow and translator waves, boundary layers theory, water waves, turbulence in artificial and natural channels and measurements, and shallow water equations and numerical solutions. Application of 1D/2D/3D hydraulic models to engineering problem solving.
Prerequisites: Undergraduate Fluid Mechanics, Water Resources Engineering I or equivalent or consent of the instructor.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

CE 573(3) **Course ID:007554** **2015-01-23**
Sediment Transport
Incipient motion, bed forms, depth-discharge relation for alluvial streams, transport of bed load and suspended load, natural river and coastal processes.
Prerequisite: CE430 or CE572 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 574(3) **Course ID:007555** **2019-04-24**
Ecohydraulics
Introduction to ecohydraulics: Instream flow requirements and fish habitat suitability; River connectivity and fishpasses; Fishpass hydraulics and design optimization; Fish hydrodynamics; Effect of turbulence on fish stability; Mixing and dispersion in rivers and its effect to fish (fickian diffusion, turbulent shear flows, advective diffusion, turbulent dispersion and mixing); Transport and reaction of water pollutants; and Stream water temperature modeling with a case study.
Prerequisites: Undergraduate Fluid Mechanics, Water Resources Engineering I or equivalent or consent of the instructor.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

CE 575(3) **Course ID:007556** **2015-01-23**
Coastal Engineering
Theory of water waves; tides and harbor oscillations; wave forces on coastal structures; wind wave analysis; beach erosion and shore protection; off-shore pipelines and outfall diffusers.
Prerequisite: CE572 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 576(3) **Course ID:007557** **2015-01-23**
Hydraulic Engineering in Cold Regions
Ice engineering for rivers, lakes and coastal zones. Topics to be covered include thermal regimes in surface water bodies; frazil ice; river ice hydraulics; transport of ice in lakes and coastal zones and ice force on structures.
Prerequisite: CE430 or CE572 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 577(3) **Course ID:007558** **2021-11-09**
Atmospheric Chemistry
[Cross-listed with CH 576, CM 576] The course will cover the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities; detailed descriptions of the chemistry of the carbon, nitrogen and sulfur cycles; characterization of the atmospheric aerosol and its role in heterogeneous reactions and materials transport; stratospheric ozone and problems with its depletion; airborne radioactivity and its role in atmospheric ion chemistry. This course covers the same topics as CE 477 and includes additional material on the graduate level.
Prerequisite: CM370 or CM371 or ES340.
Components: Lecture
Course Equivalents: CE 477, CH 576, CM 476, CM 576
Attributes: Offered Odd Springs
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 579(3) **Course ID:007559** **2022-06-07**
Water and Wastewater Treatment Design
A study of the physical, chemical and biological operations and processes utilized in the treatment of water and wastewater for both municipalities and industries. The course emphasizes both theoretical and design aspects of these processes, and includes appropriate laboratory demonstrations. Preparation of an individual design report will be required. (2 credits of design)
Prerequisites: ES330 or consent of the instructor. No credit if credit given for CE479 or similar course.
Components: Lecture
Course Equivalents: CE 479
Attributes: Offered Fall Term
Req. Designation: Technology

CE 580(3) **Course ID:007560** **2015-02-12**
Environmental Chemistry
The fundamentals of inorganic, organic, and physical chemistry with particular emphasis on those topics having application to environmental engineering practice. Chemical equilibria among gaseous, aqueous and solid phases are stressed with a strong mathematical approach. This course provides a basis for the understanding of chemical phenomena in aquatic environments.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CE 581(3) **Course ID:007561** **2022-02-02**
Hazardous Waste Management Engineering
This course is an introduction to the emerging field of hazardous waste management. This course provides an understanding of environmental regulations, management, techniques to minimize the generation and disposal of hazardous wastes, and technologies to treat wastes and remediate disposal site. (1.5 credits of design)
Prerequisites: CE340 or CE579 or equivalent course, or consent of instructor.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

CE 582(3) **Course ID:007562** **2018-07-13**
Environmental Systems Analysis and Design
This course presents the basic principles of systems analysis as applied to resource allocation and design problems commonly encountered in the field of environmental engineering. Central to the material covered is the concept of optimal problem solution and its use in choosing among alternative designs or policies. All students will complete a semester project; a greater level of quantitative analysis will be expected from students taking the course for graduate credit. (2 credits of design)
Prerequisites: CE340 or CE579 or equivalent course, EC350, or consent of instructor.
Components: Lecture
Course Equivalents: CE 482
Attributes: Offered Odd Falls
Req. Designation: Technology

CE 584(3) **Course ID:007564** **2015-02-12**
Chemodynamics
This course investigates what happens to a chemical when it is introduced into the environment and the factors that determine and influence its distribution. The dynamics of pollutant transfer in the environment, the relationship between their physical-chemical properties and transport, their persistence in the biosphere and their partitioning in biota are studied. Quantitative models of pollutant transfer between air-water, air-soil and water-sediment are developed. (1 credit of design)
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 586(3) **Course ID:007566** **2018-07-13**
Industrial Ecology
An exploration of the methods necessary for designing and implementing changes in manufacturing processes to increase sustainability. This course will identify the impacts associated with resource consumption and environmental pollution, and present the quantitative tools necessary for assessing enviornmental impacts and to design for sustainability. Topics include: industrial ecology, life cycle analysis and the integration of the environment into economic activities. (1 credit of design)
Prerequisites: prior college level exposure to the concepts of mass and energy conservations, one of the following: CE340, CH250, ES330, ES340, CH301, CH271 or consent of the instructor.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

CE 587(3) **Course ID:007567** **2022-06-07**
Environmental Engineering Laboratory
This course provides students laboratory experiences and develops students' abilities to conduct environmental relevant experimentation, analyze and interpret data, and write scientific laboratory reports. The content of lectures and experiments include theory and application of environmental laboratory methods for measurement of physical, chemical, and biological characteristics in natural and engineered environmental systems within air, water, and soil media. A final project emphasizes experimental design, and requires team work and oral presentations.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CE 590(1 - 6) **Course ID:012889** **2021-01-26**
Graduate Degree Completion Project
A project in civil and environmental engineering under the direction of a faculty advisor or program director. Credit for this work is given when the requirements for the degree are completed including the presentation of a project as appropriate to the degree program.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

CE 591(3) **Course ID:012139** **2016-07-01**
Special Topics in Construction Engineering Management
This course includes lectures and seminars covering emerging topics in civil and environmental engineering. Topics will include, but are not limited to: emerging technologies, including both software and hardware systems, which are intended to enhance the analysis, design construction, performance, and asset management for civil and environmental engineering projects; lessons learned from construction, civil, and environmental engineering sites covering infrastructure and building projects; and construction, civil and environmental engineering equipment management and selection for site applications. Presentations are given by subject area experts with complement lectures by the instructor. Case studies will be reviewed and researched for further development and discussion within the course.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: Graduate standing required.
Req. Designation: Technology

CE 595(1 - 3) **Course ID:011433** **2015-01-23**
Special Topics in Civil and Environmental Engineering
Advanced study of selected topics in the area of civil and environmental engineering.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CE 610(1 - 2) **Course ID:010161** **2022-06-07**
Civil and Environmental Engineering Seminar
Students, staff and visiting lecturers present research results and topics of current interest.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 612(1 - 15) **Course ID:007570** **2015-02-03**
Thesis, Dissertation Credits
Analytical or experimental studies in civil and environmental engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

CE 621(3) **Course ID:012747** **2016-09-16**
Advanced Structural Dynamics
This course provides fundamental and advanced theories of structural dynamics and their applications to natural hazards engineering. Topics covered in the course include numerical integration methods for dynamic analysis; nonlinear hysteresis models; nonlinear time history analysis; soil-foundation-structure/fluid-structure interactions; state-of-the-art simulation methods for civil infrastructure systems.
Components: Lecture
Attributes: Offered Odd Springs
Requirement Group: Prerequisite: CE512 or permission of instructor
Req. Designation: Technology

CE 622(3) **Course ID:012831** **2022-02-02**
Uncertainty Quantification and Optimization in Computational Mechanics
Uncertainty Quantification plays an essential role in the validation of the predictive content of computational engineering and science models. Uncertainty in the simulation-based paradigm is typically manifested either in the form of variability of model parameters or in the stochastic external effects to which this system is subjected. In this course, students will be introduced to the mathematical foundations, numerical algorithms, and computational tools necessary for: (1) the propagation of parametric uncertainty in computational mechanics simulations; (2) the analysis of the response of simulation based models to random inputs; and (3) the rational treatment of uncertainty in design optimization problems. The course will involve a term project.
Components: Lecture
Attributes: Given When Needed
Requirement Group: CE 622 Prerequisites: CE538/ME515 and EE529/ME529
Req. Designation: Technology

CE 631(3) **Course ID:012023** **2015-03-05**
Cement Chemistry
This is an advanced graduate level course. It covers materials science aspects of conventional and modified portland cement concrete including (i) dry and wet cement chemistry (ii) hydration mechanisms, and microstructure modification (iii) techniques to characterize cementitious systems (SEM, TEM, MIP, NMR, BET, Pore Solution Analysis etc.) and (iv) materials science based discussions on mechanical and durability performance of concrete .
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CE 553, Properties and Performance of Concrete Materials
Req. Designation: Technology

CE 632(3) **Course ID:013130** **2021-10-11**
Elastic and Inelastic Stress Analysis
Presents certain key aspects of inelastic solid mechanics centered around viscoelasticity, creep, viscoplasticity, and plasticity. It is divided into three parts consisting of the fundamentals of elasticity, useful constitutive laws, and applications to simple structural members, providing extended treatment of basic problems in static structural mechanics, including elastic and inelastic effects.
Components: Lecture
Course Equivalents: ME 632
Attributes: Offered Even Springs
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Civil and Environmental Eng

CE 633(3) **Course ID:007576** **2022-06-07**
Plasticity
This course provides an introduction to the subject of plasticity. The physical background of inelastic deformation in metals and geological materials is discussed. Continuum constitutive theory is presented including yield criteria, flow rules, and plastic hardening. Extension to the rate-dependent (viscoplastic) material is discussed. Uniqueness and extremum theorems are derived and discussed and field equations for general, two-dimensional and axisymmetric problems are presented. Selected problems from metal and soil/rock plasticity are presented and solved using various techniques, including slip-line theory, limit analysis and 'exact' methods. Other topics such as localization and diffuse instability in plastic deformation and application of FEM in plasticity are presented as time allows.
Prerequisite: CE554 or ME554; recommended CE551 or ME551.
Components: Lecture
Course Equivalents: ME 633
Attributes: Given When Needed
Req. Designation: Technology

CE 681(3) **Course ID:007581** **2015-01-20**
Environmental Physico-Chemical Processes
This class provides fundamental understanding of the chemical and physical processes that govern the migration and fate of pollutants in environmental systems. Emphasis will be placed on the application of these concepts to water treatment processes. Topics include: mass transfer and kinetics, coagulation, precipitation, adsorption, ion exchange, chemical oxidation, sedimentation, filtration and related processes.

Prerequisites: CE340 or CE579 or equivalent course, CE580, or consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CE 682(3) **Course ID:007582** **2015-01-20**
Environmental Biological Processes
Principles and applications of biological phenomena and processes in relation to environmental engineering practice. Emphasis is given to biokinetic analysis and design of biological treatment processes applicable to the treatment of water, municipal and industrial wastewater and hazardous wastes. Topics include: microbial growth kinetics and bioenergetics; aerobic, anaerobic fixed-film, nitrification, denitrification and phosphorus removal biological processes; sludge treatment and disposal; advanced wastewater treatment processes.
Prerequisites: CE340 or CE579 or equivalent course, CE580, CE584, and BY323, or consent of instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CE 684(1 - 3) **Course ID:007583** **2015-01-23**
Special Topics in Environmental Engineering
Advanced topics in specialized aspects of environmental engineering.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CE 686(3) **Course ID:007584** **2015-01-23**
Environmental Engineering Design
Emphasis will be on water and wastewater treatment plant design, hazardous waste site remediation, groundwater remediation and solid waste disposal.
Prerequisites: CE681 and CE682 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CE 999(1 - 10) **Course ID:011075** **2015-01-13**
Civil and Environmental Engineering Elective
A graduate level course for which there is no comparable Clarkson course. Used for transfer credit only. (Not offered at Clarkson, for transfer credit only.)
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 1(2 - 4) **Course ID:008058** **2015-01-13**
Chemical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CH 2(2 - 4) **Course ID:008059** **2015-01-13**
Chemical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CH 210(3) **Course ID:011418** **2020-10-15**
Molecular Properties
An introduction to key chemical engineering concepts that include properties of gases, laws of thermodynamics, transport of gases and liquids, and chemical kinetics.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM132 (or CM104), MA132 and PH131
Req. Designation: Technology

CH 220(3) **Course ID:011419** **2019-07-18**
Material Balances
Students will learn how to set up flow sheets for chemical processes with multiple units and perform material balances accounting for chemical reactions, phase equilibria, multistage separations, and recycle. While emphasis will be on steady state operations, unsteady processes will also be considered. A case study will be performed in teams.
Components: Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM 132 (or CM 104), MA 132, and PH 131 Corequisite: CH 210 or CM 371
Req. Designation: Technology

CH 260(3) **Course ID:011434** **2016-09-16**
Thermodynamics & Energy Balances
The fundamentals of thermodynamics, including real fluids, thermodynamic properties of gases. Application of conservation of energy principles in chemical engineering.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CH210
Req. Designation: Technology

CH 320(3) **Course ID:007587** **2019-07-18**
Phase Equilibria
Thermodynamics of pure components and solutions. Fugacities, activities, and equilibrium, calculations.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CH 260 or ES340
Req. Designation: Technology

CH 330(3) **Course ID:011579** **2011-01-25**
Transfer Process Fundamentals
Fundamentals of fluid mechanics, heat and mass transfer relevant to transfer processes: Newtonian and non-Newtonian flow behavior, hydrostatics, macroscopic and microscopic balances, flow measurement, dimensional analysis, laminar and turbulent flow in ducts and over immersed bodies, Fourier's law, steady and unsteady conduction in rectangular, cylindrical, and spherical geometries, fins, convective heat transfer in flow through ducts and over immersed objects, natural convection, Fick's law, diffusion in binary and multicomponent systems, correlations for heat and mass transfer.
Components: Lecture
Requirement Group: Prerequisites: MA232; Corequisites: CH210 and CH220
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 350(1) **Course ID:007590** **2015-01-20**
Chemical Engineering Laboratory
A series of experiments in fluid mechanics, heat transfer, complementing the junior ChE courses, are performed. Laboratory safety, data analysis, and communications skills stressed. Does not meet each week; schedule will be posted.
Components: Laboratory
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: CH330
Req. Designation: Technology

CH 360(3) **Course ID:007591** **2021-12-28** **Instructor Consent Required**
Chemical Reactor Analysis I
The principles of chemical reactor design for homogeneous and heterogeneous reactions. Analysis of the chemical reactor from a kinetic and thermodynamic point of view, including design methods for flow and non-flow reactors and experimental methods.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CH210, CH220, CH260, MA232, and Junior or Senior standing (or permission of the instruc

Req. Designation: Technology

CH 370(3) **Course ID:011610** **2021-01-12**
Transfer Process Design
Fundamentals of transfer process design, design of pipes, flow meters, pump calculation, heat transfer equipment design, correlations for various heat transfer coefficients, pressure drop in heat transfer equipment, pumping requirements for heat transfer equipment, mass transfer equipment, tray, rotating, pulsed, packed column design, efficiency concept, transfer unit concept, membrane separations, chromatographic separation methods.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: CH330
Req. Designation: Technology

CH 390(1 - 4) **Course ID:007593** **2017-01-13**
Undergraduate Research Project
A theoretical or experimental investigation of an original problem under the supervision of a faculty member. Student should select topic from list in ChE office and discuss with indicated faculty member.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CH 391(1 - 4) **Course ID:007594** **2017-01-13**
Undergraduate Research Project
A theoretical or experimental investigation of an original problem under the supervision of a faculty member. Student should select topic from list in ChE office and discuss with indicated faculty member.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CH 392(1 - 4) **Course ID:007595** **2017-01-13**
Undergraduate Research Project
A theoretical or experimental investigation of an original problem under the supervision of a faculty member. Student should select topic from list in ChE office and discuss with indicated faculty member.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CH 410(2) **Course ID:007599** **2019-07-19**
Chemical Engineering Laboratory
A series of experiments complementing the ChE senior courses are conducted. The student will gain familiarity with the equipment, practices, tools, and scope of Chemical Engineering. Extensive report writing. Laboratory safety and applied statistics and data analysis stressed. Does not meet each week; schedule will be posted.
Components: Laboratory
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: CH330
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 420(3) **Course ID:011704** **2019-07-19**
Process Economics & Conceptual Design
Engineering economics, conceptual design principles, equipment costing, safety considerations.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CH330 Corequisites: EC350, or the combination of EC150 and EC200, or the combination EC
Req. Designation: Technology

CH 430(3) **Course ID:012865** **2022-06-21**
Chemical Process Safety
Applications of chemical process principles to process safety and hazards analysis, mitigation and prevention, with emphasis on the chemical process industries.
Components: Lecture
Course Equivalents: CH 530
Attributes: Offered Spring Term
Req. Designation: Technology

CH 440(3) **Course ID:007920** **2021-02-19**
Plasma Engineering
[Cross Listed with CH540] This course will focus on the fundamentals of plasma science and engineering with particular emphasis on non-equilibrium plasmas and plasma in water environments. Focus areas addressed include material processing, chemical synthesis and conversion, environmental remediation, disinfection and biomedical applications.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CH330 and CH360
Req. Designation: Technology

CH 441(3) **Course ID:007921** **2018-03-19**
Introduction to Nanophotonics
This course introduces the principles of nanophotonics-an emerging frontier at the nexus of nanotechnology and photonics. Nanophotonics deals with light-matter interactions on the nanometer length scale, and provides enormous opportunities for fundamental research and new applications. The course will cover the theoretical foundations of nanoscale optical interactions, growth and characterization of optical nanomaterials, nanolithography, plasmonics, metamaterials, manipulation and integration of nanostructured architectures, nanoscale optical microscopy, nanophotonic devices and systems, as well as a review of applications of nanophotonics, especially in biotechnology and nanomedicine. The students will be exposed to various new concepts, properties and phenomena in a bright nanoworld.
Components: Lecture
Course Equivalents: CH 541
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PH132 and MA232
Req. Designation: Technology

CH 456(1 - 3) **Course ID:007603** **2015-02-03**
Experimental Projects
One or more project experiments related to various chemical processes are conducted. Selection of experiments is based on the student's needs and interests, and may involve existing experiments or the development of new ones.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

CH 460(3) **Course ID:007604** **2019-07-19**
Process Dynamics and Control
Process systems analysis and control. Methods for the analysis of systems and the use of these methods in the design of control systems.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CH220, CH330, and MA231.
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 465(3) **Course ID:007605** **2021-01-22**
Biochemical Engineering
Use of microorganisms and enzymes to carry out industrial scale production of useful products. Enzyme and cell growth kinetics, reactor types, design principles and operating processes (agitation, aeration, sterilization, separations), and examples of some typical industrial processes.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: CH330
Req. Designation: Technology

CH 482(3) **Course ID:007608** **2018-11-08**
Design Project
A comprehensive design is performed independently. When possible, the work will be done in a team.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: CH420
Req. Designation: Technology

CH 486(1) **Course ID:007611** **2017-09-28**
Industrial Chemistry
[Cross-Listed with CH586/CM486/586]This course will benefit junior and senior undergrads plus grads in chemistry and chemical engineering, and allow them to learn of real ways such talents are used in the professional world. It will involve different industrial chemists and chemical engineers to come to Clarkson University for each of 12 of the 14 weeks of a semester and give two lectures of about 1 hour 15 min each - one on an afternoon and the other following morning. The first lecture will relate the areas of chemistry their company was known for; the second lecture an in-depth discussion on how one project was carried out at the bench and the pitfalls that had to be resolved along the way to achieve success. The intent is to select lecturers from Clarkson Chemistry and Chemical Engineering major alumni at various lengths of time they have been professionals.
Components: Lecture
Course Equivalents: CH 586, CM 486, CM 586
Attributes: Offered Spring Term
Requirement Group: Prerequisites: Junior or Senior Standing
Req. Designation: Technology

CH 490(3) **Course ID:007612** **2018-12-11**
Elementary Transport Phenomena
Principles of transport of momentum, energy, and mass will be covered from a fundamental perspective, pointing out analogies where appropriate. Topics include the Navier-Stokes and continuity equations, analysis of one dimensional flows, boundary layer theory, the energy and species conservation equations, energy transport by conduction and convection, steady two-dimensional problems, and unsteady one-dimensional problems. Enrollment is restricted to seniors who will graduate in the calendar year in which the course is offered.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CH330 and 3.5 GPA or consent of the instructor.
Req. Designation: Technology

CH 501(1 - 4) **Course ID:007613** **2016-02-10**
Directed Study in Chemical Engineering Principles I
For graduate students with a baccalaureate degree in a field other than chemical engineering.
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

CH 502(1 - 4) **Course ID:007614** **2016-01-06**
Directed Study in Chemical Engineering Principles II
For graduate students with a baccalaureate degree in a field other than chemical engineering.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 503(1 - 4) **Course ID:012783** **2017-01-12**
Directed Study in Chemical Engineering III
For graduate students with a baccalaureate degree in a field other than chemical engineering.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CH 530(3) **Course ID:012866** **2018-03-16**
Chemical Process Safety
Applications of chemical process principles to process safety and hazards analysis, mitigation and prevention, with emphasis on the chemical process industries.
Components: Lecture
Course Equivalents: CH 430
Attributes: Offered Fall Term
Req. Designation: Technology

CH 540(3) **Course ID:007923** **2021-02-19**
Plasma Engineering
[Cross Listed with CH440] This course will focus on the fundamentals of plasma science and engineering with particular emphasis on non-equilibrium plasmas and plasma in water environments. Focus areas addressed include material processing, chemical synthesis and conversion, environmental remediation, disinfection and biomedical applications.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CH 541(3) **Course ID:007924** **2018-03-19**
Introduction to Nanophotonics
This course introduces the principles of nanophotonics-an emerging frontier at the nexus of nanotechnology and photonics. Nanophotonics deals with light-matter interactions on the nanometer length scale, and provides enormous opportunities for fundamental research and new applications. The course will cover the theoretical foundations of nanoscale optical interactions, growth and characterization of optical nanomaterials, nanolithography, plasmonics, metamaterials, manipulation and integration of nanostructured architectures, nanoscale optical microscopy, nanophotonic devices and systems, as well as a review of applications of nanophotonics, especially in biotechnology and nanomedicine. The students will be exposed to various new concepts, properties and phenomena in a bright nanoworld.
Components: Lecture
Course Equivalents: CH 441
Attributes: Offered Fall Term
Req. Designation: Technology

CH 546(3) **Course ID:007616** **2015-01-20**
Chemical Reactor Analysis II
Advanced topics in chemical reactor analysis, including residence time distributions, reactor stability, fixed and fluidized bed reactors and advanced design methods.
Prerequisites: CH445.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CH 547(3) **Course ID:012069** **2015-03-24**
Advanced Hydrocarbon Thermodynamics
This course will provide a consistent approach to the use of thermodynamics for the solution of practical process engineering problems encountered during the design and simulation of chemical processing plants with special emphasis on gas plants and refineries. Topics such as industrial equations of state, pressure-temperature diagrams, modeling with water, high pressure thermodynamic equilibrium, critical phenomena and inclusion of solids in the understanding of phase diagrams will be studied.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 551(3) **Course ID:007617** **2015-01-23**
Multicomponent Mass Transfer
Principles of mass transfer in multicomponent mixtures. Models of multicomponent diffusion, interaction effects, and applications to processes such as distillation and condensation.
Prerequisites: CH330
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CH 560(3) **Course ID:007926** **2015-02-12**
Transport Phenomena
A study of fluid mechanics, heat, and mass transport, identifying analogies where appropriate, with emphasis on physical understanding. Topics include conservation equations and constitutive relations, boundary conditions, solutions in simple situations, boundary layers, forced and natural convection, phase change phenomena, multicomponent mass transport, film and penetration models, mass transport with chemical reaction, simultaneous heat and mass transport, and experimental techniques.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CH330 and CH370 or equivalent Co-requisite: CH561
Req. Designation: Technology

CH 561(3) **Course ID:007619** **2015-02-12**
Chemical Engineering Analysis
Analysis of chemical engineering problems in transport phenomena, reactor engineering and engineering thermodynamics.
Prerequisites: MA331 or equivalent.
Corequisites: CH330 or ES330.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CH 571(3) **Course ID:007621** **2016-09-13**
Advanced Chemical Engineering Thermodynamics
Laws, principles and concepts of classical thermodynamics, including the properties of pure fluids and of solutions, the thermodynamics of flow processes, chemical reaction equilibria, etc.
Prerequisite: CH260 and CH320
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CH 576(3) **Course ID:007622** **2021-11-09**
Atmospheric Chemistry
[Cross-listed with CE 577, CM 576] The course will cover the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities; detailed descriptions of the chemistry of the carbon, nitrogen and sulfur cycles; characterization of the atmospheric aerosol and its role in heterogeneous reactions and materials transport; stratospheric ozone and problems with its depletion; airborne radioactivity and its role in atmospheric ion chemistry. This course covers the same topics as CE 477 and includes additional material on the graduate level.
Prerequisite: CM370 or CM371 or ES340.
Components: Lecture
Course Equivalents: CE 477, CE 577, CM 476, CM 576
Attributes: Offered Odd Springs
Req. Designation: Technology

CH 582(3) **Course ID:007623** **2017-11-08** **Instructor Consent Required**
Design Project
A comprehensive design is performed independently. When possible, the work will be done in a team.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Chemical Engineering

CH 586(1) **Course ID:007625** **2017-09-28**
Industrial Chemistry
[Cross-Listed with CH486/CM486/586]This course will benefit junior and senior undergrads plus grads in chemistry and chemical engineering, and allow them to learn of real ways such talents are used in the professional world. It will involve different industrial chemists and chemical engineers to come to Clarkson University for each of 12 of the 14 weeks of a semester and give two lectures of about 1 hour 15 min each - one on an afternoon and the other following morning. The first lecture will relate the areas of chemistry their company was known for; the second lecture an in-depth discussion on how one project was carried out at the bench and the pitfalls that had to be resolved along the way to achieve success. The intent is to select lecturers from Clarkson Chemistry and Chemical Engineering major alumni at various lengths of time they have been professionals.
Components: Lecture
Course Equivalents: CH 486, CM 486, CM 586
Attributes: Offered Spring Term
Req. Designation: Technology

CH 590(3) **Course ID:007626** **2015-01-20**
Elementary Transport Phenomena
(Cannot be taken by MS or PhD students in Chemical Engineering). Principles of transport of momentum, energy, and mass will be covered from a fundamental perspective, pointing out analogies where appropriate. Topics include the Navier-Stokes and continuity equations, analysis of one dimensional flows, boundary layer theory, the energy and species conservation equations, energy transport by conduction and convection, steady two-dimensional problems, and unsteady one-dimensional problems.
Prerequisites: CH 330 and a 3.5 GPA, or instructor consent
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CH 610(1 - 2) **Course ID:007627** **2015-02-03**
Chemical Engineering Seminar
Students, staff and visiting lecturers present research results and topics of current interest. Attendance is required.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

CH 611(1 - 15) **Course ID:007628** **2015-02-03**
Thesis, Dissertation Credits
Analytical or experimental studies in chemical engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

CH 612(1 - 4) **Course ID:007629** **2015-02-03**
Directed Study
Special reading or laboratory study of a specific problem under the direction of a member of the faculty.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CH 665(3) **Course ID:007633** **2015-01-23** **Instructor Consent Required**
Selected Topics in Polymers and Soft Materials
An advanced graduate course in science and engineering of polymers and soft materials. Topics of special interest will be selected to conform to the mutual interests and needs of students and faculty.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CH 999(1 - 4) **Course ID:011126** **2015-01-13**
Special Topics in Chemical Engineering
Used for awarding transfer credits for graduate courses completed elsewhere for which no equivalent Clarkson university graduate course can be identified.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Educational Chemistry

CHM 580(3) **Course ID:012239** **2021-10-08**
MAT Project in Chemistry (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?

Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Chinese Language

CHN 517(3) **Course ID:012245** **2022-04-08**
Chinese Language and Linguistics I
[Formerly CHN 517A] This course is designed to strengthen students' understanding of second language acquisition theory and teaching strategies. Its primary focus is on Chinese as a second language at the K-12 level. The course assumes that students in the course are already teaching in a Chinese language program with some or minimal CFL training. The course emphasizes instructional strategies, planning, and assessment common to most methods courses. In addition, this course introduces students to program development and assessment since most K-12 programs require their Chinese teachers to build out the language program over a series of several years. The course will address students' real time issues and concerns in the classroom as well as learn to see the 'bigger picture" of the CFL program and curriculum.
Components: Seminar
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

CHN 530(3) **Course ID:012246** **2021-10-08**
Chinese Language and Linguistics II
This 3-credit course is designed for students who contemplate a career teaching Chinese at the secondary or college level. The purpose of the class is to provide students with a general overview of the basic issues in Chinese linguistics from phonetics, morphology to syntax. Teaching strategies related to these issues will also be briefly discussed.
Components: Seminar
Attributes: Offered Spring Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

CHN 580(3) **Course ID:012247** **2021-10-08**
MAT Project in Chinese (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 1(1 - 4) **Course ID:008060** **2015-01-13**
Chemistry Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CM 2(1 - 4) **Course ID:008061** **2015-01-13**
Chemistry Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CM 31(2) **Course ID:012145** **2016-03-21**
HEOP Introduction to General Chemistry I
Introduction to the foundations of major theories of chemistry and their practical applications. Topics include; foundation of measurement, chemical calculations and dimensional analysis, the concept of the mole, reaction stoichiometry, basic thermo-chemical principles, and the structure and organization of the periodic table.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisite: For HEOP students only.
Req. Designation: Technology

CM 103(3) **Course ID:007639** **2015-02-12**
Structure and Bonding
An introduction to the electronic and geometric structures of representative inorganic and organic molecules, to the relations between structure and chemical and physical properties, and to the principles of chemical bonding. This course is designed for students majoring in chemistry.
Components: Discussion, Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

CM 104(3) **Course ID:007640** **2015-01-20**
Chemical Equilibrium and Dynamics
This course is an introduction to chemical equilibrium and kinetics. It includes some basic thermodynamics and the evaluation and use of equilibrium constants, and also the measurement and mechanistic interpretation of the rates of chemical reactions. Examples are selected to cover a wide spectrum of chemical problems and to stress experimental techniques as well as theory.
Components: Discussion, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM103 or CM131
Req. Designation: Technology

CM 105(2) **Course ID:007641** **2015-02-12**
Chemistry Laboratory I
Some fundamental principles underlying the experimental study of chemical phenomena. Some typical reactions of inorganic and organic compounds will be studied. This course will include introductions to various fields of chemical experimentation.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Corequisites: CM103
Req. Designation: Technology

CM 106(2) **Course ID:007642** **2015-01-20**
Chemistry Laboratory II
Experimental studies of the equilibria and rates of some chemical reactions, employing some volumetric and gravimetric analysis and including introductions to spectrophotometric and potentiometric measurements and to the use of computers in chemical experimentation.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM105 or, with consent of the instructor, CM131. Corequisite: CM104.
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 121(1) **Course ID:007643** **2015-01-20**
Freshmen Seminar
A course to acquaint incoming freshmen with activities and facilities in the Chemistry Department, provide a forum for discussion of curriculum choices and career options in chemistry.
Components: Seminar
Attributes: Offered Spring Term
Req. Designation: Technology

CM 131(4) **Course ID:007644** **2016-09-14**
General Chemistry I
A general overview of chemistry, including principles and theories as well as descriptive chemistry of important elements and compounds. Laboratory experiments augment lecture topics to provide a small group hands-on learning experience.
Components: Discussion, Laboratory, Lecture
Attributes: Offered Fall and Spring
Req. Designation: Technology

CM 132(4) **Course ID:007645** **2015-01-20**
General Chemistry II
A continuation of CM 131. Chemical principles, theories, and descriptive chemistry with laboratory experiments to provide additional exposure to lecture topics in a small group environment.
Components: Discussion, Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM131
Req. Designation: Technology

CM 221(3) **Course ID:007647** **2015-02-12**
Spectroscopy
A study of spectroscopic techniques, including both their analytical applications and the use of molecular spectroscopy in the identification and characterization of chemical compounds. The techniques discussed include atomic emission and absorption, fluorescence, visible-ultraviolet, infrared and mass spectroscopy and nuclear magnetic resonance spectroscopy.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM104 or CM132
Req. Designation: Technology

CM 223(3) **Course ID:007648** **2015-02-12**
Spectroscopy Laboratory
This laboratory course accompanies CM 221.
Components: Laboratory
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: CM106 or CM132 Corequisites: CM221
Req. Designation: Technology

CM 241(3) **Course ID:007649** **2015-02-12**
Organic Chemistry I
An introductory course in organic chemistry dealing with the structures, names, chemical and physical properties, preparations, spectroscopy and reaction mechanisms of organic compounds.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM104 or CM132
Req. Designation: Technology

CM 242(3) **Course ID:007650** **2015-01-20**
Organic Chemistry II
A continuation of CM 241.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: CM241
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 244(3) **Course ID:007651** **2020-01-15**
Organic Chemistry Laboratory I
In this laboratory course, procedures for the synthesis of typical organic compounds are combined with spectroscopic and other physical and chemical techniques to illustrate the study of functional-group chemistry and the characterization and identification of organic compounds.
Components: Laboratory
Attributes: Two communication units, Offered Fall and Spring
Requirement Group: Prerequisite: CM 241, Organic Chemistry I Corequisite: CM 242, Organic Chemistry II
Req. Designation: Technology

CM 300(3) **Course ID:007652** **2015-01-20**
Instrumental Laboratory
Laboratory work designed to illustrate principles discussed in CM 320, CM 371 and CM 372.
Components: Laboratory
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisite: CM371 Corequisite: CM320
Req. Designation: Technology

CM 302(3) **Course ID:013092** **2021-02-26**
Forensic Chemistry
This course introduces the principles, methods and instrumentation of chemistry behind the work of crime investigation and will be illustrated with case studies. It will explain how to obtain analytical results through sample preparation, instrumental analysis and data interpretation. It covers topics commonly applicable to the everyday functions of a crime laboratory including forensic analysis of drugs, explosives and inks, DNA profiling, blood analysis etc. The laboratory section will provide an opportunity for students to practice forensic chemistry techniques. This course is open to students with minimal study in chemistry but who are interested in forensic chemistry as well as those with a substantive background in chemistry.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite CM223 Spectroscopy Laboratory or approval by Instructor
Req. Designation: Technology

CM 305(3) **Course ID:013136** **2022-02-09**
Biochemistry for Health Sciences
This course provides the fundamental knowledge that is essential to the study of biochemistry at advanced levels. This course integrates biochemistry with physiology and cell biology and is aimed specifically at introductory health science students. It provides a general introduction to the biochemical basis of various cellular functions and their relevance to disease. Topics covered include structure, function and chemistry of biomolecules, energy metabolism, molecular genetics, the biochemistry of cancer, and recent biotechnology. The course is intended for health science students who have no previous background in sciences. It assumes no prior knowledge and covers some chemistry and molecular biology basics.
Components: Lecture
Course Equivalents: BY 305
Attributes: Offered Spring Term
Req. Designation: Technology

CM 312(3) **Course ID:007655** **2015-01-20**
Survey of Inorganic Chemistry
A review of fundamental chemical principles and a study of the qualitative description of binding in inorganic molecules and of the properties, structures and reactions of elements and their compounds.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM371 or equivalent
Req. Designation: Technology

CM 320(3) **Course ID:007657** **2022-04-12**
Separations and Electrochemistry
This course deals with techniques of separation and electrochemical techniques used in research and analysis. It includes single- and multistage techniques of separation, with emphasis on chromatographic methods; and the principles and applications of potentionmetric, polarographic, voltammetric and some other electroanalytical techniques.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 342(2) **Course ID:012112** **2018-02-26**
Food Chemistry
Food chemistry is a one-semester course that will teach about basic structural principles of food essentials and their chemistry. The course will teach specifically: (i) Molecular basis for the sensation of flavor; (ii) Structure and properties of edible polysaccharides, proteins, and fats; (iii) Chemical and physical changes that these molecules undergo under different food-related treatments (e.g. heating, cooling, mechanical processing); (iv) Brief chemistry of digestion (enzymatic and microbial).
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CM241 with a grade of B or higher Corequisites: CM242
Req. Designation: Technology

CM 345(4) **Course ID:007659** **2015-02-12**
Advanced Laboratory
Advanced techniques in manipulation of chemical compounds and their isolation and characterization are studied. Examples are low temperature and inert atmosphere reaction conditions, synthesis of both inorganic and organic compounds in the form of fine particles, use of thermal analysis, electron microscopy and X-ray diffraction to determine product shapes and composition, and spectroscopic evaluation of metallo-organic complexes having industrial relevance. Course involves extensive use of library facilities to identify background materials as well as details for techniques employed. Course also includes a final presentation based on laboratory and literature findings.
Components: Laboratory
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: CM242 and CM244
Req. Designation: Technology

CM 371(3) **Course ID:007661** **2014-11-20**
Physical Chemistry I
[Cross-listed with PH 371] This course covers the gaseous state, kinetic theory and chemical thermodynamics, with applications to chemical and phase equilibria. The emphasis is on mathematics and problem solving.
Components: Lecture
Course Equivalents: PH 371
Requirement Group: Prerequisites: CM104 or CM132, MA132, PH131 Corequisites: PH132
Req. Designation: Technology

CM 372(3) **Course ID:007662** **2014-11-20**
Physical Chemistry II
[Cross-listed with PH 372] A continuation of CM 371. Topics may include quantum mechanics, atomic structure, chemical bonds, intermolecular forces, spectroscopy, molecular symmetry, optical activity, photochemistry and photobiology.
Components: Lecture
Course Equivalents: PH 372
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM371 or equivalent
Req. Designation: Technology

CM 391(3) **Course ID:007665** **2015-02-03**
Independent Study
An opportunity for junior chemistry majors to undertake research under a faculty member's direction. The research work to be arranged with the faculty member who assists in the choice of a problem and in the planning and execution of the work. A written report must be submitted at the end of each semester summarizing the work and results to date.
Prerequisites: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 406(3) **Course ID:007669** **2020-08-25**
Biomedical Analysis and Instrumentation
[Cross-listed with BY 406] Biomedical Analysis and Instrumentation is a lecture course designed to provide advanced undergraduates and graduate students in basic sciences, biosciences and bioengineering disciplines with scientific and engineering aspects of instrumentation, sample analysis, measuring and processing signals from living organisms. Functioning and calibration of biomedical transducers and devices actually used in clinical practice for analyzing clinical biomarkers for disease diagnostics will be reviewed. Emerging research in bioinstrumentation, biomedical technologies, stand alone and wearable sensing devices, analytical method development and validation will be also be covered. Special emphasis will be placed on measurement principles of medical instrumentation used in health technologies ranging from laboratory scale to next generation wearables. Training in professional ethics, grant writing, patenting, innovation, entrepreneurial activities and FDA regulation for new device development, laboratory management, as well as communication
Components: Lecture
Course Equivalents: BY 406, CM 506, BY 506
Attributes: Offered Even Springs
Requirement Group: Prerequisites: CM221
Req. Designation: Technology

CM 409(1 - 2) **Course ID:010675** **2015-02-03** **Instructor Consent Required**
Ugrd Teaching Assist in Chem
Assisting a faculty member in a chemistry course as an undergraduate teaching assistant. Students should check with their major department to determine whether these credits can be used to meet their degree requirements.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

CM 413(3) **Course ID:007671** **2017-09-12**
Carbon Capture and Sequestration
[Cross-listed with CH 413] Sustainable energy generation is seen as one of the largest challenges of our generation. All long-term solutions rely on the direct or indirect conversion of solar energy, yet these solutions appear to be years from implementation. In the coming decades then, while the relative importance of fossil fuels will decrease, absolute use of fossil fuels will not. Carbon Capture and Sequestration (CCS) employed on a global scale can sustain the world’s energy use and help mitigate alarmingly high carbon dioxide levels in the atmosphere. The goal of this course is to provide students with a modern view of current and emerging research in CCS. Topics will include our current understanding of carbon dioxide in and around the planet, the geological storage of carbon dioxide, and the science and technology of capturing carbon dioxide with focus on material chemistry aspects. Development of analytical methods and characterization tools for assessing CCS properties and materials will also be discussed. Through this series
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CM 417(1 - 3) **Course ID:007672** **2017-01-13**
Directed Research in Inorganic Chemistry
Students will carry out research in inorganic chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of this course.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CM 418(1 - 3) **Course ID:007673** **2022-05-02**
Directed Study in Inorganic Chemistry
The study of a subject not otherwise available in inorganic chemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 422(3) **Course ID:012913** **2018-11-02**
Advanced Mass Spectrometry: Practical Applications
Practical Applications will introduce the students to mass spectrometry and its applications within different fields, including pharmaceutical and biotech industry, academia, government, forensics, etc. Various types of instruments will be discussed, as well as their their application within different fields. The course will then focus on different types of well-known “omics”, such as proteomics, metabolomics, glycomics, or lipidomics, but also on specialized types of “omics” such as peptidomics, post-translational modification-omics (PTM-omics), interactomics, foodomics, microbiomics, venomics, DNA- RNA- & Protein-adductomics, genomics, proteogenomics or transcriptomics. Particular applications of all these kinds of “omics” in biotechnology & pharmaceutical industry, healthcare, biowarfare and forensics will also be discussed.
Components: Lecture
Course Equivalents: CM 522, BY 427, BY 527
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM/BY460/560, or consent of the instructor
Req. Designation: Technology

CM 427(1 - 3) **Course ID:007677** **2017-01-13**
Directed Research in Analytical Chemistry
Students will carry out research in analytical chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CM 428(1 - 3) **Course ID:007678** **2015-02-03**
Directed Study in Analytical Chemistry
The study of a subject not otherwise available in analytical chemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 430(3) **Course ID:007680** **2019-09-03**
Colloids and Interfaces
Physico-chemical principles and experimental techniques related to the characterization and investigation of colloidal systems and interfaces are covered on an introductory level. From the many areas of application, the emphasis will be on those situations that are encountered in everyday life such as environmental problems (aerosols, water treatment), biological aspects (transport and absorption of fat, biological membranes), foods and cosmetics (emulsions), detergency and various technological processes.
Components: Lecture
Course Equivalents: CM 530
Attributes: Offered Fall Term
Req. Designation: Technology

CM 432(3) **Course ID:007950** **2019-01-01**
Fine Particle Characterization
This course is intended to familiarize the students with the analytic techniques routinely used to characterize the size, size distribution, shape, composition, structure, and surface properties (composition, charge, topography) of individual particles as well as the properties of dispersion particles. In conjunction with the latter, the course will discuss many concepts covered by colloids and surface science courses.
Components: Lecture
Course Equivalents: CM 532
Attributes: Given When Needed
Req. Designation: Technology

CM 437(1 - 3) **Course ID:007683** **2017-01-13**
Directed Research in Colloid Chemistry
Students will carry out research in colloid chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 442(3) **Course ID:007688** **2019-03-06**
Advanced Organic Chemistry
The course will cover essential topics of organic chemistry including dynamic stereochemistry, conformational analysis, photochemistry, pericyclic reactions, and chemistry of free radicals.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CM 444(3) **Course ID:007690** **2015-01-23**
Medicinal Chemistry
Various classes of medicinal agents will be discussed in relation to the diseases that they are used to treat. The history and development of these drugs will be covered as well as attempts to correlate chemical structure with biological activity.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: CM242.
Req. Designation: Technology

CM 446(3) **Course ID:007692** **2015-01-23**
Modern Spectroscopic Methods in Organic Chemistry
This course deals largely with the applications of spectroscopic techniques to the identification of organic compounds. Heavy emphasis will be given to nuclear magnetic resonance techniques for protons, carbon and other nuclei. Practical and theoretical aspects of FT NMR will be emphasized.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CM242 and CM371.
Req. Designation: Technology

CM 447(1 - 3) **Course ID:007693** **2017-01-13**
Directed Research in Organic Chemistry
Students will carry out research in organic chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

CM 448(1 - 3) **Course ID:007694** **2015-02-03**
Directed Study in Organic Chemistry
The study of a subject not otherwise available in organic chemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 451(3) **Course ID:010374** **2014-11-20**
Manufacturing Implications of Advanced Materials Processing
The processing of materials into manufactured goods requires an understanding of the chemical composition of the starting substrates, the nature of intermediates, and the properties of final products. This course focuses on the preparation, modification, characterization, and the applications of fine, ultra-fine, and nanosize metallic particles. The objectives are to: a) provide an overview of the relevant theoretical and practical aspects related to the preparation, characterization, and modification of fine particles in general and metallic particles in particular, b) familiarize students with the industrial approaches for developing and manufacturing fine particles on large scale, and c) teach students how the properties of the resulting particles/colloids can be tailored in order to ensure optimal performance in specific applications. During the semester the students will also participate in several practical sessions in which metal colloids will be prepared and characterized.
Components: Lecture
Course Equivalents: CM 551
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 457(1 - 3) **Course ID:007699** **2017-01-13**
Directed Research in Polymer Chemistry
Students will carry out research in polymer chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

CM 458(1 - 3) **Course ID:007700** **2015-01-23**
Directed Study in Polymer Chemistry
The study of a subject not otherwise available in organic chemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CM 460(3) **Course ID:007702** **2014-11-18**
Biochemistry I
[Cross-listed with BY 450] This course is an introduction to the molecular basis of biological processes. The first part of the course will cover the structure and function of the four major classes of biomolecules - proteins, carbohydrates, lipids and nucleic acids. The second part covers the organization and regulation of the major energy generating and biosynthetic pathways.
Components: Lecture
Course Equivalents: BY 450, BY 650, CM 560
Requirement Group: Prerequisites: CM241 or consent of the instructor.
Req. Designation: Technology

CM 461(3) **Course ID:007703** **2022-02-02**
Biochemistry II
[Cross-listed with BY 451] A continuation of Biochemistry I dealing mainly with metabolic pathways, intermediary metabolism, protein synthesis, membrane transport, DNA replication and RNA transcription.
Components: Lecture
Course Equivalents: BY 451
Attributes: Offered Spring Term
Requirement Group: Prerequisite: CM460 or equivalent.
Req. Designation: Technology

CM 466(3) **Course ID:010918** **2015-01-23**
Bioelectronics & Bionanotechnology
This course covers novel areas in science and technology that have high importance for fundamental science and practical applications. Bioelectronics is a scientific and technological area that includes electronic coupling of biomaterials (enzymes, DNA, recognition proteins, biological cells) with electronic devices. The bioelectronic systems can be used to develop sensing devices (enzyme-based biosensors, DNA sensors, immunosensors, etc.) and to develop biofuel cells (implantable biofuel cells for biomedical applications, self-powered biosensors, autonomously operated devices). New methods and new materials (functionalized nanoparticles, quantum dots, carbon nanotubes, etc.) developed due to the tremendous recent success in nanotechnology pave the way for the novel possibilities to couple biomaterials and electronic transducers, thus resulting in the new technological field named Bionanotechnology. The students will be introduced into the most important areas of Bioelectronics and Bionanotechnology.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CM372, CM460.
Req. Designation: Technology

CM 467(1 - 3) **Course ID:007706** **2017-01-13**
Directed Research in Biochemistry
Students will carry out research in biochemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 468(1 - 3) **Course ID:007707** **2015-02-03**
Directed Study in Biochemistry
The study of a subject not otherwise available in biochemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 469(3) **Course ID:007708** **2021-09-08**
Implantable and Wearable Bioelectronics
Chemistry CM469/569 is a lecture course designed to provide graduate students and advanced undergraduates with a working knowledge in the multidisciplinary research area of bioelectronics, giving particular information about implantable and wearable bioelectronics. The course will concentrate on concepts, experimental realizations and practical applications. This course covers novel areas in science and technology that have high importance for fundamental science and practical applications. Major science areas covered by the course will be in chemistry, particularly biochemistry and electrochemistry. Minor sub-areas studied in the course will be related to biomedical applications and electrical/electronic engineering. All studies in the course will not require any background knowledge except general chemistry and basics of biochemistry. The major topics covered by the class will be related, but not limited, to biosensors, biofuel cells, bioelectronic devices concentrating on the concepts rather than technical details. The course work for
Components: Lecture
Course Equivalents: CM 569
Attributes: Offered Spring Term
Req. Designation: Technology

CM 470(3) **Course ID:007709** **2019-04-19**
Biochemistry & Biotechnology Laboratory
[Cross-listed with BY 470] This course is a one semester course in the fundamental laboratory approaches for biochemistry and biotechnology. While largely a hands-on course, laboratory experiments will be supplemented with lectures that integrate the theoretical and practical principals covered in the exercises. Topics include protein purification, characterization and analysis, enzyme kinetics and molecular modeling.
Components: Laboratory
Course Equivalents: BY 470
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: CM221 and CM223 or BY450/CM460 or consent of the instructor.
Req. Designation: Technology

CM 472(3) **Course ID:007710** **2018-10-10**
Chemistry at Surfaces: Structure and Catalysis
This senior undergraduate and graduate course will survey the field of surface chemistry, with specific attention dedicated to the structure of solid surfaces and chemical processes at solid interfaces. This course will cover the basics of the structure of periodic solids, relate that understanding to solid interfaces, and finally address how surface structure and reduced dimensionality impact chemical reactions (i.e. hetergeneous catalysis). Analytical techniques common to this discipline will also be discussed. Graduate students will be assessed differently than undergraduates in this course. Graduate students will have the additional responsibility of delivering a presentation discussing one of several primary research articles germane to the field that were selected by the instructor, while undergraduate students will submit a paper describing one of these articles in detail.
Components: Lecture
Course Equivalents: CM 572
Attributes: Offered Odd Springs
Requirement Group: Prerequisites: CM371 and CM372, or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 475(3) **Course ID:007713** **2015-10-19**
Sustainable Nanotechnology
The goal of this course is to provide graduate students and advanced undergraduates with a modern view of current and emerging research in nanotechnology. Topics will include: fundamental nanoscale properties and applications, green manufacturing and assembly in functional devices, interaction of nanomaterials with biological systems, the physical and chemical phenomena at nano-bio interfaces, fate, transport and transformation of engineered nanomaterials, environmental and health impact, nanometrology, nanotoxicology and hazard identification of nano-based products. Development of analytical methods and characterization tools for assessing nanoscale properties and materials will also be discussed. Students will be exposed to interdisciplinary topics and an integrated training bridging material and environmental sciences with biology and analytical chemistry. Students will be able to demonstrate a basic awareness of risks and benefits of emerging technologies and evaluate overall environmental and societal impact.

Components: Lecture
Course Equivalents: CM 575, MSE 575, ES 575
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Chemical & Biomolecular Eng - Subject: Chemistry

CM 476(3) **Course ID:007714** **2014-11-20**
Atmospheric Chemistry
[Cross-listed with CE 477] The course will cover the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities; detailed descriptions of the chemistry of the carbon, nitrogen and sulfur cycles; characterization of the atmospheric aerosol and its role in heterogeneous reactions and materials transport; stratospheric ozone and problems with its depletion; airborne radioactivity and its role in atmospheric ion chemistry.

Components: Lecture
Course Equivalents: CE 477, CE 577, CH 576, CM 576
Attributes: Offered Odd Springs
Requirement Group: Prerequisites: CM370 or CM371 or ES340.
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 477(1 - 3) **Course ID:007715** **2017-01-13**
Directed Research in Physical Chemistry
Students will carry out research in physical chemistry under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

CM 478(1 - 3) **Course ID:007716** **2020-04-03**
Directed Study in Physical Chemistry
The study of a subject not otherwise available in physical chemistry courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CM 481(3) **Course ID:013037** **2020-04-03**
Computational Chemistry
[Cross Listed with CM581] Computational Chemistry is senior undergraduate and graduate course which will discuss theoretical and computational methods in chemistry and their applications. This course will include both lectures and computer lab. The lectures will introduce the fundamental theories and methods in chemistry and their applications in the cutting-edge research. The computer lab will be hands on tutorials on calculating the structures and properties of chemicals, exploring the reaction mechanisms, reactivities, and selectivities. The objectives of this course are: (1) to provide students with the basic background of computational methodologies and their applications. (2) to enhance their experiences with common computational methods by class project. (3) to encourage their creativity, critical thinking and problem-solving ability. Graduate students will have additional course work.
Components: Lecture
Course Equivalents: CM 581
Attributes: Offered Even Falls
Requirement Group: Prerequisites: CM371 and CM372
Req. Designation: Technology

CM 482(3) **Course ID:012951** **2019-09-05**
Information Processing by Chemistry
The course is composed of lectures and student presentations on signal-switchable chemical and electrochemical systems. These systems perform Boolean logic operations, memory function and control of bioelectronic devices, e.g., biofuel cells.
Students will gain knowledge on chemical/biochemical systems of various complexity logically processing different input signals. Preparation of sensing switchable interfaces will be explained. Finally, bioelectronic systems processing information and operating as signal-switchable devices will be discussed.
Components: Lecture
Course Equivalents: CM 582
Attributes: Given When Needed
Req. Designation: Technology

CM 483(3) **Course ID:010314** **2022-02-02**
Introduction to Polymer Science
[Cross-listed with PH 483] This course is about fundamental aspects of polymer science. It introduces the world of chain molecules from synthesis and properties to applications. Basic knowledge from polymer chemistry and physics are combined in the one course in a form appropriate for undergraduates and graduates in chemistry, physics and engineering to develop the understanding of polymeric behavior in synthetic materials and natures.
Components: Lecture
Course Equivalents: CM 583
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Junior standing or permission of instructor
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 485(3) **Course ID:007718** **2022-02-02**
Nanostructured Materials
[Cross-listed with PH 585] This course reviews the methods to make nanoscale building blocks and approaches to arrange the building blocks into functional architectures for advanced materials. The list of topics includes: chemical patterning and lithography, layer-by-layer self assembly, synthesis and self assembly of nanoparticles, nanotubes and nanowires, properties of nanoclusters and self assembled structures (photonic crystals, plasmonic effects, quantum dots, porous materials, biomimetics).
Components: Lecture
Course Equivalents: CM 585
Attributes: Given When Needed
Requirement Group: Prerequisites: Senior Standing or consent of the instructor.
Req. Designation: Technology

CM 486(1) **Course ID:012837** **2022-02-02**
Industrial Chemistry
[Cross-Listed with CM586/CH486/586]This course will benefit junior and senior undergrads plus grads in chemistry and chemical engineering, and allow them to learn of real ways such talents are used in the professional world. It will involve different industrial chemists and chemical engineers to come to Clarkson University for each of 12 of the 14 weeks of a semester and give two lectures of about 1 hour 15 min each - one on an afternoon and the other following morning. The first lecture will relate the areas of chemistry their company was known for; the second lecture an in-depth discussion on how one project was carried out at the bench and the pitfalls that had to be resolved along the way to achieve success. The intent is to select lecturers from Clarkson Chemistry and Chemical Engineering major alumni at various lengths of time they have been professionals.
Components: Lecture
Course Equivalents: CH 486, CH 586, CM 586
Attributes: Given When Needed
Requirement Group: Prerequisites: Junior or Senior Standing
Req. Designation: Technology

CM 487(3) **Course ID:012908** **2022-02-02**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: PH 587, CM 587, PH 487, MSE 587, ES 587
Attributes: Given When Needed
Requirement Group: Prerequisites: PH132 or consent of the instructor; ES260 and/or PH231 are recommended prerequisites
Req. Designation: Technology

CM 491(6) **Course ID:007719** **2017-01-13**
Undergraduate Thesis
Research work to be arranged with the consent of a staff member who assists the student in the choice of a problem and in the planning and execution of work on it. For senior chemistry majors.
Prerequisite: consent of a department faculty member.
Components: Research
Attributes: Offered Fall Term
Req. Designation: Technology

CM 492(6) **Course ID:007720** **2017-01-13**
Undergraduate Thesis
A continuation of CM 491. A written thesis is required at the end of the course.
Prerequisite: consent of a department faculty member.
Components: Research
Attributes: Two communication units, Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 495(1) **Course ID:011318** **2014-01-01**
Internship/Co-op in Chemistry & Biomolecular Science
Students will gain practical work experience in chemistry or biomolecular science under direction and supervision of professionals outside their department. Students must submit a formal report describing work performed as well as the Internship/Co-op learning opportunities. Report approval is required for the award of credit. Feedback will be provided by their Internship/Co-op field supervisor. This course will be graded on a pass/no-credit basis.
Components: Independent Study
Req. Designation: Technology

CM 497(1 - 3) **Course ID:007721** **2015-02-03**
Directed Study
The study of a subject not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 499(1 - 3) **Course ID:007723** **2015-02-03**
Directed Study
The study of a subject not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 506(3) **Course ID:007725** **2022-02-02**
Biomedical Analysis and Instrumentation
[Cross-listed with BY 506] Biomedical Analysis and Instrumentation is a lecture course designed to provide advanced undergraduates and graduate students in basic sciences, biosciences and bioengineering disciplines with scientific and engineering aspects of instrumentation, sample analysis, measuring and processing signals from living organisms. Functioning and calibration of biomedical transducers and devices actually used in clinical practice for analyzing clinical biomarkers for disease diagnostics will be reviewed. Emerging research in bioinstrumentation, biomedical technologies, stand alone and wearable sensing devices, analytical method development and validation will be also be covered. Special emphasis will be placed on measurement principles of medical instrumentation used in health technologies ranging from laboratory scale to next generation wearables. Training in professional ethics, grant writing, patenting, innovation, entrepreneurial activities and FDA regulation for new device development, laboratory management, as well as communication
Components: Lecture
Course Equivalents: BY 406, CM 406, BY 506
Attributes: Given When Needed
Req. Designation: Technology

CM 513(3) **Course ID:007728** **2017-09-12**
Carbon Capture and Sequestration
[Cross-listed with CH 513] Sustainable energy generation is seen as one of the largest challenges of our generation. All long-term solutions rely on the direct or indirect conversion of solar energy, yet these solutions appear to be years from implementation. In the coming decades then, while the relative importance of fossil fuels will decrease, absolute use of fossil fuels will not. Carbon Capture and Sequestration (CCS) employed on a global scale can sustain the world’s energy use and help mitigate alarmingly high carbon dioxide levels in the atmosphere. The goal of this course is to provide students with a modern view of current and emerging research in CCS. Topics will include our current understanding of carbon dioxide in and around the planet, the geological storage of carbon dioxide, and the science and technology of capturing carbon dioxide with focus on material chemistry aspects. Development of analytical methods and characterization tools for assessing CCS properties and materials will also be discussed. Through this series
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CM 520(3) **Course ID:007729** **2022-04-12**
Separations and Electrochemistry
This course covers the same topics as CM 320 and includes additional material on the graduate level.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 522(3) **Course ID:012914** **2022-02-02**
Advanced Mass Spectrometry: Practical Applications
Practical Applications will introduce the students to mass spectrometry and its applications within different fields, including pharmaceutical and biotech industry, academia, government, forensics, etc. Various types of instruments will be discussed, as well as their their application within different fields. The course will then focus on different types of well-known “omics”, such as proteomics, metabolomics, glycomics, or lipidomics, but also on specialized types of “omics” such as peptidomics, post-translational modification-omics (PTM-omics), interactomics, foodomics, microbiomics, venomics, DNA- RNA- & Protein-adductomics, genomics, proteogenomics or transcriptomics. Particular applications of all these kinds of “omics” in biotechnology & pharmaceutical industry, healthcare, biowarfare and forensics will also be discussed.
Components: Lecture
Course Equivalents: CM 422, BY 427, BY 527
Attributes: Given When Needed
Requirement Group: Prerequisites: CM/BY460/560, or consent of the instructor
Req. Designation: Technology

CM 530(3) **Course ID:007732** **2019-09-03**
Colloid and Interfaces
Physico-chemical principles and experimental techniques related to the characterization and investigation of colloidal systems and interfaces are covered on an introductory level. From the many areas of application, the emphasis will be on those situations that are encountered in everyday life such as environmental problems (aerosols, water treatment), biological aspects (transport and absorption of fat, biological membranes), foods and cosmetics (emulsions), detergency and various technological processes. This course covers the same topics as CM 430 and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: CM 430
Attributes: Offered Fall Term
Req. Designation: Technology

CM 532(3) **Course ID:007951** **2019-01-01**
Fine Particle Characterization
This course is intended to familiarize the students with the analytic techniques routinely used to characterize the size, size distribution, shape, composition, structure, and surface properties (composition, charge, topography) of individual particles as well as the properties of dispersion particles. In conjunction with the latter, the course will discuss many concepts covered by colloids and surface science courses. Graduate students will do additional work.
Components: Lecture
Course Equivalents: CM 432
Req. Designation: Technology

CM 542(3) **Course ID:007737** **2019-03-06**
Advanced Organic Chemistry
The course will cover essential topics of organic chemistry including dynamic stereochemistry, conformational analysis, photochemistry, pericyclic reactions, and chemistry of free radicals.

This course covers the same topics as CM 442 and includes additional material on the graduate level.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CM 544(3) **Course ID:007739** **2015-01-23**
Medicinal Chemistry
This course covers the same topics as CM 444 and includes additional material on the graduate level.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CM 546(3) **Course ID:007741** **2015-01-23**
Modern Spectroscopic Methods in Organic Chemistry
No prerequisites. This course covers the same topics as CM 446 and includes additional material on the graduate level.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 551(3) **Course ID:007744** **2014-11-20**
Manufacturing Implications of Advanced Materials Processing
The processing of materials into manufactured goods requires an understanding of the chemical composition of the starting substrates, the nature of intermediates, and the properties of final products. This course focuses on the preparation, modification, characterization, and the applications of fine, ultra-fine, and nanosize metallic particles. The objectives are to: a) provide an overview of the relevant theoretical and practical aspects related to the preparation, characterization, and modification of fine particles in general and metallic particles in particular, b) familiarize students with the industrial approaches for developing and manufacturing fine particles on large scale, and c) teach students how the properties of the resulting particles/colloids can be tailored in order to ensure optimal performance in specific applications. During the semester the students will also participate in several practical sessions in which metal colloids will be prepared and characterized. Graduate students will do additional work, such as a term paper or review
Components: Lecture
Course Equivalents: CM 451
Req. Designation: Technology

CM 560(3) **Course ID:007747** **2014-11-20**
Biochemistry I
[Cross-listed with BY 650] This course covers the same topics as CM 460 and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: BY 450, BY 650, CM 460
Req. Designation: Technology

CM 561(3) **Course ID:007748** **2014-11-24**
Biochemistry II
[Cross-listed with BY 651] This course covers the same topics as CM 461 and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: BY 651
Req. Designation: Technology

CM 566(3) **Course ID:010919** **2015-01-23**
Bioelectronics & Bionanotechnology
This course covers novel areas in science and technology that have high importance for fundamental science and practical applications. Bioelectronics is a scientific and technological area that includes electronic coupling of biomaterials (enzymes, DNA, recognition proteins, biological cells) with electronic devices. The bioelectronic systems can be used to develop sensing devices (enzyme-based biosensors, DNA sensors, immunosensors, etc.) and to develop biofuel cells (implantable biofuel cells for biomedical applications, self-powered biosensors, autonomously operated devices). New methods and new materials (functionalized nanoparticles, quantum dots, carbon nanotubes, etc.) developed due to the tremendous recent success in nanotechnology pave the way for the novel possibilities to couple biomaterials and electronic transducers, thus resulting in the new technological field named Bionanotechnology. The students will be introduced into the most important areas of Bioelectronics and Bionanotechnology.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 567(1) **Course ID:012760** **2022-02-02**
Biofuel Cells – Design and Applications
This is a lecture course designed to provide graduate students with a working knowledge in the highly multidisciplinary research area of biofuel cells (including microbial, enzyme-based and “abiotic” biofuel cells, their construction, operation and various applications). The course will include a brief overview of microbial fuel cells. The “abiotic” biofuel cells based on the use of inorganic catalytic species (mostly catalytic nanoparticles) will be studied in connection with the general information on nanoparticles and their immobilization on electrodes. The main part of the course will be devoted to the enzyme-based biofuel cells and their biomedical applications, particularly as a potential power source for implantable biomedical devices (e.g., pacemakers). The scientific advances and technical problems will be discussed. The course is addressed to graduate students with different backgrounds, including students from chemistry and biomolecular science, biology, chemical engineering and electrical engineering. Since the attending students can have very

Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Science - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 569(3) **Course ID:013122** **2022-02-02**
Implantable and Wearable Bioelectronics
Chemistry CM469/569 is a lecture course designed to provide graduate students and advanced undergraduates with a working knowledge in the multidisciplinary research area of bioelectronics, giving particular information about implantable and wearable bioelectronics. The course will concentrate on concepts, experimental realizations and practical applications. This course covers novel areas in science and technology that have high importance for fundamental science and practical applications. Major science areas covered by the course will be in chemistry, particularly biochemistry and electrochemistry. Minor sub-areas studied in the course will be related to biomedical applications and electrical/electronic engineering. All studies in the course will not require any background knowledge except general chemistry and basics of biochemistry. The major topics covered by the class will be related, but not limited, to biosensors, biofuel cells, bioelectronic devices concentrating on the concepts rather than technical details. The course work for

Components: Lecture
Course Equivalents: CM 469
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 570(3) **Course ID:007752** **2015-01-20**
Biochemistry & Biotechnology Laboratory
This course is a one semester course in the fundamental laboratory approaches for biochemistry and biotechnology. While largely a hands-on course, laboratory experiments will be supplemented with lectures that integrate the theoretical and practical principals covered in the exercises. Topics include protein purification, characterization and analysis, enzyme kinetics and molecular modeling.
Prerequisites: BY312 or CY450 or CM460 or consent of the instructor.
Components: Laboratory
Attributes: Offered Spring Term
Req. Designation: Technology

CM 572(3) **Course ID:007753** **2022-02-02**
Chemistry at Surfaces: Structure and Catalysis
This senior undergraduate and graduate course will survey the field of surface chemistry, with specific attention dedicated to the structure of solid surfaces and chemical processes at solid interfaces. This course will cover the basics of the structure of periodic solids, relate that understanding to solid interfaces, and finally address how surface structure and reduced dimensionality impact chemical reactions (i.e. hetergeneous catalysis). Analytical techniques common to this discipline will also be discussed. Graduate students will be assessed differently than undergraduates in this course. Graduate students will have the additional responsibility of delivering a presentation discussing one of several primary research articles germane to the field that were selected by the instructor, while undergraduate students will submit a paper describing one of these articles in detail.
Components: Lecture
Course Equivalents: CM 472
Attributes: Given When Needed
Req. Designation: Technology

CM 575(3) **Course ID:007756** **2015-10-19**
Sustainable Nanotechnology
[Cross-listed with MSE 575, and ES 575] This course covers the same topics as CM 475 and includes additional coursework on the graduate level.
Components: Lecture
Course Equivalents: CM 475, MSE 575, ES 575
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Chemical & Biomolecular Eng - Subject: Chemistry

CM 576(3) **Course ID:007757** **2021-11-09**
Atmospheric Chemistry
[Cross-listed with CE 577, CH 576] The course will cover the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities; detailed descriptions of the chemistry of the carbon, nitrogen and sulfur cycles; characterization of the atmospheric aerosol and its role in heterogeneous reactions and materials transport; stratospheric ozone and problems with its depletion; airborne radioactivity and its role in atmospheric ion chemistry. This course covers the same topics as CE 477 and includes additional material on the graduate level.
Prerequisite: CM370 or CM371 or ES340.
Components: Lecture
Course Equivalents: CE 477, CE 577, CH 576, CM 476
Attributes: Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 581(3) **Course ID:013038** **2020-04-03**
Computational Chemistry
[Cross Listed with CM481] Computational Chemistry is senior undergraduate and graduate course which will discuss theoretical and computational methods in chemistry and their applications. This course will include both lectures and computer lab. The lectures will introduce the fundamental theories and methods in chemistry and their applications in the cutting-edge research. The computer lab will be hands on tutorials on calculating the structures and properties of chemicals, exploring the reaction mechanisms, reactivities, and selectivities. The objectives of this course are: (1) to provide students with the basic background of computational methodologies and their applications. (2) to enhance their experiences with common computational methods by class project. (3) to encourage their creativity, critical thinking and problem-solving ability. Graduate students will have additional course work.
Components: Lecture
Course Equivalents: CM 481
Attributes: Offered Even Falls
Req. Designation: Technology

CM 582(3) **Course ID:012950** **2019-09-05**
Information Processing by Chemistry
The course is composed of lectures and student presentations on signal-switchable chemical and electrochemical systems. These systems perform Boolean logic operations, memory function and control of bioelectronic devices, e.g., biofuel cells.
Students will gain knowledge on chemical/biochemical systems of various complexity logically processing different input signals. Preparation of sensing switchable interfaces will be explained. Finally, bioelectronic systems processing information and operating as signal-switchable devices will be discussed.
Components: Lecture
Course Equivalents: CM 482
Attributes: Given When Needed
Req. Designation: Technology

CM 583(3) **Course ID:010315** **2022-02-02**
Introduction to Polymer Science
[Cross-listed with PH 583] This course is about fundamental aspects of polymer science. It introduces the world of chain molecules from synthesis and properties to applications. Basic knowledge from polymer chemistry and physics are combined in the one course in a form appropriate for undergraduates and graduates in chemistry, physics and engineering to develop the understanding of polymeric behavior in synthetic materials and natures.
Components: Lecture
Course Equivalents: CM 483
Attributes: Given When Needed
Req. Designation: Technology

CM 585(3) **Course ID:011127** **2022-02-02**
Nanostructured Materials
[Cross-listed with PH 585] This course reviews the methods to make nanoscale building blocks and approaches to arrange the building blocks into functional architectures for advanced materials. The list of topics includes: chemical patterning and lithography, layer-by-layer self assembly, synthesis and self assembly of nanoparticles, nanotubes and nanowires, properties of nanoclusters and self assembled structures (photonic crystals, plasmonic effects, quantum dots, porous materials, biomimetics).
Components: Lecture
Course Equivalents: CM 485
Attributes: Given When Needed
Req. Designation: Technology

CM 586(1) **Course ID:012838** **2022-02-02**
Industrial Chemistry
[Cross-Listed with CM486/CH486/586]This course will benefit junior and senior undergrads plus grads in chemistry and chemical engineering, and allow them to learn of real ways such talents are used in the professional world. It will involve different industrial chemists and chemical engineers to come to Clarkson University for each of 12 of the 14 weeks of a semester and give two lectures of about 1 hour 15 min each - one on an afternoon and the other following morning. The first lecture will relate the areas of chemistry their company was known for; the second lecture an in-depth discussion on how one project was carried out at the bench and the pitfalls that had to be resolved along the way to achieve success. The intent is to select lecturers from Clarkson Chemistry and Chemical Engineering major alumni at various lengths of time they have been professionals.
Components: Lecture
Course Equivalents: CH 486, CH 586, CM 486
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 587(3) **Course ID:012909** **2022-02-02**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: PH 587, CM 487, PH 487, MSE 587, ES 587
Attributes: Given When Needed
Req. Designation: Technology

CM 735(1 - 3) **Course ID:007769** **2015-02-03**
Special Topics in Colloid and Surface Chemistry
Topics in colloid and surface chemistry and related areas selected to meet the needs of the class.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 755(1 - 3) **Course ID:007779** **2015-02-03**
Special Topics in Polymer Chemistry
Topics in polymer chemistry and related areas selected to meet the needs of the class.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 765(1 - 3) **Course ID:007784** **2015-02-03**
Special Topics in Biochemistry
Topics in biochemistry and related areas selected to meet the needs of the class.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 775(1 - 3) **Course ID:007789** **2015-02-03**
Special Topics in Physical Chemistry
Topics in physical chemistry and related areas selected to meet the needs of the class.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 890(1 - 3) **Course ID:007800** **2015-02-03**
Directed Study
The study, on the graduate level, of a subject not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

CM 900(1 - 2) **Course ID:007810** **2015-02-03**
Seminar
Reports are made by students on topics from the current literature, or by students, faculty members or outside speakers on their own research.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

CM 990(1 - 15) **Course ID:007811** **2015-02-03**
Thesis, Dissertation or Special Project
Each student does independent, original work on a project under the guidance and supervision of an instructor. A grade on all of the credits for this work presented in satisfaction of the requirements for a degree is given when those requirements are completed.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Chemistry

CM 999(1 - 10) **Course ID:011096** **2015-02-16**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 1(2 - 4) **Course ID:009604** **2015-01-13**
Communication Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

COMM 2(2 - 4) **Course ID:009605** **2015-01-13**
Communication Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Foundation Curriculum Humanities Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

COMM 100(3) **Course ID:009621** **2021-11-03**
Introduction to Digital Art: Time & Image
[Cross-listed with DA 100] [Formerly COMM 221] This introductory studio course explores many of the key principles, techniques and dialogues governing the creative potential of digital technologies within art and design. Topics of study include bitmap and vector-based digital imaging together with digital approaches to time-based media. The goal of the course is to empower students with an artistic and technological understanding of the subject, while encouraging an experimental approach to digital media.
Components: Lecture
Course Equivalents: DA 100
Attributes: One communication unit, Imaginative Arts, Offered Each Term
Req. Designation: Technology

COMM 101(3) **Course ID:011091** **2015-01-13**
Introductory Writing
Credit for this course is awarded only on the basis of an incoming student having taken a college-level introductory writing course at another college or university. The focus of this type of course is the teaching of writing itself, and typical titles include 'Freshman Composition,' 'Composition 1,' 'Expository Writing,' 'Freshman English,' and 'Writing and Critical Thinking,' among others. The two communication points associated with COMM101 can be counted toward the Clarkson Common Experience's communication requirement.
Components: Lecture
Attributes: Two communication units, Transfer Credit Only
Req. Designation: Technology

COMM 120(1) **Course ID:013135** **2021-10-13**
Making and Communicating Innovation
This course will provide a high level overview of prototyping digital and physical innovations and will provide instruction on communicating innovations. Making topics covered include but are not limited to 3D modeling/printing, audio and video principles/recording/editing, basic video shooting/editing. Communication topics include but are not limited to context, audience, and purpose analysis, genres in business and technical communication, pitching, writing style, and writing and revision processes. This is a hybrid course that will include in person and virtual sessions.
Components: Lecture
Course Equivalents: IGN 120
Attributes: Given When Needed
Req. Designation: Technology

COMM 175(3) **Course ID:013161** **2022-03-18**
Introduction to Design
This course introduces students to key design movements, practices, and innovators in fields such as graphic design, typography, and design thinking.
Components: Lecture
Attributes: One communication unit, Imaginative Arts
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 190(0) **Course ID:011191** **2015-02-26** **Department Consent Required**
Writing Center Tutor
Students will be introduced to Writing Center theory which includes collaborative learning, the writing process, rhetorical concepts, disciplinary genres, and interpersonal communication skills. Students will also apply these concepts by conducting writing conferences with members of the Clarkson community. In the process, students will deepen their understanding of the dynamics of interpersonal communication, develop their writing skills and their knowledge of writing in the disciplines.
Prerequisite: Admission by invitation from the Director of the Writing Center. Students may enroll in COMM190 only twice.
Components: Independent Study
Attributes: One communication unit, Offered Each Term
Req. Designation: Technology

COMM 210(3) **Course ID:009609** **2016-08-29**
Theory of Rhetoric for Business, Science, and Engineering
[Formerly TC 210] This course introduces students to a rhetorical perspective of communication. Students will develop their abilities to: identify and analyze communication problems and issues in a given context; develop effective arguments; and communicate with others using various communication media (written, electronic, oral, visual). The course contains a substantial reading component, as well as instruction, practice, and feedback in writing and speaking.
Components: Lecture
Attributes: Two communication units, Offered Fall Term
Req. Designation: Technology

COMM 216(3) **Course ID:013145** **2021-11-10**
Intro to Sports Broadcasting
Intro to Sports Broadcasting will focus on all aspects of the industry, providing a broad understanding and appreciation of the art of sports broadcasting. Students within the course will discuss sports broadcasting history and origins and debate historical approaches. This course focuses on students' knowledge and intellectual grasp of the industry and culminates with the students beginning to develop their own on-air sports broadcasting talent.

Students will be introduced to a diverse array of techniques and philosophies for sports broadcasting from fundamentals and essentials to advanced learning methods, utilizing a hands-on approach. The course will consist of discussions, critiques, learning exercises, take home assignments and hands-on practice and participation.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 217(3) **Course ID:009611** **2015-02-03**
Introduction to Public Speaking
This lecture and laboratory course is designed to enhance the individual's effective public communication by giving him or her a variety of speaking roles in different situations. The objective of the course is to develop an awareness of the speaking potential of each student with emphasis on listening ability, nonverbal behavior, idea organization and effective use of language and visual aids.
Components: Lecture
Attributes: Two communication units, Offered Each Term
Req. Designation: Technology

COMM 219(3) **Course ID:012856** **2018-01-16**
Introduction to Social Media
This course is geared toward understanding and utilizing the various social media channels for personal, professional and community benefit. In this course we will: Assess a variety of social media channels, examine successful users of new media, construct/refine our social media presence, relate social media attributes to our future paths, understand the social media climate through current articles, case studies, readings, and reports, Skype with industry professionals to gain varied insight, create a social media campaign to help spread awareness on some component of Clarkson University, understand how some component of social media campaigns could impact your future aspirations.
Components: Lecture
Attributes: Two communication units, Individual and Group Behavior, Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Communication

COMM 226(3) **Course ID:012000** **2015-03-05**
Short Film Screenwriting
[Cross-listed with FILM 226] In this course, you will learn the process of writing short screenplays for narrative fiction films of any genre. Short films can be anywhere from 30 seconds to 40 minutes long, though the majority of them fall between seven and fifteen minutes. Each student will complete two short scripts and then revise one of these from the ground up. Since this is a workshop, you are expected to comment thoughtfully on your classmates' work, as they will comment thoughtfully on yours. Though there is some reading in this course, your primary concern should be writing, writing, writing!

Components: Lecture
Course Equivalents: FILM 226
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 229(3) **Course ID:012826** **2017-08-15**
Principles of User-Experience Design
This course introduces the processes and practices of user experience design (UXD) as it applies to websites, applications, and product development, and includes grounding in theories and techniques for developing websites,
user-interfaces, media artifacts, and products. Students think critically about and practice design thinking and iteration, analyze and theorize design choices, communicate ideas in multimedia, collaborate with others, perform research, hypothesize, conduct tests, and report data. By the end of the course, students will have a solid understanding of major user-experience design methodologies.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Offered Spring Term
Req. Designation: Technology

COMM 245(3) **Course ID:012970** **2021-03-25**
Writing for Media
Writing for Media helps students learn to write for a people in diverse types of media and genres, ranging from traditional areas such as journalism through social media. Students will develop skills at analyzing communication needs in diverse contexts; writing communications that work effectively for readers, viewers, listeners, and users in those contexts. Students will also learn how to adapt their own skills to emerging media in the future.
Components: Lecture
Attributes: Imaginative Arts, Given When Needed
Req. Designation: Technology

COMM 310(3) **Course ID:009612** **2022-03-08**
Mass Media and Society
This course consists of readings in and analysis of modern media communication and its influence. It includes the history of the media, media control, and various media effects on special audiences and on the development of other media. The course centers on an analysis of how society controls the media and how the media controls society. The course is based on discussion of opinion pieces and other readings.
Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Fall Term
Req. Designation: Technology

COMM 312(3) **Course ID:011664** **2015-01-23**
Public Relations
This course will introduce students to the history, nature, theory and practice of public relations in the United States by examining the activities of public relations professionals and firms. Attention will be given to the communication process and how persuasion is employed to influence various publics via traditional PR strategies and approaches, as well as how emerging media are changing current practice in various fields (e.g., health care, entertainment, government, and non-profits). Frequent practical exercises, communication tasks, and activities could include developing written and/or video press releases, maintaining a blog, running a press conference, planning events for a PR campaign in coordination with a client’s goals, creating ‘press kits,’ developing strategies for building relationships with the media, developing a crisis communication plan for an organization, and associated oral presentations.
Components: Lecture
Attributes: Two communication units, Given When Needed
Req. Designation: Technology

COMM 313(3) **Course ID:009615** **2022-03-08**
Professional Communication
[Cross-listed with EM313] This course presents students opportunities to learn how to design and present effective professional documents. The course emphasizes a rhetorical approach to analyzing the issues and details important to the communication to be produced (e.g., audience, style, format, purpose). Students will practice writing both individually and collaboratively and will be expected to present their work orally on occasion. Students will encounter topics such as, but not limited to, abstracts, email, instructions, letters, memoranda, proposals, and various types of reports. Students of any major may take this course.
Components: Lecture
Course Equivalents: EM 313
Attributes: Two communication units, Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 314(3) **Course ID:012925** **2019-02-07**
Placemaking, Marketing and Promotion
This course includes a foundational understanding of the construct of Placemaking or the ways in which people in places at various geographic scopes (neighborhood, community, town, or region) explore collaboratively their needs and develop planning and entrepreneurial strategies for more livable, sustainable and productive communities. This exploration interrogates multiple disciplines and fields including physical geography, architecture, community planning, sustainability certification programs (e.g., LEED), civic engagement, entrepreneurism, regulatory frameworks, as well as current trends in the literature and practice. A focus will also be on Creative Placemaking initiatives that put artists and The Arts at the forefront of community development. The course also builds on this foundation to examine the various ways in which communities utilize Placebranding as well as Marketing and Promotional Strategies to reach their goals including tourism, residential growth and sustainable, economic development.
Components: Lecture
Attributes: One communication unit, Economics and Organizations, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

COMM 315(3) **Course ID:013059** **2020-10-13**
STEAM Journalism
Writing is one of the most varied fields in the modern workforce. From full-time and freelance journalists covering breaking news – to media writers and PR professionals working in-house to tell organizational stories across multi-media and even technical genres, the role of “writer” is complex and diverse. What has become more evident with advances in technology is that writers in these wide-ranging capacities, whose task is to illuminate stories about science, technology, engineering and math (STEM), have something in common: integration of the “Arts” (the addition of “A”) to deepen and contextualize stories embedded in technical information and data. These approaches take the form of creative practices, elements, design principles, and standards, to foster inquiry, collaboration, and emphasis on process-based writing. This course introduces students to journalism, field and practice, and the ways in which journalism is evidenced in writing roles and functions in organizations and media production. Students will focus experientially on developing and
Components: Lecture
Req. Designation: Technology

COMM 316(3) **Course ID:013095** **2021-03-08**
Health Communication
This course explores topics at the intersection of health communication and health promotion. We will explore research, theory, and practice across levels of communication (i.e., interpersonal, organizational, intercultural, mass) and evidence for their influence on health behaviors and outcomes. Relevant topics include health information seeking, patient-provider interactions, social support (i.e., patient-patient & patient-caregiver dyads), and communication within healthcare organizations conducted in-person or through mediated environments (e.g., telehealth, social media, virtual reality). Strong attention will be paid to the role of communication in health disparities relevant to culture, rurality, and literacy.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 317(3) **Course ID:013150** **2022-03-08**
Public Discourse and Dialogue Across Difference
This course is centered in critical approaches to intersectional human differences across the spectrum of identity. The content, classroom conversations, and texts you produce will focus on issues of race, gender, class, sexuality, and ability differences across multiple discursive contexts. We will consider how we define and constitute identities (both others’ and our own) and how our identity is constituted for us. We will consider the ways we write, talk, think, and feel about identity and broader social inequities -- with the intent of getting to a level of comfort where we can readily engage in meaningful conversations on these subjects both in and outside the classroom without resorting to hostility and further division.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Requisites: Must be Sophomore level or higher.
Req. Designation: Technology

Science - Communication, Media & Design - Subject: Communication

COMM 322(3) **Course ID:011374** **2022-04-08**
Typography and Design
This course introduces students to typography as a design discipline. We will discuss the history and current state of typography, analyze the ways that type and design contribute to different meanings, and produce specific designs using type and other graphic elements in print and online forms.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 326(3) **Course ID:011955** **2015-03-05**
Feature Film Screenwriting
In this course, you will learn the process of writing a feature-length screenplay. You will devise an original story idea, craft intermediate documents (i.e. logline, treatment, and beat sheet), and then write a first draft. Our goal is not to complete a polished draft (most screenplays go through at least a dozen revisions), but rather to execute a full draft in proper screenplay format that hits all the dramatic turning points, fleshes out characters and dialog, and leaves you will a document ready for substantive revision - now that you know what you're writing. Since this is a workshop, you are expected to comment thoughtfully on your classmates' work, as they will comment thoughtfully on yours. Along the way, you will read several professional scripts and complete a brief critique of each. We will also learn about the profession of screenwriting, including what to do with finished scripts, how to seek representation, and what the Writers Guild of America is. Though there is a good amount of reading in this course, your primary concern should be
Components: Lecture
Same As Offering: FILM 326
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

COMM 327(3) **Course ID:009623** **2021-03-03**
Digital Video Production I
This course presents students with a hands-on opportunity to gain knowledge and experience in digital video production. The focus of this course will be on mastering the technical fundamentals of video production: recording high quality video and audio, lighting, editing, and color grading. Students will work alone and in small teams to produce video projects throughout the semester and will have the opportunity to gain experience in the entire video production process from conceptual development though video delivery. Emphasis will be on practical exercises with material presented via lectures, discussions, and hands-on practice.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Fall Term
Req. Designation: Technology

COMM 328(3) **Course ID:013124** **2022-03-18**
Video Production with Impact
Video production with impact is a hands-on video production course where students learn how to produce high quality scripted and unscripted videos for different professional and creative applications. The class will focus on the creative skills related to communicating ideas clearly and effectively through video. Students will leave the class with a demonstrated ability to write, film, and editing compelling and impactful video content. The class will teach basic technical skills, but the emphasis will be on professional communication and creative problem solving.
Components: Lecture
Attributes: Imaginative Arts, Offered Spring Term
Req. Designation: Technology

COMM 329(3) **Course ID:012862** **2021-04-13**
Front-End Development for the Web
This course focuses on the technical, rhetorical, and critical knowledge necessary to produce web and mobile applications, focusing especially on developing proficiency with the core technologies: HTML5, CSS3, and JavaScript (including frameworks, pre-processors, and script libraries). Students will invent, critique, and develop standards-compliant websites and applications, write and debug code, produce visual and informational designs, collaborate with others, and articulate principles of workflow, user-experience, and design. (COMM 229 recommended but not required.)
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

Liberal Arts - Communication, Media & Design - Subject: Communication

COMM 330(3) **Course ID:010594** **2022-03-08**
Science Journalism
Popular media has a tremendous influence on the production and reception of modern science. News and magazine articles, television shows, and movie documentaries influence public policy on science, research funding, the general public's interest in and understanding of scientific research, and even young people's willingness to choose a career in science. Drawing on student research experience in undergraduate science, students will learn about reporting science using a range of approaches and media. The class will investigate the influence popular accounts of science have on multiple audiences including specialist and non-specialist groups. Assignments will challenge students to understand the societal implications of scientific research and to identify and address different constituent positions and interests.

Components: Lecture
Attributes: Two communication units, Science, Technology and Society, Given When Needed
Requirement Group: Prerequisites: COMM210 and six (6) hours of a science, or permission of the Comm & Media department
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 345(3) **Course ID:009625** **2022-03-08**
Information Design
Information Design explores ways to structure complex data into usable information in genres including websites, computer interfaces, information visualizations, charts, interactive media, and more. Drawing on theories and practices from disciplines including communication theory, cognitive psychology, visual theory, and new media, students will learn to understand users and their contexts, select appropriate media and genres, and design effective and efficient informational texts.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

COMM 347(3) **Course ID:013062** **2022-03-08**
Design Thinking
In this practice-based course, students will learn how to apply Design Thinking frameworks, methods, and tools to problems within their discipline(s). They will also learn about Design Thinking's strengths and weaknesses, and how it varies across different industries and cultures.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

COMM 360(3) **Course ID:011586** **2021-06-23**
Sound Design
This course covers basic audio production including topics such as acoustics, microphones, speakers, amplification, effects, recording, and editing. Students will learn methods for recording, editing, and mixing music and spoken word as well as basic sound design for movies and video games. The course will include reading about concepts and practices as well as extensive hands-on work in the studio.
Components: Lecture
Attributes: Two communication units, Imaginative Arts
Req. Designation: Technology

COMM 375(3) **Course ID:013032** **2022-03-08**
Product Design
Provides students with a framework for developing consumer products ranging from interfaces to physical products. The course covers fundamentals of product design, user needs analysis, competition assessment, ideation, critique, and virtual and physical prototyping.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

COMM 391(3) **Course ID:010692** **2015-01-23** **Instructor Consent Required**
Special Topics Course
These courses reflect ongoing developments in communication practice and theory, often related to the particular faculty member's research interests.
Prerequisites: one course in communication or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 392(3) **Course ID:010693** **2018-08-23**
Special Topics Course
These courses reflect ongoing developments in communication practice and theory, often related to the particular faculty member's research interests.
Prerequisites: one course in communication or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 393(3) **Course ID:010694** **2014-10-08**
Special Topics Course
These courses reflect ongoing developments in communication practice and theory, often related to the particular faculty member's research interests.
Components: Lecture
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 394(3) **Course ID:009630** **2022-03-08**
Special Topics
These courses reflect ongoing developments in communication practice and theory, often related to the particular faculty member's research interests.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 395(3) **Course ID:010695** **2015-01-23**
Special Topics
These courses reflect ongoing developments in communication practice and theory, often related to the particular faculty member's research interests.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

COMM 410(3) **Course ID:009633** **2022-03-08**
Theories and Philosophies of Communication
This course explores a range of approaches to understanding human communication, including work from communication, philosophy, cognitive science, social science, and more. Through extensive reading, discussion, and writing, students investigate how people communicate—and miscommunicate—with each other as individuals and communities.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

COMM 412(3) **Course ID:009635** **2015-01-23**
Organizational Communications and Public Relations Theory
This course examines the nature of the organization and the strategic communication processes that build relationships between organizations and their publics. Through assigned readings, lectures, and class discussion and analysis, students are exposed to communication theory and trends relevant to the workplace. Students will examine the communicative implications of such topics as organizational structure and goals; corporate culture; managerial schools of thought; leadership styles; superior-subordinate relationships; and communication consulting. In addition, students will address communicative implications in a changing economy; employee loyalty and dissent; gender and the workplace; and corporate image in crisis situations. This course seeks to provide students with insight into the organizational context, not only to make them more effective communicators but also to help them make informed choices in their careers.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

COMM 415(3) **Course ID:013060** **2020-10-13**
STEAM Journalism
Writing is one of the most varied fields in the modern workforce. From full-time and freelance journalists covering breaking news – to media writers and PR professionals working in-house to tell organizational stories across multi-media and even technical genres, the role of "writer" is complex and diverse. What has become more evident with advances in technology is that writers in these wide-ranging capacities, whose task is to illuminate stories about science, technology, engineering and math (STEM), have something in common: integration of the "Arts" (the addition of "A") to deepen and contextualize stories embedded in technical information and data. These approaches take the form of creative practices, elements, design principles, and standards, to foster inquiry, collaboration, and emphasis on process-based writing. This course introduces students to journalism, field and practice, and the ways in which journalism is evidenced in writing roles and functions in organizations and media production. Students will focus experientially on developing and
Components: Lecture
Req. Designation: Technology

COMM 420(1 - 9) **Course ID:009639** **2014-09-23** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects. Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 421(1 - 9) **Course ID:009640** **2015-03-03** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects.
Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

COMM 422(1 - 9) **Course ID:009641** **2014-09-23** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects.
Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Req. Designation: Technology

COMM 423(1 - 9) **Course ID:009642** **2015-02-03** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects.
Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

COMM 424(1 - 9) **Course ID:009643** **2010-06-17** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects.
Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Req. Designation: Technology

COMM 425(1 - 9) **Course ID:009644** **2022-03-08** **Department Consent Required**
Communication: Independent Study
Designed primarily for a student who wishes to pursue special interests in communication for one or more semesters, this series of courses allows individual students to define independent study projects.
Prerequisites: one course in communication, consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

COMM 427(3) **Course ID:009646** **2022-03-08**
Digital Video Production II
COMM 427 builds on the concepts and skills learned by students in COMM 327 (Digital Video Production I). This is a hands-on course that will include: conceptual, aesthetic and technical production of the film-style, single-camera, 30-second spot; instructional and training program development; and live multi-camera studio production for interactive video teleconferencing and streaming media on the WWW. Although a text will be used, emphasis will be on practical exercises, with students frequently working in small teams.
Components: Lecture
Attributes: Two communication units, Offered Odd Springs
Requirement Group: Prerequisites: COMM327, or permission of the Comm & Media department
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 428(3) **Course ID:009647** **2022-03-08**
Environmental Communication
This course focuses on the intersection of theory, environmental challenges and communication; specifically, the ways in which varied people and stakeholders identify, label, frame, shape, and convey these challenges, as well as the ways in which they make decisions and policies in the public sphere at varied scopes and levels of governance, and in the face of risk and uncertainty. Exploration includes historic and contemporary environmental movements, key leaders and figures, environmental law and seminal policy frameworks, including agencies and institutions, and the ways in which we are grappling with current challenges through communication mediums and changing media. Students will engage in critical reading, case studies, discussion, and research, as well as guest speaker presentations and field trips when possible.
Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

COMM 429(3) **Course ID:012974** **2019-10-21**
Full-stack Development
This course focuses on systematically developing and deploying web technologies in contexts ranging from the personal to the professional. Students will develop with major back-end technologies and learn the related disciplines of server administration, content management, information architecture, and scalable application development. By the end of the course, students will be able to build and deploy applications, write and debug server-side code, design, implement, and administer content management systems, and plan and manage large-scale development projects. The primary languages students will develop facility with include PHP, SQL, Javascript, and Ruby (as well as HTML5 and CSS3).
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: COMM329
Req. Designation: Technology

COMM 447(3) **Course ID:012992** **2021-04-13**
Advanced Design Thinking
This course focuses on design frameworks, processes, and tools for invention, innovation, and change. With their emphasis on out-of-the-box thinking, creativity, and originality, these frameworks both build on and go beyond the Design Thinking methods taught in COMM347. Examples include Double Diamond Design, Frame Innovation, and Far Field Design. During the semester, you will find and solve several challenges within your chosen area(s) of interest. In keeping with a design orientation, classes will follow a studio format, where studio entails creatively making to learn in hands-on ways.
Components: Lecture
Attributes: Two communication units, Individual and Group Behavior, Offered Fall Term
Req. Designation: Technology

COMM 448(3) **Course ID:012991** **2022-03-08**
Portraying Innovation
This practice-based course focuses on how to effectively communicate innovation and invention across disciplines and sectors (e.g., engineering, sciences, the arts, business, creative industries, public sector). Photography, videography, narrative methods, and portrait theory will be used throughout.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Req. Designation: Technology

COMM 449(3) **Course ID:012993** **2022-03-08**
Narrating Innovation
This course focuses on innovation from a design-led perspective. During the semester, you will find and solve several innovation challenges within your chosen area(s) of interest. Relative to “design” we will use a number of design lenses, ranging from easy to difficult, and from incremental to frame-changing. In keeping with a design orientation, classes will follow a studio format, where studio entails “creatively making to learn in hands-on ways.” Hands-on means that you will work on challenges using both 2D and 3D methods (e.g., modeling, prototyping, enacting). “Innovation” can be defined in many ways; here we will broadly think of it as both inventive (coming up with original, creative solutions) and potentially generative (creates some kind of good—societal, commercial, or otherwise).
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: Communication

COMM 450(3) **Course ID:012924** **2022-03-08**
Leading Innovation
Today's emphasis on 'innovation everywhere' has created a big need for people who can lead others around innovation. The questions around this are many--for example, how to lead innovation efforts within teams, R&D settings, new ventures, organizations of all kinds, and how to enact the role of Chief Innovation Officer. This course assumes that effective innovation leadership requires inspiration, creative direction and vision, finding ways to effectively communicate this, and finding ways to get others on board. With this, the course examines how to artfully create innovation vision, fashion innovation narratives and styles, communicate these through multiple means and media, and effectively design innovation systems. The course uses a studio-based, live-case format where you will take a challenge that an actual innovation leader is facing, creatively work on it using arts-based methods within a studio format, present your solutions to the relevant stakeholders, and get feedback on your ideas. We will work on innovation leadership cases from a
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Individual and Group Behavior, University Course, Offered Fall Term
Req. Designation: Technology

COMM 470(3) **Course ID:011507** **2022-03-08** **Department Consent Required**
Communication Internship
These internships are designed to provide practical work experience for the communication major or concentration student. Students work with a professional on communication projects areas such as public relations, publication design, advertising, editing, or digital media design. Students can earn credit for only one course for each internship experience.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

COMM 480(1 - 3) **Course ID:011093** **2012-01-06** **Instructor Consent Required**
Undergraduate Teaching Assistantship in Communication & Media
Students assist a faculty member in teaching a Communication & Media course. Students engage insubstantial pedagogical work beyond mastery of the target course material. Such activities might include mentoring students in course work, leading class discussions or demonstrations, designing or assessing course modules.

Prerequisites: the student will have already taken the course in a previous semester or receive consent from the instructor.
Components: Independent Study
Req. Designation: Technology

COMM 490(3) **Course ID:009652** **2021-06-23** **Department Consent Required**
Advanced Communication Internship
These internships are designed to provide practical work experience for the junior or senior communication major or concentration student. Generally, students work with a professional on communication projects in the fields such as web development, public relations, publication design, advertising, editing, or digital media design and production
Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisites: Junior or Senior Standing
Req. Designation: Technology

COMM 499(3) **Course ID:013033** **2022-03-08**
Senior Project
Students will plan and complete a complex, large communication project over the course of a full semester with ongoing feedback from peers and faculty. The course culminates in an exhibition during commencement week.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: Senior Standing
Req. Designation: Technology

COMM 999(1 - 10) **Course ID:011097** **2015-01-13**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 1(2 - 4) **Course ID:008062** **2015-08-15**
Computer Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. Check with major department to determine whether credits count toward graduation.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

CS 2(2 - 4) **Course ID:008063** **2015-08-15**
Computer Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Programming Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

CS 141(4) **Course ID:007813** **2015-08-15**
Introduction to Computer Science I
This course is an introduction to basic concepts of computer science, with emphasis on programming. Computer programming is to the study of computer science what writing is to the study of literature. It is a primary tool for implementing algorithms in computer science. Fundamental techniques for software design and implementation will be covered and these concepts demonstrated in a programming language like C++. Additional topics include top-down modular design, developing general-purpose software tools, procedural and data abstraction, algorithms, and an introduction to recursion and dynamic data structures. The course consists of three hours of lecture and a one hour computer laboratory session per week.
Components: Laboratory, Lecture
Course Equivalents: EE 261
Attributes: Offered Each Term
Req. Designation: Technology

CS 142(3) **Course ID:007814** **2015-08-15**
Introduction to Computer Science II
This course will further develop and expand upon the topics introduced in CS 141. Advanced programming techniques will be covered, with extensive use of recursion and dynamic data structures. Abstract data types, including lists, queues, trees and graphs, will be studied. Specific emphasis will be given to tree traversals and binary search trees. Algorithms for searching and sorting will be explored along with methods of comparative analysis. The topics in this course provide an essential foundation for the further study of computer science.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: CS 141 or equivalent
Req. Designation: Technology

CS 241(3) **Course ID:007815** **2015-08-15**
Computer Organization
An introduction to computer organization and assembly language programming. Topics include the functional organization of computer hardware; data representation, and computer arithmetic; instruction sets, addressing modes and low-level I/O. Introduces machine and assembly language, and systems programming techniques in the programming language C. This course serves as a foundation for courses on operating systems, compilers, networks, and computer artchitecture.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CS 142 or equivalent
Req. Designation: Technology

CS 242(3) **Course ID:007816** **2019-04-03**
Advanced Programming Concepts in Java
This course builds upon the foundation topics covered in CS 142, and covers concepts and skills required for real-life, modern programming. Topics will include basic object-oriented programming design, graphical user interfaces (GUIs), exception handling, multithreading and synchronization, networking, and client/server applications. The programming language Java with its companion OOP/GUI libraries will be used to illustrate these topics. This course will emphasize team programming on a large-scale project with a realistic deadline.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CS142, EE262, or EE361
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 341(3) **Course ID:007818** **2019-04-03**
Programming Languages
This course examines the major paradigms underlying modern programming languages. The course currently focuses on object-oriented and logic programming. The rationale of the paradigms is discussed along with typical programming idioms used with them. Programming exercises are used to illustrate concepts--the course does not aim to make students proficient programmers in all the languages that will be studied.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: CS142, EE262, or EE361
Req. Designation: Technology

CS 344(3) **Course ID:007819** **2018-11-12**
Algorithms and Data Structures
The primary goal of this course is to build on the programming skills gained in CS 141 and 142 to introduce students to more sophisticated algorithms and data structures and the notion of algorithm design. The course also introduces the basic formalism and concepts used in the analysis of algorithms. The relative efficiency of the algorithms studied is estimated by informal application of these ideas. The algorithms and data structures discussed include those for sorting and searching, pattern matching, set representation, graph problems, dynamic programming and others. Programming exercises based on 'realistic' applications help students to understand the often difficult process of reducing a real-world problem to a standard algorithmic question.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CS142 or EE262 or EE363, and MA132
Req. Designation: Technology

CS 345(3) **Course ID:007820** **2019-04-03**
Automata Theory and Formal Languages
[Cross-listed with MA 345] This course gives an introduction to formal languages and their relation to automata. Topics include deterministic and non-deterministic finite automata, regular expressions and languages, closure properties and decision procedures for context-free languages, recursive and recursively enumerable sets, Turing machines, and decidability. Some aspects of computational complexity may also be explored.
Components: Lecture
Course Equivalents: CS 541, MA 345
Requirement Group: Prerequisites: CS 142, EE262, or EE361, and MA211
Req. Designation: Technology

CS 350(3) **Course ID:007831** **2021-10-29**
Software Design and Development
Working in teams, students will learn tools and strategies for designing and implementing medium/large software projects. Suitable project ideas will be solicited from the community in order to match student teams with real users where possible. Students will learn to elicit requirements from users and to work in an effective team. Students will learn and practice techniques for software testing including black-box testing, stress testing, performance testing, code reviews, and code coverage tools. Students will produce documentation that is appropriate at various stages in the software life cycle including for example, requirements documents, project plans and user manuals. The work will include oral presentations and written reports.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisite: CS242
Req. Designation: Technology

CS 407(1 - 15) **Course ID:007821** **2017-01-13** **Instructor Consent Required**
Directed Study in Computer Science
This is a directed study course that will allow the student the opportunity to pursue special interests in Computer Science.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

CS 408(1 - 15) **Course ID:007822** **2017-01-13** **Instructor Consent Required**
Directed Study in Computer Science
This is a directed study course that will allow the student the opportunity to pursue special interests in Computer Science.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 411(1 - 15) **Course ID:007823** **2015-08-15** **Instructor Consent Required**
Directed Study in Applied Computer Science
This is a directed study course that will allow the student the opportunity to pursue special interests in Applied Computer Science.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CS 412(1 - 15) **Course ID:007824** **2020-04-10** **Instructor Consent Required**
Directed Study in Applied Computer Science
This is a directed study course that will allow the student the opportunity to pursue special interests in Computer Science.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

CS 442(3) **Course ID:007826** **2019-04-24**
Computational Complexity
The complexity of a computational problem is the amount of computer resources it requires. Computational complexity theory studies the complexity of computational problems as well as relationships between different types of resources. This course will cover both classical and research-related topics in computational complexity, such as: complexity measures and complexity classes for sequential machines and Boolean circuits, reductions and completeness, hierarchy theorems, relativization, circuit complexity, and proof complexity.
Components: Lecture
Course Equivalents: MA 442
Attributes: Given When Needed
Requirement Group: Prerequisites: CS345 or equivalent MA345.
Req. Designation: Technology

CS 444(3) **Course ID:007827** **2015-08-15**
Operating Systems
This course is an introduction to the concepts of operating systems, their structures and organization. Major topics include process management (asynchronous processes, interprocess communication and synchronization, multithreading, deadlock and starvation, scheduling), storage management (paging/segmentation, virtual memory, file systems), protection and security issues, and an introduction to distributed systems. To demonstrate these concepts, case studies of operating systems will be presented, and a programming project will be an integral part of the course.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CS 344; and CS241 or EE360 or EE264
Req. Designation: Technology

CS 445(3) **Course ID:007828** **2021-11-30**
Compiler Construction
A study of compiler design. Overview of the compilation process. Formal definition of syntax, lexical scanning, parsing including LL and LR grammars, run-time structures, intermediate code generation, and storage allocation. Students are expected to develop a compiler for a substantial subset of a high-level language using compiler tools such as lex and a compiler yacc.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS344, CS345, CS241 and CS341
Req. Designation: Technology

CS 447(3) **Course ID:007829** **2019-04-03**
Computer Algorithms
[Cross-listed with MA 447] This course will study and contrast a variety of computational algorithms and develop tools for algorithm analysis. Methods and topics such as dynamic programming, greedy algorithms, graph algorithms, circuits, parallel algorithms, matrix and polynomial algorithms, string matching, and geometrical algorithms will be explored. The theory of NP-completeness and methods of managing NP-complete problems will also be covered.
Components: Lecture
Course Equivalents: MA 447
Requirement Group: Prerequisites: CS344 and MA211
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 449(3) **Course ID:010886** **2015-08-15**
Computational Learning
[Cross-listed as MA 449] Computational learning studies algorithmic problems for inferring patterns and relations from data. This course describes the mathematical foundations of learning and explores the important connections and applications to areas such as artificial intelligence, cryptography, statistics, and bioinformatics. A list of relevant topics may include perceptron and online learning, graphical models and probabilistic inference, decision tree induction and boosting, analysis of Boolean functions, sample complexity bounds, cryptographic and complexity hardness, and reinforcement learning. Basic ideas from computer science and mathematics are employed to describe the main ideas and major developments in computational learning.
Components: Lecture
Course Equivalents: MA 449
Requirement Group: Prerequisites: CS344 and CS345, or consent of the instructor.
Req. Designation: Technology

CS 451(3) **Course ID:007832** **2021-11-30**
Artificial Intelligence
This course is a comprehensive introduction to core concepts in artificial intelligence and surveys active research areas. Fundamental ideas in knowledge representation and search will be emphasized. Methods for encoding knowledge will include predicate logic, production rules, semantic networks, frames and other schemata. Data-driven and goal-driven search strategies will be covered, along with heuristic search algorithms. Additional topics will be drawn from knowledge-based systems, reasoning under uncertainty, planning, natural language understanding, neural networks and learning. Throughout the course, students will learn AI programming techniques and applications using languages such as LISP or Prolog.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS344 (CS250 and CS341 recommended)
Req. Designation: Technology

CS 452(3) **Course ID:007833** **2021-11-30**
Computer Graphics
[Cross-listed with EE 465] An introduction to computer graphics. Graphics hardware, algorithms for generating and displaying two and three-dimensional geometric figures, animation, interactive displays. Programming projects using OpenGL will be assigned.
Components: Lecture
Course Equivalents: EE 465
Attributes: Given When Needed
Requirement Group: Prerequisites: CS142 or EE361, and MA232 or MA239 (or MA339 as a corequisite)
Req. Designation: Technology

CS 455(3) **Course ID:007835** **2015-08-15**
Computer Networks
[Cross-listed with EE 407] This course covers layered networking protocols with an emphasis on common Internet protocols such as TCP, IP, HTTP, and SMTP. It also covers local area networking, focusing on link layer standards such as the IEEE standards for Ethernet and wireless. Additional topics such as security and congestion control will also be covered. EE407 and CS455 are offered each fall as one course with multiple listings.
Components: Laboratory, Lecture
Course Equivalents: EE 407
Requirement Group: Prerequisites: One of course in computer architecture (EE264, CS241 or IT502 or equivalent). One cours

Req. Designation: Technology

CS 456(3) **Course ID:007836** **2021-11-30**
Cryptography
[Cross-listed with MA 456] Cryptography is the discipline which studies the making of 'secret' codes. This course will examine some of the methods of cryptography together with many surprising applications. The language of modern cryptography is primarily number theory, and various tools of number theory will be developed as needed. No background in number theory or cryptography will be necessary, but some mathematical sophistication and familiarity with proofs will be assumed. Topics will include: one-way functions, public-key cryptosystems, digital signatures, probabilistic encryption, primality testing, interactive proof systems, and methods of secret sharing.
Components: Lecture
Course Equivalents: MA 456
Attributes: Given When Needed
Requirement Group: Prerequisites: CS142, EE262, or EE361, and MA211 (CS 344 recommended)
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 457(3) **Course ID:010599** **2015-08-15**
Computer and Network Security
[Cross-listed with EE 410] Attacks on networked computer systems are an increasingly important problem. This course covers the types of vulnerabilities that are present in modern computer systems and the types of malicious software that exploit these vulnerabilities. It also covers best practices for preventing, detecting and responding to such attacks including anti-virus software, defensive programming techniques, intrusion detection systems, honeypots and firewalls.
Prerequisites: A general course in computer networking such as CS455/555 or EE407/507. Programming experience to the level of CS142 or EE361.
Components: Lecture
Course Equivalents: CS 557, EE 410, EE 510
Req. Designation: Technology

CS 458(3) **Course ID:007837** **2015-08-15**
Formal Methods for Program Verification
Formal methods are algorithms and techniques that actually prove that a program meets its design criteria, and are the only way to guarantee that a program works correctly. As computer software increases in size and complexity, formal methods are becoming an essential part of software engineering. This is especially true of safety critical and life critical systems, where software errors can have life threatening consequences. Until recently, formal methods have had limited application because they were difficult to use. This is changing, and they are receiving greater acceptance from software engineers in industry and government. This course introduces students to the basic concepts and methods of program verification. A variety of techniques and tools will be covered, and students will gain experience in applying the tools to actual programs. After completing the course, students will have sufficient expertise to learn new methods as they become available.
Components: Lecture
Course Equivalents: CS 558
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MA211 or MA346; and CS344
Req. Designation: Technology

CS 459(3) **Course ID:010238** **2021-11-30**
Human-Computer Interaction
This course provides an introduction to the field of human-computer interaction (HCI). This discipline focuses on the design, evaluation and implementation of interactive computing systems from a user's point of view. The course will give a broad overview of the ideas, techniques, and tools in the subject, with a systematic approach to designing visual interfaces and evaluating their effectiveness. Case studies of existing interfaces, technologies, and data display methods will be discussed and critiqued. Topics include: programming and command languages; menus and forms graphical user interfaces, computer-supported cooporerative work, information search and visualization; input/output devices; and display design. A collaborative course project will explore issues in HCI and design.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS242 or EE408
Req. Designation: Technology

School of Arts and Sciences - Electrical & Computer Eng - Subject: Computer Science

CS 460(3) **Course ID:007838** **2014-11-20**
Database Systems
[Cross-listed with EE 468] An introduction to database systems. The entity-relationship and relational models are presented and applied to the design of typical databases. New developments in object-oriented and multimedia databases are presented. Emphasis will be placed on database design for applications in the context of an existing database management system such as ORACLE or ACCESS.

Components: Lecture
Course Equivalents: EE 468
Attributes: Offered Spring Term
Requirement Group: Prerequisites: Programming experience in a high-level language
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 461(3) **Course ID:010465** **2021-11-30**
Mixed Reality
[Cross-Listed with CS561] This course provides an introduction to the mathematics and computing underlying virtual (VR) and augmented reality (AR). Students will learn stereo camera geometry for VR, recovery of 3D scene structure from images for content manipulation in AR, acquiring of illumination maps for photorealistic AR, and capture of human interaction for virtual environments. Students will perform several short and long projects as part of the course.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS142/EE361, and MA232/MA239 or corequiste of MA339.
Req. Designation: Technology

CS 466(3) **Course ID:012867** **2018-03-19**
Blockchain Technologies
Blockchain technologies are the underlying technological foundation of almost all digital currencies, such as Bitcoin and Ethereum. Without the need of a trusted authority or central server, Blockchain technologies can securely archive and are inherently resistant to modification of data. The course will cover the basics and advanced topics of Blockchain technologies. The basics include public key cryptography and cryptocurrency, hashing algorithms, mining process, proof of work, block structures, transactions and wallets. Advanced topics may include consensus algorithms, smart contracts, blockchain network security and applications. We will discuss the limitations of current applications and explore new systems and proposals that overcome them. The course will offer many hands-on lab components and a blockchain-based course project. Students should already have had solid programing skills, such as C, C++ or Python, to take the course.
Components: Lecture
Course Equivalents: CS 566
Attributes: Given When Needed
Requirement Group: Prerequisites: CS344
Req. Designation: Technology

CS 469(3) **Course ID:012898** **2019-04-24**
Quantum Information and Computation
[Cross-listed with CS569 and MA469] This course studies information and computation based on quantum mechanical laws. The first part of the course will cover the relevant background in quantum information theory. A brief discussion of several universal quantum computational models will be given. The second part will cover algorithmic techniques important for developing quantum algorithms. Topics to be covered include amplitude amplification, quantum walks, phase estimation, hidden subgroup problems, and quantum protocols. Background in physics would be helpful but is not required.
Components: Lecture
Course Equivalents: CS 569
Attributes: Given When Needed
Requirement Group: Prerequisites: CS344 and MA232 or MA339
Req. Designation: Technology

CS 470(3) **Course ID:012938** **2019-04-03**
Deep Learning
This course will cover the principles of modern deep learning architectures from a theoretical and practical perspective. Course topics covered will include an introduction to machine learning and basic neural network architectures, and in-depth discussions on convolutional neural networks, recurrent neural networks based on units such as LSTMs and GRUs, and, if time permits, GANs. Students will be required to implement programming assignments and projects that apply deep learning architectures to solve classification and regression problems.
Components: Lecture
Attributes: Given When Needed
Requirement Group: CS470 Prerequisites: CS142, EE262, or EE361, and MA339.
Req. Designation: Technology

CS 471(3) **Course ID:012896** **2018-10-12**
System Administration and Network Operations
This course is designed to give students the basic skills and knowledge to administer Unix/Linux machines as standalone workstations or in a network environment. For example, students will learn to install and configure the Linux operating system, create and maintain system users and groups, maintain and administer a file system, configure and maintain network services, troubleshoot system and network problems, and secure the system and network environment. Comprehensive hands-on labs throughout the course will reinforce learning and develop skills and competency.
Components: Lecture
Course Equivalents: CS 571
Attributes: Given When Needed
Requirement Group: Prerequisites: CS241, EE260, or EE264
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 472(3) **Course ID:013009** **2020-01-06**
Image Understanding
This course is an introduction to image processing and computer vision algorithms. Students will learn concepts such as image formation, how to store a digital image on a computer, how to use it in a program, different image features and their importance in computer vision, as well as some advanced computer vision topics such as object classification. Students will implement these concepts as part of the programming assignments. They will also do some theoretical assignments and a project.
Components: Lecture
Course Equivalents: CS 572
Attributes: Given When Needed
Requirement Group: Prerequisites:CS142 or EE262 or EE361, and MA232 or MA239 (or MA339 as a corequisite)
Req. Designation: Technology

CS 473(3) **Course ID:013057** **2020-11-04**
Computer Vision
[Cross-Listed CS573/EE473] This course will cover an overview of basic theoretical underpinnings and practical applications of computer vision, with particular emphasis on geometrical techniques underlying 2D and 3D vision. Topics covered include, but are not restricted to, estimation of image transformations, image formation, pose estimation, camera calibration, epipolar geometry, structure-from-motion, stereo reconstruction, filtering, interest point detection, motion estimation, image segmentation, and object recognition.
Components: Lecture
Course Equivalents: CS 573
Attributes: Given When Needed
Requirement Group: Prerequisites: CS142 or EE262, and MA339.
Req. Designation: Technology

CS 475(3) **Course ID:013066** **2020-10-23**
Computing, Ethics and Society
[Cross-Listed CS575] This course focuses on the increasing ubiquitous nature of computing, its impact on society and the ethical issues related to the design, implementation and deployment of computing technologies. We will examine case studies of the impact of computing technology on society and reflect on issues such as privacy, equality, justice, security, accountability, transparency, safety and reliability.
Components: Lecture
Course Equivalents: CS 575
Attributes: Given When Needed
Requirement Group: Prerequisite: CS141
Req. Designation: Technology

CS 497(1 - 3) **Course ID:007839** **2022-05-20** **Instructor Consent Required**
Undergraduate Research I
Students engage in computer science research with a faculty member. The topic will be determined by student interest and faculty research programs. This course may be repeated for credit.
Prerequisites: consent of the instructor.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

CS 498(1 - 3) **Course ID:007840** **2022-06-16** **Instructor Consent Required**
Undergraduate Research II
A continuation of CS 497.
Prerequisites: consent of the instructor.
Components: Research
Req. Designation: Technology

CS 499(0) **Course ID:010168** **2015-08-15**
Professional Experience
This course records successful completion of an approved professional experience meeting the requirements of the Clarkson Common Experience. Typical activities include internships and co-ops, directed research, and suitable semester-long class projects.
Components: Independent Study
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 500(3) **Course ID:012269** **2016-07-01**
Network and Security Systems
[Formerly CSC 560] This course explores critical business challenges: how to protect an organization's computer networks, systems, applications and information. Students learn how to design procedures, protocols, and policies that address both engineering and human issues. Engineered security is examined through the application or cryptography, digital signatures and certificates, authentication protocol, firewalls, and intrusion detection. Also considered are security issues related to people's use of organization's networks and systems including policies and practices for password management and protecting privacy rights. Students also study options for maintaining business continuity in the event of a disruption of business operations. Specific case studies are used to highlight the choices that must be made to balance operational efficiency of business functions with protecting the business from the onslaught of security threats. Prerequisite expertise: Networking protocols. The student should have taken a course in computer communications/networking
Components: Lecture
Req. Designation: Technology

CS 501(3) **Course ID:012270** **2018-11-02**
Software Quality Management
[Formerly CSC 561] This course prepares students to apply a quality mindset to both the development process and the developed software. Students learn the theory and practice of quality assurance and testing computer software. Topics of study include the use of metrics to measure quality, software quality standards as a baseline for establishing and assessing quality, the effects of the economics on product reliability, and software testing practices (including test design, coverage, and tools). Students will study specific cases that highlight practical techniques and reveal the relationship between software quality management and meeting an organization's business objectives
Components: Lecture
Same As Offering: CS 501
Req. Designation: Technology

CS 501(3) **Course ID:012270** **2018-11-02**
Software Quality Management
[Formerly CSC 561] This course prepares students to apply a quality mindset to both the development process and the developed software. Students learn the theory and practice of quality assurance and testing computer software. Topics of study include the use of metrics to measure quality, software quality standards as a baseline for establishing and assessing quality, the effects of the economics on product reliability, and software testing practices (including test design, coverage, and tools). Students will study specific cases that highlight practical techniques and reveal the relationship between software quality management and meeting an organization's business objectives
Components: Lecture
Same As Offering: CS 501
Req. Designation: Technology

CS 502(3) **Course ID:012271** **2016-07-01**
Business Intelligence
[Formerly CSC 562] This course offers an interdisciplinary look at computing technologies in support of forming valuable business insights and making effective decisions. Students acquire knowledge of the conceptual basis for data warehousing (collection and organization of data in database management systems) and data mining (detecting of patterns in business data). Students then build the skills to extract business intelligence from collected and analyzed data and present it for use in business decision-making activities. Various practical applications are studies such as customer segmentation, Customer Relationship Management (CRM), Group Decision Support Systems (GDSS), and Executive Information Systems (EIS). Students will learn about trends in the use of business intelligence software and techniques and examine specific case studies. There will be an opportunity for students to develop their own application project. Prerequisite expertise: database management systems.
Components: Lecture
Req. Designation: Technology

CS 503(3) **Course ID:012273** **2016-07-01**
Systems Analysis and Design Methods
[Formerly CSC 564] The application of information technology has extended to all quarters of the business world. While the nature and the scope of information systems vary widely depending on the business context, the fundamental knowledge underlying their development remains the same. This course aims to provide technology students with a solid understanding of the important methodologies and tools & techniques related to the development of information systems in a variety of contexts.
Components: Lecture
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 504(3) **Course ID:012274** **2016-07-01**
Enterprise Architecture
[Formerly CSC 570] This course provides students with an understanding of the basic concepts and practices of Enterprise Architecture (EA). This is not a course on information systems development, web/application programming, database development, or network design. The course focuses on understanding how information technology resources can best be leveraged to support an organization's strategic goals and business requirements. Basic proficiency is developed in the understanding of several EA methodologies, number of governments and major corporations around the world, as well as the U.S. Federal Government's approach to EA. Students learn the theory and practice of EA through a combination of lectures, student-led class instructions, analysis papers, exams, and a written project with a verbal presentation.
Components: Lecture
Req. Designation: Technology

CS 505(3) **Course ID:012278** **2016-07-01**
Business Data & Communications & Networking
[Formerly CSC 583B] This course is designed to convey the essentials of data communication networks. It will cover concepts, technologies and architectures. There will be practical lessons built into the semester's topics and assignments whenever possible. A single course cannot cover all possible networking topics and issues, so we will cover the major conceptual areas balanced with practical discussions and exercises. We will also discuss important network management topics such as domain management and security. Specifically, the following topics will be covered: Fundamentals of Networking Technologies, OSI Model, Physical Layer, Data Link Layer, Local Area Networks, Wireless Local Area Networks, Network/Transport Layers TCP/IP, Backbone Networks, Wide Area Networks, Application Layer, The Internet, Network Design, Network Management and Network Troubleshooting, Network Security, Voice over IP.
Components: Lecture
Req. Designation: Technology

CS 506(3) **Course ID:012275** **2016-07-01**
Engineering Statistics
[Cross-listed with EE 602, ME 577] [Formerly CSC 572] Modern engineering practice makes extensive use of statistical methods for the efficient collection and analysis of engineering data, and to support data-based decision making. This course will introduce the statistical tools that are of greatest importance for practicing engineers. Core topics to be covered will include probability and distribution theory, the construction and interpretation of statistical intervals, statistical hypothesis testing, regression analysis and empirical modeling, statistical experimental design, and statistical quality/process control. Additional specialized topics may also be covered, depending upon the interests of the class; possible topics include system reliability analysis, measurement system analysis, process capability analysis (and "six-sigma"), accelerated life testing, and acceptance sampling.
Components: Lecture
Course Equivalents: EE 602, ME 577
Req. Designation: Technology

CS 511(3) **Course ID:007841** **2021-11-30**
Foundations of Computer Science
This course covers a variety of topics fundamental to Computer Science. Topics will vary from year to year to accommodate the background and interests of the participants. Possible topics include: mathematical foundations, analysis of algorithms, data abstraction, elementary data structures and algorithms such as lists, stacks and sorting, advanced data structures and algorithms such as heaps, hashing, dynamic programming, and graph algorithms, object-oriented programming, and basic automata theory.
Prerequisites: programming experience.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 541(3) **Course ID:007843** **2015-08-15**
Introduction to Automata Theory and Formal Languages
This course covers an introduction to formal languages and their relation to automata. Topics include: regular languages, deterministic and nondeterministic finite automata, closure properties for regular sets, context free grammars, normal forms, ambiguity, pushdown automata, a treatment of closure properties and decision algorithms for context free languages. Also included are a treatment of recursive and recursively enumberable sets, Turing machines, decidability and undecidability.
Prerequisites: MA211, MA346 or equivalent.
Components: Lecture
Course Equivalents: CS 345, MA 345
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 542(3) **Course ID:007844** **2015-08-15**
Computational Complexity
The complexity of a computational problem is the amount of computer resources it requires. Computational complexity theory studies the complexity of computational problems as well as relationships between different types of resources. This course will cover both classical and research-related topics in computational complexity, such as: complexity measures and complexity classes for sequential machines and Boolean circuits, reductions and completeness, hierarchy theorems, relativization, circuit complexity, and proof complexity. Students will be expected to independently explore some of the course material.
Prerequisites: CS345 or CS541, or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 544(3) **Course ID:007845** **2015-08-15**
Operating Systems
This course is an introduction to the concepts of operating systems, their structures and organization. Major topics include process management (asynchronous processes, interprocess communication and synchronization, multithreading), storage management (paging/segmentation, virtual memory, file systems), protection and security issues, and distributed systems. To demonstrate these concepts, case studies of operating systems will be presented, and a programming project will be an integral part of the course.
Prerequisites: CS344, EE264 or equivalent, or consent of the instructor.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CS 545(3) **Course ID:007846** **2021-11-30**
Compiler Construction I
A graduate-level study of compiler design. Overview of the compilation process. Formal definition of syntax, lexical scanning, parsing including LL and LR grammars, run-time structures, intermediate code generation, and storage allocation. Students develop a compiler for a substantial subset of a high-level language using compiler tools such as lex and yacc.
Prerequisites: CS241, CS341, or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 547(3) **Course ID:007861** **2018-01-15**
Computer Algorithms
[Cross-listed with EE 667] This course will study and contrast a variety of computational algorithms and develop tools for algorithm analysis. Methods and topics such as dynamic programming, greedy algorithms, graph algorithms, circuits, parallel algorithms, matrix and polynomial algorithms, string matching, and geometrical algorithms will be explored. The theory of NP-completeness and methods of managing NP-complete problems will also be covered.
Prerequisites: CS344, MA211 or MA346.
Components: Lecture
Course Equivalents: EE 667
Req. Designation: Technology

CS 549(3) **Course ID:010887** **2020-06-09**
Computational Learning
Computational learning studies algorithmic problems for inferring patterns and relations from data. This course describes the mathematical foundations of learning and explores the important connections and applications to areas such as artificial intelligence, cryptography, statistics, and bioinformatics. A list of relevant topics may include perceptron and online learning, graphical models and probabilistic inference, decision tree induction and boosting, analysis of Boolean functions, sample complexity bounds, cryptographic and complexity hardness, and reinforcement learning. Basic ideas from computer science and mathematics are employed to describe the main ideas and major developments in computational learning. Students are expected to learn and explore recent research ideas in the area. Prerequisite: CS 345 or consent of instructor; Corequisite: CS 547 or consent of instructor
Components: Lecture
Requirement Group: Corequisite: CS547 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 550(3) **Course ID:007847** **2021-10-29**
Software Design and Development
Working in teams, students will learn tools and strategies for designing and implementing medium/large software projects. Suitable project ideas will be solicited from the community in order to match student teams with real users where possible. Students will learn to elicit requirements from users and to work in an effective team. Students will learn and practice techniques for software testing including black-box testing, stress testing, performance testing, code reviews, and code coverage tools. Students will produce documentation that is appropriate at various stages in the software life cycle including for example, requirements documents, project plans and user manuals. The work will include oral presentations and written reports. Students enrolled in CS550 will be expected to independently explore some aspects of the course material. Students are expected to have taken introductory software development courses similar to CS141, CS142 and CS242.
Components: Lecture
Same As Offering: CS 550
Attributes: Offered Spring Term
Req. Designation: Technology

CS 550(3) **Course ID:007847** **2021-10-29**
Software Design and Development
Working in teams, students will learn tools and strategies for designing and implementing medium/large software projects. Suitable project ideas will be solicited from the community in order to match student teams with real users where possible. Students will learn to elicit requirements from users and to work in an effective team. Students will learn and practice techniques for software testing including black-box testing, stress testing, performance testing, code reviews, and code coverage tools. Students will produce documentation that is appropriate at various stages in the software life cycle including for example, requirements documents, project plans and user manuals. The work will include oral presentations and written reports. Students enrolled in CS550 will be expected to independently explore some aspects of the course material. Students are expected to have taken introductory software development courses similar to CS141, CS142 and CS242.
Components: Lecture
Same As Offering: CS 550
Attributes: Offered Spring Term
Req. Designation: Technology

CS 551(3) **Course ID:007848** **2021-11-30**
Artificial Intelligence
[Cross-listed with EE 565] This course is an introduction to the computational study of intelligent systems. Topics include heuristic search, knowledge representation, automated reasoning, knowledge-based systems, reasoning under uncertainty, planning, and intelligent agents. Additional topics may be drawn from machine learning, neural networks, computer vision, and natural language understanding. AI programming techniques and methods will also be covered throughout the course.
Prerequisites: CS344 or equivalent or consent of the instructor.
Components: Lecture
Course Equivalents: EE 565
Attributes: Given When Needed
Req. Designation: Technology

CS 552(3) **Course ID:007849** **2015-08-15**
Computer Graphics
[Cross-listed with EE 505] An introduction to computer graphics. Graphics hardware, algorithms for generating and displaying two and three-dimensional geometric figures, animation, interactive displays. Programming projects using OpenGL will be assigned. Students will be expected to independently explore some aspects of the course material. Prerequisites: Programming experience in C/C++ family language, basic concepts in linear algebra and matrices.
Components: Lecture
Course Equivalents: EE 505
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 555(3) **Course ID:007851** **2016-07-21**
Computer Networks
[Cross-listed with EE 507] This course covers layered protocols, network architectures, OSI, digital networks, local area networks, metropolitan networks, wide area networks, and interconnection of local area networks and non-uniform networks. Students will be expected to explore independently advanced aspects of the subject area. Prerequisites: One of course in computer architecture (EE264, CS241 or IT502 or equivalent). One course in computer programming (EE261, CS141 or equivalent.) Note: IT501 also satisfies the programming requirement.
Components: Laboratory, Lecture
Course Equivalents: EE 507
Req. Designation: Technology

CS 556(3) **Course ID:007863** **2018-01-15**
Cryptography
Cryptography is the discipline which studies the making of 'secret' codes. This course will examine some of the methods of cryptography together with many surprising applications. The language of modern cryptography is primarily number theory, and various tools of number theory will be developed as needed. No background in number theory or cryptograaphy will be necessary, but some mathematical sophistication and familiarity with proofs will be assumed. Topics will include: one-way functions, public-key cryptosystems, digital signatures, probabilistic encryption, primality testing, interactive proof systems, and methods of secret sharing.
Prerequisites: MA211, MA346, or equivalent.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

CS 557(3) **Course ID:010600** **2015-08-15**
Computer and Network Security
[Cross-listed with EE 510] Attacks on networked computer systems are an increasingly important problem. This course covers the types of vulnerabilities that are present in modern computer systems and the types of malicious software that exploit these vulnerabilities. It also covers best practices for preventing, detecting and responding to such attacks including anti-virus software, defensive programming techniques, intrusion detection systems, honeypots and firewalls.
Prerequisites: A general course in computer networking such as CS455/555 or EE407/507. Programming experience to the level of CS142 or EE361.
Components: Lecture
Course Equivalents: CS 457, EE 410, EE 510
Req. Designation: Technology

CS 558(3) **Course ID:007852** **2015-08-15**
Formal Methods for Program Verification
Formal methods are algorithms and techniques that actually prove that a program meets its design criteria, and are the only way to guarantee that a program works correctly. As computer software increases in size and complexity, formal methods are becoming an essential part of software engineering. This is especially true of safety critical and life critical systems, where software errors can have life threatening consequences. Until recently, formal methods have had limited application because they were difficult to use. This is changing, and they are receiving greater acceptance from software engineers in industry and government. This course introduces students to the basic concepts and methods of program verification. A variety of techniques and tools will be covered, and students will gain experience in applying the tools to actual programs. After completing the course, students will have sufficient expertise to learn new methods as they become available.

Components: Lecture
Course Equivalents: CS 458
Attributes: Offered Spring Term
Req. Designation: Technology

CS 559(3) **Course ID:010239** **2021-11-30**
Human-Computer Interaction
This course provides an introduction to the field of human-computer interaction (HCI). This discipline focuses on the design, evaluation and implementation of interactive computing systems from a user's point of view. The course will give a broad overview of the ideas, techniques, and tools in the subject, with a systematic approach to designing visual interfaces and evaluating their effectiveness. Case studies of existing interfaces, technologies, and data display methods will be discussed and critiqued. Topics include: programming and command languages; menus and forms graphical user interfaces, computer-supported cooporerative work, information search and visualization; input/output devices; and display design. A collaborative course project will explore issues in HCI and design.
Prerequisites: proficiency in C++, Java or C.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS242 or EE408
Req. Designation: Technology

School of Arts and Sciences - Electrical & Computer Eng - Subject: Computer Science

CS 560(3) **Course ID:007853** **2014-11-18**
Database Systems
[Cross-listed with EE 568] An introduction to database systems. The entity-relationship and relational models are presented and applied to the design of typical databases. New developments in object-oriented and mutimedia databases are presented. Emphasis will be placed on database design for applications in the context of an existing database management system such as ORACLE or ACCESS. Substantial independent investigation of advanced topics will be required.
Prerequisites: programming experience in a high level language.
Components: Lecture
Course Equivalents: EE 568
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 561(3) **Course ID:010466** **2021-11-30**
Mixed Reality
[Cross-Listed with CS461]This course provides an introduction to the mathematics and computing underlying virtual (VR) and augmented reality (AR). Students will learn stereo camera geometry for VR, recovery of 3D scene structure from images for content manipulation in AR, acquiring of illumination maps for photorealistic AR, and capture of human interaction for virtual environments. Students will perform several short and long projects as part of the course. Students will also analyze seminal papers in supporting fields such as graphics, vision, and computational photography.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 566(3) **Course ID:012868** **2018-03-19**
Blockchain Technologies
Blockchain technologies are the underlying technological foundation of almost all digital currencies, such as Bitcoin and Ethereum. Without the need of a trusted authority or central server, Blockchain technologies can securely archive and are inherently resistant to modification of data. The course will cover the basics and advanced topics of Blockchain technologies. The basics include public key cryptography and cryptocurrency, hashing algorithms, mining process, proof of work, block structures, transactions and wallets. Advanced topics may include consensus algorithms, smart contracts, blockchain network security and applications. We will discuss the limitations of current applications and explore new systems and proposals that overcome them. The course will offer many hands-on lab components and a blockchain-based course project. Students should already have had solid programming skills, such as C, C++ or Python, to take the course. Students will be expected to independently explore some of the course material.
Components: Lecture
Course Equivalents: CS 466
Attributes: Given When Needed
Req. Designation: Technology

CS 569(3) **Course ID:012899** **2019-04-24**
Quantum Information and Computation
[Cross-listed with CS469 and MA469] This course studies information and computation based on quantum mechanical laws. The first part of the course will cover the relevant background in quantum information theory. A brief discussion of several universal quantum computational models will be given. The second part will cover algorithmic techniques important for developing quantum algorithms. Topics to be covered include amplitude amplification, quantum walks, phase estimation, hidden subgroup problems, and quantum protocols. Background in physics would be helpful but is not required. As part of a research project, students are expected to explore topics of interest from the literature.
Prerequisites: CS344, and MA232 or MA339, or consent of the instructor.
Components: Lecture
Course Equivalents: CS 469
Attributes: Given When Needed
Req. Designation: Technology

CS 570(3) **Course ID:012939** **2019-04-03**
Deep Learning
This course will cover the principles of modern deep learning architectures from a theoretical and practical perspective. Course topics covered will include an introduction to machine learning and basic neural network architectures, and in-depth discussions on convolutional neural networks, recurrent neural networks based on units such as LSTMs and GRUs, and, if time permits, GANs. Students will be required to implement programming assignments and projects that apply deep learning architectures to solve classification and regression problems. Students will read and assess papers on current evolutions to these architectures. Graduate students will do additional work.
Prerequisites: CS142, EE262 or EE361, and MA339, or consent of instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 571(3) **Course ID:012897** **2018-10-24**
System Administration and Network Operations
This course is designed to give students the basic skills and knowledge to administer Unix/Linux machines as standalone workstations or in a network environment. For example, students will learn to install and configure the Linux operating system, create and maintain system users and groups, maintain and administer a file system, configure and maintain network services, troubleshoot system and network problems, and secure the system and network environment. Comprehensive hands-on labs throughout the course will reinforce learning and develop skills and competency. Graduate students will be expected to explore independently advanced aspects of the subject area.
Prerequisite: CS241 or equivalent
Components: Lecture
Course Equivalents: CS 471
Attributes: Given When Needed
Req. Designation: Technology

CS 572(3) **Course ID:013010** **2020-01-06**
Image Understanding
This course is an introduction to image processing and computer vision algorithms. Students will learn concepts such as image formation, how to store a digital image on a computer, how to use it in a program, different image features and their importance in computer vision, as well as some advanced computer vision topics such as object classification. Students will implement these concepts as part of the programming assignments. They will also do some theoretical assignments and a project. Students enrolled in CS572 will study a research paper on related topics and present it to the class. Prerequisites: CS142 or EE262 or EE361, and MA232 or MA239 or MA339, or equivalent.
Components: Lecture
Course Equivalents: CS 472
Attributes: Given When Needed
Req. Designation: Technology

CS 573(3) **Course ID:013058** **2020-11-04**
Computer Vision
[Cross-Listed CS473/EE573] This course will cover an overview of basic theoretical underpinnings and practical applications of computer vision, with particular emphasis on geometrical techniques underlying 2D and 3D vision. Topics covered include, but are not restricted to, estimation of image transformations, image formation, pose estimation, camera calibration, epipolar geometry, structure-from-motion, stereo reconstruction, filtering, interest point detection, motion estimation, image segmentation, and object recognition. Students enrolled in CS573 will be expected to read and implement research papers on seminal and modern techniques in computer vision. Prerequisites: CS142 or EE262, and MA339 (or equivalent, with consent from the instructor).
Components: Lecture
Course Equivalents: CS 473
Attributes: Given When Needed
Req. Designation: Technology

CS 575(3) **Course ID:013067** **2020-10-23**
Computing, Ethics and Society
[Cross-Listed CS475]This course focuses on the increasing ubiquitous nature of computing, its impact on society and the ethical issues related to the design, implementation and deployment of computing technologies. We will examine case studies of the impact of computing technology on society and reflect on issues such as privacy, equality, justice, security, accountability, transparency, safety and reliability. Students enrolled in CS575 will become familiar with venues where computer science research regarding fairness, accountability, transparency and ethics is published and the types of topics and themes commonly covered in this literature today. They will gain skills in reading research literature and apply this to some pieces of recently published work. Prerequisites: CS141, or equivalent.
Components: Lecture
Course Equivalents: CS 475
Attributes: Given When Needed
Req. Designation: Technology

CS 607(1 - 15) **Course ID:007854** **2020-04-10** **Instructor Consent Required**
Topics in Computer Science
A graduate course in the field of Computer Science. Areas of coverage will be selected to conform to the mutual interests and needs of students and faculty.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 608(1 - 15) **Course ID:007855** **2020-04-10** **Instructor Consent Required**
Topics in Computer Science
A graduate course in the field of Computer Science. Areas of coverage will be selected to conform to the mutual interests and needs of students and faculty.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CS 611(1 - 15) **Course ID:007856** **2020-04-10** **Instructor Consent Required**
Topics in Applied Computer Science
A graduate course in the field of Applied Computer Science. Areas of coverage will be selected to conform to the mutual interests and needs of students and faculty.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CS 612(1 - 15) **Course ID:007857** **2020-04-10** **Instructor Consent Required**
Topics in Applied Computer Science
A graduate course in the field of Applied Computer Science. Areas of coverage will be selected to conform to the mutual interests and needs of students and faculty.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

CS 634(1 - 15) **Course ID:007859** **2015-08-15**
Thesis
Each student does independent, original work on a project under the guidance and supervision of an instructor. A grade on all of the credits for this work presented in satisfaction of the requirements for a degree is given when those requirements are completed.
MS in Computer Science.
Components: Thesis Research
Attributes: Given When Needed
Req. Designation: Technology

CS 647(3) **Course ID:011388** **2015-08-15**
Advanced Algorithms
This course covers advanced topics in computer algorithms. Topics covered include, but are not restricted to, linear programming and combinatorial optimization, randomized algorithms and probabilistic methods, competitive analysis and online algorithms, algorithms for algebraic and geometric problems, and space-efficient algorithms. The emphasis will be on methods and techniques instead of specific applications. As part of a research project, students are to explore specific topics of interest from the literature.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: CS 547
Req. Designation: Technology

CS 649(3) **Course ID:012763** **2016-10-03**
Current Issues In Machine Learning
In this course, we will read current publications of machine learning research. Students will gain experience reading and critiquing research papers. Class times will be devoted to discussing the papers and possible extensions of the work. Projects may consist of a small piece of research.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 653(3) **Course ID:010888** **2018-01-15**
Automated Reasoning
This course will cover advanced topics in Automated Reasoning research. Students will gain experience reading and discussing research papers. Students will be expected to conduct research-related work in Automated Reasoning.
Prerequisites: CS541 and CS547, or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 654(3) **Course ID:010375** **2018-01-15**
Current Issues in Computer Networking Research
In this course we will read both classic and current publications of networking research. Students will gain experience reading and critiquing research papers. Class times will be devoted to discussing the papers and possible extensions of the work. Projects will consist of a small piece of research.
Prerequisites: CS454/554 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 657(3) **Course ID:010464** **2018-01-15**
Advanced Topics in Computer Security
This course will cover advanced topics in computer security research. Students will gain experience reading and discussing research papers. Students will be expected to conduct research-related work in computer security.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 662(3) **Course ID:013105** **2021-04-23**
Advanced Techniques in Virtual Reality and 3D User Interfaces
Topics taught will include, but are not limited to, the design of human subject studies for virtual reality (VR)/augmented reality (AR), statistical and learning-based techniques for evaluating VR/AR human subject studies, shared and multi-person VR/AR spaces, cognition in VR/AR, emotion in VR/AR, simulating physical characteristics of everyday objects in VR/AR, attention and engagement in VR/AR. In addition to material related to advanced topics, students will be engaged in understanding the evolution of modern VR through the assessment of relevant research literature, and will work on a comprehensive research project on an advanced VR topic.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS552,CS559,CS561,CS572,or CS573 or permission from the instructor
Req. Designation: Technology

CS 668(3) **Course ID:012792** **2018-01-15**
Natural Language Processing
This course introduces students to the fundamental concepts and ideas in natural language processing (NLP). In this course students will learn how to create systems that are able to understand and produce language for applications ranging from plagiarism detection to information extraction to automated summarization. The course will focus on four key areas: understanding and recognizing words; syntax (i.e. structure of language); semantics (i.e. meaning of language); pragmatics/discourse (i.e. interpretation of language in context). Students will be introduced to document similarity techniques using frequency and sequence based techniques; n-gram models; parts of speech tagging; named entity recognition; word sense disambiguation; machine translation; use of deep learning in NLP. Students will work with large scale datasets spanning from open source repositories to news articles. As part of the course students will read the latest literature in NLP and provide oral and written summaries.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

CS 670(3) **Course ID:013134** **2021-10-12**
Advanced Topics in Deep Learning
This course is designed to provide fundamental and specialized knowledge on various deep learning topics and, in the process, prepare students for independent research on real-world problems that require machine learning solutions. The course will cover fundamental topics in learning theory such as Hoeffding’s Inequality, Vapnik-Chervonenkis (VC) Dimension, and bias-variance tradeoff. The course will also cover specialized deep learning topics such as instance segmentation, image caption generation, and multi-task learning. The course assessment will include programming assignments that will require the students to implement deep learning models using a programming language such as Python and libraries such as Keras and TensorFlow. Students will also be required to study and present academic papers on related topics and complete a research project.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 673(3) **Course ID:013096** **2021-03-17**
Advanced Techniques in Computer Vision
Topics taught will include, but are not limited to, linear and non-linear optimization techniques in computer vision, bundle adjustment, non-rigid structure from motion, multi-view sparse and dense reconstruction, and advanced techniques in image synthesis and representation using deep generative models. In addition to material related to advanced topics, students will be engaged in understanding the evolution of modern computer vision through the assessment of relevant research papers, and will work on a comprehensive research project on an advanced computer vision topic.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: CS573
Req. Designation: Technology

CS 675(3) **Course ID:013068** **2020-10-23**
Fairness, Accountability and Transparency in AI and Automated Systems
This course focuses on the important and emerging area of Fairness, Accountability and Transparency across all areas of computing with a focus on applications in Artificial Intelligence, Machine Learning and Automated Decision Making Systems. Lectures and class discussions will draw on classic and current research literature. Students are expected to complete a research project and present the results of their work. Prerequisites: CS475 or CS575, or permission of instructor.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: CS575, or instructor permission.
Req. Designation: Technology

CS 676(3) **Course ID:013168** **2022-05-13**
Advanced Topics in Multimodal System Design
he course will cover topics on advanced methods in multimodal systems, with a focus on understanding the techniques involved in capture, temporal synchronization, calibration, data acquisition, networking, and data analysis from dense multi-viewpoint systems consisting of multiple modalities of cameras at varying spatial and temporal resolutions. Students will review literature on approaches used to perform cross-sensor temporal registration, calibration, data acquisition, and analysis using machine learning to perform tasks such as pose detection and action recognition for a variety of applications. Students will also do a project and perform presentations on their work.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS 550
Req. Designation: Technology

CS 677(3) **Course ID:013167** **2022-05-13**
Advanced Topics in Human-Robot Interaction
The course will cover current research in human-robot interaction (HRI), i.e., what it takes for robots to be seamlessly integrated into human environments, while being aware of human needs. The course will cover interdisciplinary work that integrates topics in robotics, artificial intelligence, computer vision, language understanding, human-computer interaction, and psychology. Through collaborative instructor and student-led discussions of HRI literature, students will receive an understanding of mathematical techniques, study design methods, and societal impact of research in HRI. To demonstrate their understanding of material and dedication toward contributing toward societally impactful HRI, students will perform an end-to-end project with research outcomes of interest to HRI.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: CS 573, or CS 570, or CS 552
Req. Designation: Technology

CS 707(1 - 0) **Course ID:007864** **2022-03-30**
Seminar in Computer Science
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

CS 708(1 - 0) **Course ID:007865** **2022-03-30**
Seminar in Computer Science
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Computer Science

CS 999(1 - 10) **Course ID:011763** **2015-08-15**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Computer Science Teaching

CST 528(3) **Course ID:013000** **2022-04-08**
Current Topics in Computer Science I
Students will investigate topics central to computer science for the preK-12 learner. Computer science principles will be aligned to industry standards and New York state teaching and learning standards. This course is designed for MAT, Computer Science students.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

CST 563(3) **Course ID:012999** **2020-01-15**
Current Topics in Computer Science II
Current topics in the field of computer science will be explored with attention paid to fundamental concepts as well as future trends. This course is designed for MAT, Computer Science students.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

CST 580(3) **Course ID:012998** **2021-10-08**
MAT Project in Computer Science
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, and include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 1(2 - 4) **Course ID:010697** **2019-07-08**
Digital Arts Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Req. Designation: Technology

DA 2(2 - 4) **Course ID:011608** **2019-07-08**
Digital Arts Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Common Experience Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

DA 100(3) **Course ID:010525** **2021-03-31**
Introduction to Digital Art: Time & Image
[Cross-listed with COMM 100] This introductory studio course explores many of the key principles, techniques and dialogues governing the creative potential of digital technologies within art and design. Topics of study include bitmap and vector-based digital imaging together with digital approaches to time-based media. The goal of the course is to empower students with an artistic and technological understanding of the subject, while encouraging an experimental approach to digital media.
Components: Lecture
Course Equivalents: COMM 100
Attributes: One communication unit, Imaginative Arts, Offered Spring Term
Req. Designation: Technology

DA 110(3) **Course ID:008565** **2021-03-31**
Drawing
This perceptually based studio course serves as one of the foundations for the DA&S major. Students will learn the importance of line, value, perspective, and human anatomy through the use of media such as graphite, charcoal, and ink. The translation of the 3D world to the 2D world through drawing will be emphasized.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Fall Term
Req. Designation: Technology

DA 120(3) **Course ID:011147** **2021-03-31**
Elements of Design
In this traditional studio art course, the foundations of visual design will be studied, particularly in the fields of color theory and two and three dimensional design. Students create projects with a strong focus on basic elements such as: line, shape, texture, value, color, composition, plane, volume, and space. Other concepts, such as form vs. function and conceptual vs. perceptual creativity will also be studied.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Fall Term
Req. Designation: Technology

DA 140(3) **Course ID:011884** **2022-03-08**
Introduction to Digital Art: Form & Code
This course introduces the key principles of computer programming. Through workshops, presentations, quizzes, readings, and project-based exercises and assignments, the course embarks on an investigation into the creative possibilities of computer programming within the digital arts. The skills and concepts taught in this course set a foundation for higher level DA&S courses within e.g. game design, web programming, and computational arts.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

DA 200(3) **Course ID:010526** **2021-03-31**
3D Digital Modeling & Imagery
This studio course introduces the creation of 3D imagery through the use of the computer. Students will gain experience through the creation and rendering of polygonal models, textures, and lights. This course will demonstrate the importance this medium has in fine art, film, advertising, and video games. Recommended to take DA/COMM 100 prior to taking DA 200, but not required.
Components: Lecture
Attributes: Imaginative Arts, Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 207(1) **Course ID:011818** **2021-03-31**
Media Landscapes I
Students will watch, discuss, and critique media objects such as movies and other forms of popular culture. The course focuses on historical and contemporary examples of work that offer ongoing cultural legacies and represent significant achievements within their genre.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

DA 212(3) **Course ID:011820** **2021-03-31**
Art in Context
This course offers a critical exploration of the key themes, ideas, and dialogues that inform and guide contemporary art practices. Through readings, writings, and discussions, students will analyze artists and art movements through both historical and theoretical perspectives with a special emphasis on the position of new media technologies in contemporary art and culture.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

DA 225(3) **Course ID:011590** **2022-03-08**
Digital Painting and Illustration
This studio course teaches painting and illustration through the use of digital tools such as the computer and pen tablet. Building on the student's previous knowledge of color theory, drawing, and design, this course will introduce a raster-based media that facilitates the digital creation of concept art, comics, paintings, and 3D textures.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: DA100/COMM100, and DA110 or DA120 (or permission of the Communications & Media departme

Req. Designation: Technology

DA 250(3) **Course ID:011115** **2021-03-31**
Interactive & Algorithmic Art
In this course, students will be introduced to artistic expressions unique to digital art. They will experiment with creating forms, motions, and interactions through the design of algorithms and the manipulation of math functions. They will learn to conceive and design art works as a dynamic process and as an inseparable combination of audience participation and its visual manifestation. Through this course, students will garner an appreciation of contemporary and technological forms of artistic expression through the understanding of code-based art making. Students will also garner experience in deconstruction code-based digital art to garner a deeper appreciation of the art form. Throughout the course, students will be introduced to various examples of the application of code-based and interactive methods from artists who have a human-centered and critical approach to the role of technology in society.
Components: Lecture
Attributes: Imaginative Arts, Offered Fall Term
Requirement Group: Prerequisite: CS 141 or DA 140, or permission of the Comm & Media department
Req. Designation: Technology

DA 300(3) **Course ID:010527** **2019-07-08**
3D Imagery & Animation
An advanced studio course in which students apply their 3D modeling knowledge to camera and object animations. Students will explore advanced procedures while incorporating their experience with digital video and sound editing into each project. Projects will include both digital still imagery and 3D animation shorts.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: DA200 or permission of the Comm & Media department
Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 320(3) **Course ID:011817** **2021-03-31**
Moving Images: Motion Graphics & Animation
Focusing predominantly on the software applications Adobe After Effects and Flash, this course explores creative and experimental uses of time-based media as both a form of artistic expression and as a vehicle for presenting data and information. While primarily a studio course, techniques and skills will be taught within a wider critical framework that explores the historical and theoretical precedents and contexts surrounding motion graphics and time-based art practices.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: DA100 or COMM100, or permission of the department
Req. Designation: Technology

DA 321(3) **Course ID:013151** **2022-03-18**
Video Art
With an emphasis on creative experimentation and artistic expression, DA321 offers a hands-on exploration of video and time-based media as an artistic medium. Focusing on hands-on project development, the course combines the acquisition of technical proficiencies in experimental and interdisciplinary approaches to video, with an exploration of the historical themes and theoretical frameworks informing contemporary time-based art practices.It is recommended to take DA 320 prior to taking this course.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: DA100 or COMM 100. DA320 Recommended
Req. Designation: Technology

DA 340(3) **Course ID:012926** **2019-07-08**
Virtual Reality (VR) and Mixed Reality
This exploratory class will delve into the use of virtual reality devices such as the Oculus Rift and HTC Vive for interactive content creation. Students will explore a mix between real-time, 360 video, and pre-rendered methods in order to produce challenging content which will explore the potential of what can be achieved with these exciting new platforms. Emphasis will be placed on the experimental application of techniques towards innovative content.
Components: Lecture
Attributes: Imaginative Arts, Given When Needed
Requirement Group: Prerequisite: CS141 or DA100
Req. Designation: Technology

DA 341(3) **Course ID:013065** **2022-03-08**
Animating and Visualizing Data
This studio course involves utilizing data as a means of linear and non-linear storytelling. Students will learn how to incorporate flat, time-series, and other types of data into moving images. Various methods will be introduced, but all will involve creating a data reader and the aspects of aesthetically displaying said data.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: DA140 or CS141
Req. Designation: Technology

DA 342(3) **Course ID:013099** **2021-03-25**
3D Character Design, Sculpting and Rigging
Students will conceptualize, design and digitally paint 2D characters and realize them as high polygon sculpted models. Methods for sculpting, baking and retopology will be covered for high-fidelity characters in preparation for rigging. Advanced rigging methods will be introduced for full character dialogue and expressive movement. Students will be required to purchase a small digital Wacom tablet to realize their designs.
Components: Lecture
Requirement Group: Prerequisite: DA200 or permission of the department if you have a basic knowledge of 3D modeling softw

Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 343(3) **Course ID:013132** **2021-10-12**
3D Digital Character Animation
This studio course covers principles of character animation and visual storytelling in relation to topics such as character acting, lip syncing, and game character cycles. With a focus on narrative-driven animation, the course engages with storyboarding, virtual camera cinematography and staging, as well as an exploration of narrative structures in relation to time-based media. With the emphasis on character animation rather than character creation, the course relies predominantly on pre-built assets as the starting point for animations.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: DA/COMM 100, or permission of the instructor.
Req. Designation: Technology

DA 391(3) **Course ID:011076** **2019-07-08** **Department Consent Required**
Special Topics: Digital Arts & Science
In DA&S Special Topics courses, students study topics not otherwise available in formal courses under the supervision of a faculty member. The specific topic and the course description for a special topics course are listed when it is offered. These courses reflect ongoing developments in digital art media and practice, which often are related to the particular faculty member's research interests. These courses are intended primarily for advanced students who wish to pursue special interests in the field.
Components: Lecture
Req. Designation: Technology

DA 392(3) **Course ID:011077** **2019-07-08** **Department Consent Required**
Special Topics: Digital Arts & Science
In DA&S Special Topics courses, students study topics not otherwise available in formal courses under the supervision of a faculty member. The specific topic and the course description for a special topics course are listed when it is offered. These courses reflect ongoing developments in digital art media and practice, which often are related to the particular faculty member's research interests. These courses are intended primarily for advanced students who wish to pursue special interests in the field.
Components: Lecture
Req. Designation: Technology

DA 394(3) **Course ID:011079** **2019-07-08** **Instructor Consent Required**
Special Topics in Digital Arts & Sciences
In DA&S Special Topics courses, students study topics not otherwise available in formal courses under the supervision of a faculty member. The specific topic and the course description for a special topics course are listed when it is offered. These courses reflect ongoing developments in digital art media and practice, which often are related to the particular faculty member's research interests. These courses are intended primarily for advanced students who wish to pursue special interests in the field.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

DA 400(3) **Course ID:011121** **2019-07-08** **Department Consent Required**
Directed & Collaborative Study
A studio course available to advanced students wishing to pursue further research in a specific area of interest. Meeting at the same time as DA300, this course provides an opportunity for collaboration & directed research in the specified area. This optional course gives the student a chance to expand their portfolio in preparation for a career in the digital arts.
Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisites: A 300-level DA course, DA&S major, and permission of the Comm & Media department
Req. Designation: Technology

DA 410(1 - 3) **Course ID:011122** **2021-08-30** **Department Consent Required**
Directed & Collaborative Study
A studio course available to advanced students wishing to pursue further research in a specific area of interest. Meeting at the same time as DA310, this course provides an opportunity for collaboration & directed research in the specified area. This optional course gives the student a chance to expand their portfolio in preparation for a career in the digital arts.
Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisites: A 300 level DA course, DA&S majors only, and permission of the Comm & Media department
Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 420(1 - 3) **Course ID:011324** **2019-07-08** **Department Consent Required**
Digital Arts Independent Study
Designed primarily for a student who wishes to pursue special interests in Digital Arts for one or more semesters, this series of courses allows individual students to define independent study projects.
Components: Independent Study
Requirement Group: Prerequisites: One course in Digital Arts and permission of the Comm & Media department
Req. Designation: Technology

DA 421(1 - 3) **Course ID:011325** **2019-07-08** **Department Consent Required**
Digital Arts Independent Study
Designed primarily for a student who wishes to pursue special interests in Digital Arts for one or more semesters, this series of courses allows individual students to define independent study projects.
Components: Independent Study
Requirement Group: Prerequisites: One course in Digital Arts and permission of the Comm & Media department
Req. Designation: Technology

DA 423(1 - 3) **Course ID:011707** **2019-07-08** **Department Consent Required**
Digital Arts Independent Study
Designed primarily for a student who wishes to pursue special interests in Digital Arts for one or more semesters, this series of courses allows individual students to define independent study projects.
Components: Independent Study
Requirement Group: Prerequisites: One course in Digital Arts and permission of the Comm & Media department
Req. Designation: Technology

DA 480(3) **Course ID:011125** **2022-03-08**
Internship in Digital Arts
These internships are designed to provide practical work or research experience for the Digital Arts & Sciences majors. Generally, students work with a professional on projects in the field of digital arts, interactive design, advertising, and/or digital media design and production.
Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisites: DA&S Majors,DA Minor, or permission of the Comm & Media department
Req. Designation: Technology

DA 490(1 - 3) **Course ID:011206** **2022-03-08** **Department Consent Required**
Undergraduate Teaching Assistantship in Digital Arts & Science
Students assist a faculty member in teaching a Digital Arts & Science course. Students engage in substantial pedagogical work beyond mastery of the target course material. Such activities might include mentoring students in course work, leading class discussions or demonstrations, designing or assessing course modules. Prerequisites: the student will have already taken the course in a previous semester or receive consent from the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

DA 491(3) **Course ID:010528** **2019-07-08**
Professional Practice
This is the first semester in the advanced studio sequence in which the DA&S major applies the knowledge and skills developed in the program to design a visual portfolio under the directed study of a specific faculty member. Each student should choose the proper section which correlates with the faculty member who they wish to work with for the semester.
Components: Lecture
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: Any 300 Level DA course and open to DA&S Majors only (or by permission of the Comm & Me

Req. Designation: Technology

DA 492(3) **Course ID:010529** **2019-07-08**
Senior Studies
The capstone of the advanced studio sequence in which DA&S seniors integrate the knowledge and skills developed in the program to complete their portfolios by working independently on a large-scale project. Each student should choose the proper section which correlates with the faculty member who they wish to work with for the semester.
Components: Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisites: DA491 and Senior standing in DA&S
Req. Designation: Technology

School of Arts and Sciences - Digital Arts & Science - Subject: Digital Arts

DA 499(0) **Course ID:013042** **2020-06-01**
Digital Art Minor Portfolio
Under the guidance of Digital Arts faculty advisers from within the Department of Communication, Media & Design,
students will compile a portfolio that functions as a way of showcasing and reflecting upon their achievements within
the minor. The portfolio will be completed within this course. Students must receive a P (pass) in the minor portfolio in order to complete the requirements for the minor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

DA 500(3) **Course ID:012785** **2019-07-08**
Directed Study & Collaborative Projects
DA500 will involve the creation of advanced projects under the guidance of the instructor. Topics may include but are not limited to: data visualization, scientific visualization, UI/UX interface design & app development, outreach projects structured around STEM Education, and STEM based virtual reality experiences.
Components: Independent Study
Attributes: Offered Fall and Spring
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Data Science

DS 241(3) **Course ID:012919** **2021-05-14**
Introduction to Data Science
[Cross listed as MA 241]This course introduces the basics of data manipulation and pre-processing to analyze data for statistical decision-making, building the skills required to organize, visualize, and communicate using data. The course seeks to help students address this question: given data from the world of science, engineering, medicine, etc., collected from multitude of sensors and sources, how do you begin to make sense of that data – and how do you use it? The primary tool for coding will be R/RStudio, but supporting Python syntax and libraries may also be introduced. The course emphasizes not only the low-level coding skills, but also the higher-level critical and quantitative reasoning skills required to analyze real-world datasets. Topics introduce key concepts such as descriptive statistics and sampling distribution (as a means to view large and very large data sets) and the basic analysis tools of Linear Regression and Data Mining. Additional topics may include social network data, unstructured data, and natural language text processing.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisite: STAT282, or STAT383, or STAT318, or STAT389
Req. Designation: Technology

DS 392(3) **Course ID:012892** **2018-10-08**
Ethics in Data Science and Applied Mathematics
This course will consider real situations in which computational or data science delivers capabilities that may conflict with societal values. Students will analyze frameworks for promoting ethical decision making, such as audits, codes of conducts, and legal regulations. They will discuss how data-driven decision making can be aligned with societal values. (Discussion topics may include things like data stewardship, secondary-effect analysis, political and legal roles of mathematical professionals, and representative workforce.) Guest speakers from both physical and social sciences will introduce relevant, real-world examples, with a portion of course time dedicated to discussion of daily news items that relate to the topics of this course.
Components: Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: DS392 Restrictions: Any STAT or DS Course
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: English for Academic Purposes

EAP 250(3) **Course ID:011340** **2015-02-19**
Academic Writing for Undergraduates I
[Formerly ESL250] This course, designed for non-native speakers of English at a low-advanced level of proficiency in written English, focuses on reading and writing for the academic context. Students read material from a variety of fields and develop their writing skills in definition, description, comparison and contrast, and analysis. The course also includes vocabulary-building techniques and a review of grammatical structures needed for effective writing.
Prerequisite: placement test.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EAP 255(3) **Course ID:011627** **2014-11-20**
Academic Spoken Communication Skills for TAs and other International Undergraduate Students
The course focuses on development of effective communication skills (including appropriate grammar and vocabulary) for various academic purposes (e.g., making presentations on a variety of academic themes, answering audience questions). As a group and individually, students also work on pronunciation, intonation patterns, and other features of fluent American English.
Components: Lecture
Course Equivalents: EAP 555
Req. Designation: Technology

EAP 350(3) **Course ID:011341** **2015-01-23**
Academic Writing for Undergraduates II
[Formerly ESL350] This course integrates academic reading, writing, and critical thinking for non-native speakers of English who are at an advanced level of proficiency in written English. Students read short academic articles on various topics by a variety of authors, discuss and evaluate ideas, and write a number of analytical and argumentative papers, including a documented paper based on outside sources. Attention is given to key academic writing skills, e.g., summary, paraphrase, use of citations, and effective support of ideas.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: Placement test or grade of C or better in EAP250.
Req. Designation: Technology

EAP 354(2) **Course ID:011336** **2015-02-03**
Advanced Academic Writing for Undergraduates
[Formerly ESL354] This writing seminar will provide high advanced non-native speakers of English with tools and teacher feedback to shape their writing skills for university level writing requirements. This seminar will focus primarily on the American cultural expectations/conventional structures for successful academic writing courses; students will enhance their tone, form, and structure of texts.
Prerequisites: Placement exam or completion of EAP250 with a grade of C or better.
Components: Lecture
Attributes: One communication unit, Offered Each Term
Req. Designation: Technology

EAP 380(1 - 3) **Course ID:013133** **2021-10-12** **Instructor Consent Required**
Independent Study in EAP
ESL for undergraduates whose needs don't fit into a conventional course.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

EAP 550(3) **Course ID:011343** **2015-02-19**
Academic Writing for Graduates I
[Formerly ESL550] This course, designed for non-native speakers of English at a low-advanced level of proficiency in written English, focuses on reading and writing for the academic context. Students read material from a variety of fields and develop their writing skills in definition, description, comparison and contrast, and analysis. The course also includes vocabulary-building techniques and a review of grammatical structures needed for effective writing.
Prerequisite: placement test.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Communication, Media & Design - Subject: English for Academic Purpose

EAP 552(3) **Course ID:011344** **2015-01-20**
Academic Writing for Graduates II
[Formerly ESL552] This course integrates academic reading, writing, and critical thinking for non-native speakers of English who are at an advanced level of proficiency in written English. Students read short academic articles on various topics by a variety of authors, discuss and evaluate ideas, and write a number of analytical and argumentative papers, including a documented paper based on outside sources. Attention is given to key academic writing skills, e.g., summary, paraphrase, use of citations, and effective support of ideas.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

EAP 554(2) **Course ID:011345** **2015-01-20** **Instructor Consent Required**
Academic Writing Seminar for Graduates II
[Formerly ESL554] This writing seminar will provide high advanced non-native speakers of English with tools and teacher feedback to shape their writing skills for university level writing requirements. This seminar will focus primarily on the American cultural expectations/conventional structures for successful academic writing courses; students will enhance their tone, form, and structure of texts.
Prerequisites: Placement test or permission of the instructor
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

EAP 555(3) **Course ID:011342** **2014-11-20**
Academic Spoken Communication Skills for TAs and other International Graduate Students
[Formerly ESL555] This course is intended for international TAs and other international graduate students who need to improve their spoken English skills in order to interact effectively with students and faculty. The course focuses on development of effective communication skills (including appropriate grammar and vocabulary) for various academic purposes (e.g., leading discussions, making presentations, answering questions). As a group and individually, students also work on pronunciation, intonation patterns, and other features of fluent American English.
Components: Lecture
Course Equivalents: EAP 255
Req. Designation: Technology

EAP 580(1 - 3) **Course ID:012954** **2019-09-02** **Instructor Consent Required**
Independent Study in EAP
For EAP interest or need. Consent of Instructor required.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 1(2 - 4) **Course ID:008068** **2015-06-30**
Economics Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EC 2(2 - 4) **Course ID:008069** **2015-06-30**
Economics Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EC 150(3) **Course ID:008070** **2015-06-30**
Principles of Microeconomics
(May be used with EC 151 to satisfy a CUSB M.B.A. or M.S. foundation requirement.) An introduction to microeconomics covering the role of the price system in and public policies toward the allocation of resources and the distribution of income. Included are the basic concepts of industry, supply and demand, technological change, private and social costs, market structures, analysis of firm behavior, household behavior and the gains from international trade. Students will be expected to use personal computers.
Components: Lecture
Attributes: Economics and Organizations, Offered Fall and Summer
Requirement Group: Restriction: Not open to Chemical, Civil, or Environmental Engineering majors. Students may not be gr

Req. Designation: Technology

EC 151(3) **Course ID:008071** **2015-06-30**
Principles of Macroeconomics
(May be used with EC 150 to satisfy a CUSB (Clarkson School of Business) M.B.A. or M.S. foundation requirement.) An introduction to macroeconomics including the analysis of national income determination, monetary and fiscal policy, aggregate economic growth and international economics. Price stability, balance of international payments and economic growth and development will also be examined. Students will be expected to use personal computers and prerequisite software.
Components: Lecture
Attributes: Economics and Organizations, Offered Spring and Summer
Requirement Group: Restriction: Not open to Chemical, Civil, or Environmental Engineering majors. Students may not be gr

Req. Designation: Technology

EC 200(1) **Course ID:011236** **2022-02-10**
Engineering Economics
A course to supplement EC150 for those students who are required to complete EC350 or its equivalent. The course will cover the topic of engineering economic analysis and provides preparation for the Fundamentals of Engineering Exam and the Professional Engineering Exam. Requisite: The course will only be offered to those students who have completed EC150.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisite: EC150 or EC151
Req. Designation: Technology

EC 311(3) **Course ID:008073** **2015-06-30**
Introduction to Econometrics
Introduction to econometric techniques and statistical procedures required in analysis of economic problems. The course focuses on problems in estimation and inference of linear regression models. Topics include estimation and hypothesis testing using simple and multiple linear regression models under classical assumptions, binary variables, estimation and inference when the classical assumptions are violated, and basic time series analysis. This course requires the use of computers.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: MA181 or equivalent and STAT282 or equivalent.
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 313(3) **Course ID:012872** **2018-12-11**
Mathematical Economics
This course aims to have students be able to understand and apply mathematical concepts in the context of a wide range of fields in economics, including microeconomics, macroeconomics, finance, economics of risk and uncertainty, economic development, international trade, environmental economics, and industrial organization. The course will build upon basic economic theory and mathematical concepts to focus on topics such as: comparative statics, financial mathematics, unconstrained and constrained optimization, dynamic optimization, and applications in contexts of uncertainty and strategic behavior.
Components: Lecture
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: EC150, EC151, MA131, and MA132
Req. Designation: Technology

EC 350(3) **Course ID:008074** **2015-06-30**
Economic Principles and Engineering Economics
An introduction to microeconomic concepts in a market type economy. Some of the issues covered are the role of supply, demand, market price determination, consumer behavior, production theory and cost, and market structure. An introduction to macroeconomic concepts including the analysis of national income determination, monetary and fiscal policy, aggregate economic growth, international economics and inflation. This course also includes a segment on engineering economic analysis. Engineering students should take this course rather than EC150 and EC151 because it provides preparation for the Professional Engineering exam.
Components: Lecture
Attributes: Economics and Organizations, Offered Each Term
Requirement Group: Prerequisite: Sophomore Standing, and Engineering or Engineering and Management majors only. Students

Req. Designation: Technology

EC 357(3) **Course ID:008077** **2018-01-29**
Intermediate Microeconomics
The study of how producers and consumers, acting through the market, determine the prices and outputs of goods and the allocation and income of productive resources. Empirical materials are used, and emphasis is placed on the uses and limitations of economic reasoning.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: EC/EM150 or EC350.
Req. Designation: Technology

EC 358(3) **Course ID:008078** **2018-03-26**
Intermediate Macroeconomics
Macroeconomics is the study of the economy as a whole and is concerned with some of the most important questions in economics such as: Why is there unemployment? What are the sources of rapid inflation? What causes recessions? Why are some nations rich while others are poor? Why do some economies grow faster than others do? Can policymakers “fine-tune” the economy? This course analyzes the economy in a “general equilibrium” framework, where the performance of the economy in terms of output, employment and unemployment, inflation and international capital flows is determined by the simultaneous interaction of the goods, labor, money, and international markets. The course will highlight the critical difference between the economy in the short and long run, the important role that expectations about the future play in macroeconomic analysis, and the role, limits, and transmission mechanisms of fiscal and monetary policy in efforts at economic stabilization.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EC150, EC151, and EC313
Req. Designation: Technology

EC 360(3) **Course ID:008079** **2016-09-23**
Environmental Economics
[Cross-listed with EV 360] Economic analysis of problems caused by the impact of economic activities of society on the environment, and of the public and private policies that could be used for environmental improvement.
Components: Lecture
Attributes: Economics and Organizations, Individual and Group Behavior, University Course, Offered Spring Term
Requirement Group: Prerequisites: EC/EM150 or EC350.
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 367(3) **Course ID:008082** **2017-11-07**
International Economics
A survey of current theory and practice of international trade and finance. Topics covered include international trade theory, tariffs and quotas, international commodity agreements, balance of payments, foreign exchange markets, adjustment mechanisms and the international monetary system. Attention is given to the role of multinational corporations in the international economy.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: At least one course in Economics (EC)
Req. Designation: Technology

EC 370(3) **Course ID:010978** **2015-07-08**
Economics of Innovation
This course is designed to introduce students to microeconomic concepts relating to innovation, learning, technology adoption, and intellectual property protection. Various economic models of innovation are addressed. Topics include: incentives to innovate, market effects of innovation, and models of firm behavior and investment in innovation under conditions of uncertainty, and the importance of network effects/externalities and standardization in technology adoption. Throughout the course, students will be exposed both to economic theory as well as existing real-world case studies.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Sophomore Standing and EC150.
Req. Designation: Technology

EC 384(3) **Course ID:008085** **2017-04-05**
Game Theory and Economic Strategy
This course is designed to introduce students to the various rudimentary elements of game theory with the goal of providing the student with the tools and the ability to enhance their capabilities for strategic thinking. Applications are drawn from a wide variety of areas such as business, politics, international relations, and biology. Cases can incorporate entry and deterrence strategies, advertising, pricing and product quality, auctions, issues of technology standards, and problems of compatibility. The course will include the main elements of games and their structure, decision analysis, solution concepts, uncertainty and information, cooperation, and bargaining.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: EC/EM150 or EC350 and MA181 or MA131
Req. Designation: Technology

EC 451(3) **Course ID:010979** **2022-02-10**
Industrial & Supply Chain Economics
This course studies the economics of industrial organization within the framework of supply chain management. Models of industry structures are covered along with the study of business clusters and networks. Material includes horizontal and vertical integration, transaction costs and outsourcing, incentive contracting, product differentiation, and pricing strategies. Topics are illustrated through selected industry case studies.
Components: Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: EC150 or EC350 and MA181 or MA131.
Req. Designation: Technology

EC 468(3) **Course ID:010387** **2022-02-10**
Financial Markets and Institutions
[Cross-listed with FN 468] Emphasis is placed on understanding the basics of managing financial institutions, such as banks, the flow of funds, markets, and regulatory agencies that affect the institutions. The course addresses risk management, term structure of interest rates, international and domestic market operations and policy questions about financial markets and related topics.
Components: Lecture
Course Equivalents: FN 468
Attributes: Offered Spring Term
Requirement Group: Prerequisite: FN361.
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 475(3) **Course ID:011764** **2022-02-10**
Personnel Economics
This course makes use of economic theory and empirical evidence concerning personnel issues and the way incentives are structured within an organization. Topics include issues such as hiring standards, learning of worker productivity, compensation mechanisms, labor turnover, layoffs and buyouts, and various other personnel issues.
Components: Lecture
Attributes: Offered Odd Springs
Requirement Group: Prerequisite: EC150.
Req. Designation: Technology

EC 487(1 - 3) **Course ID:008090** **2017-01-12** **Instructor Consent Required**
Special Projects in Economics
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisites: permission of the instructor
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

EC 604(2) **Course ID:008091** **2015-08-06**
Applied Economics (MBA Module)
[Cross-listed with EC 605] A graduate course in applied economics. An investigation of economic concepts and models likely to be useful for managers involved in financial, economic and strategic decision-making at various levels. Quantitative techniques and selected econometric procedures are emphasized. This course is designed for MBA students and meets five hours per week for five weeks.
Components: Lecture
Course Equivalents: EC 605, EC 605
Requirement Group: Restriction: Admission to the MBA program required
Req. Designation: Technology

EC 605(3) **Course ID:008092** **2017-11-13**
Managerial Economics
[Cross-listed with EC 604] This is an advanced and applied course in managerial economics, with introductory material in microeconomic principles. The course starts with selected principles topics such as demand and supply analysis, market equilibrium, household behavior, production and costs, and firm behavior. We then move on to more sophisticated theories of consumption and production such as demand elasticity measures, profit maximization and sensitivity analysis, price discrimination, demand estimation, theories of risk and uncertainty, market structures, and game theory. Students participate in economics games and experiments throughout the course, and examples drawn from the business and financial worlds are used to illustrate the key concepts.
Components: Lecture
Same As Offering: EC 605
Course Equivalents: EC 604
Req. Designation: Technology

Business - CRC Business - Subject: Economics

EC 605(3) **Course ID:008092** **2017-11-13**
Managerial Economics
[Cross-listed with EC 604] This is an advanced and applied course in managerial economics, with introductory material in microeconomic principles. The course starts with selected principles topics such as demand and supply analysis, market equilibrium, household behavior, production and costs, and firm behavior. We then move on to more sophisticated theories of consumption and production such as demand elasticity measures, profit maximization and sensitivity analysis, price discrimination, demand estimation, theories of risk and uncertainty, market structures, and game theory. Students participate in economics games and experiments throughout the course, and examples drawn from the business and financial worlds are used to illustrate the key concepts.

Components: Lecture
Same As Offering: EC 605
Course Equivalents: EC 604
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 611(3) **Course ID:011986** **2019-11-01**
Econometrics
This course is an introductory-level graduate econometrics course, focusing mainly on time-series and panel data techniques. It is entry-level in the sense that students are not presumed to have any prior acquaintance with econometrics, although they should have sufficient statistical and computing background and coursework in calculus including some optimization. Students also need to be somewhat familiar with some statistical software such as R or SAS or Python. The course attempts to serve two types of audiences. For those who wish to pursue applied data analysis in the real world, it presents a wide array of problem instances and tools appropriate for those instances. The course also serves as a stepping stone for those interested in knowing the field more intimately, introducing them to a fair amount of theory and a selection of classic and contemporary econometrics papers.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: Economics

EC 652(3) **Course ID:012007** **2018-11-08**
Industrial Organization in the Supply Chain
[Cross-listed with EC 651] This is an industrial organization course that focuses on the strategic interactions within the supply chain under various market conditions. Models of industry structures are explored along with the discussion of business clusters and networks. Starting with a review of basic microeconomics principles: other topics include horizontal and vertical integration, outsourcing, contract negotiations and incentives, logistics issues, capacity constraints, pricing strategies and network issues all from the perspective of the supply chain. Students apply the models covered in class through several case studies to evolve in the art of strategic thinking.
Components: Lecture
Req. Designation: Technology

Business - School of Business - Subject: Economics

EC 660(3) **Course ID:008095** **2015-06-30**
Environmental Economics
This course considers environmental problems from an economic perspective. Topics include the theoretical foundations of environmental economics, measuring the costs and benefits of environmental policies, environmental policy issues, and special topics including risk and uncertainty in environmental regulation, sustainable development, and issues in natural resource damage assessment.
Prerequisites: EC150 or EC350 or EC151 or equivalent.
Components: Lecture
Req. Designation: Technology

EC 687(1 - 6) **Course ID:008100** **2015-06-30** **Instructor Consent Required**
Special Projects in Economics
An investigation of a problem undertaken by the student which is acceptable to and under the guidance of the faculty member and chairperson. The course provides an opportunity for the student to investigate and analyze a problem area of economics in depth on an independent study basis.
Prerequisites: permission of the Department of Economics Chair, and the faculty member involved.
Components: Independent Study
Req. Designation: Technology

Institute for STEM Education - Inst for STEM Education - Subject: Education

ED 300(1) **Course ID:012778** **2020-07-16**
Field Experience
(Minimum of 20 hours) Candidates are observers in a variety of education and education-related settings. Apart from community and after-school programs, there must also be a range of school and classroom experiences (e.g., urban, suburban, rural; high-and low-performing schools)-all taking place at the secondary level-so that candidates have a broad experience and learn as much as possible about secondary learners and secondary education philosophy.

Components: Field Studies
Attributes: Offered Fall and Spring
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 440(1) **Course ID:012996** **2019-11-20** **Instructor Consent Required**
Seminar in Cultural Competency and Teaching in the STEM Classroom
This seminar focuses on how culture, gender, race, and class impact the nature of STEM Education in secondary schools. Content will include a mix of reading, invited speakers, and panel discussions chosen to introduce participants to teaching and learning issues of diversity, poverty, and social justice. Students will provide written responses each week and submit a self-assessment on their own cultural sensitivity and sense of educational equity and describe how it evolved over the semester in terms of being influenced and informed by the course content. Requires permission of instructor or department.
Components: Seminar
Attributes: Offered Spring Term
Req. Designation: Technology

ED 501(1) **Course ID:012289** **2018-01-03**
Teaching Practicum
Formerly EDS 500F] MAT interns must complete 75 hours total (12 full school days) of observation and/or teaching either before the residency or at the beginning of the residency. 30 hours of the practicum should be completed with the mentor and with other department members assigned by the mentor and/or supervisor. The Practicum must include at least 15 hours in each of the following settings: students with disabilities, low socio-economic, and English as a New Language (ENL). Half of the total Practicum must be in grades 7-9, and the other half in grades 10-12. Residency supervisors must meet with the intern and mentor during the first weeks of school to review the Practicum requirements for the individual intern. The supervisor will help facilitate each intern's Practicum in collaboration with the mentor and intern and arrange observations in other schools, if needed. During the Practicum, the intern will understand the differences in adolescents' learning challenges, cognitive abilities, emotional and physical needs (CAEP InTASC 1.1); interpret students'
Components: Practicum
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 502(0) **Course ID:012290** **2020-05-13**
NYS Requirements
[Formerly EDS 500G] This course provides the NYS requirements for teacher certification. This course covers the prevention and intervention of school violence, child abuse identification and reporting, prevention of child abduction, drug, alcohol and tobacco abuse prevention and dignity for all students.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 503(1) **Course ID:012813** **2022-04-08**
Professionalism in Teaching I
Coursework in diversity and inclusion, career preparation, New York State Certification Exam preparation, and residency seminar.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

ED 504(1) **Course ID:012947** **2021-10-08**
Professionalism in Teaching II
Coursework in diversity and inclusion, career preparation, New York State Certification Exam preparation, and residency seminar. This is a continuation of ED 503 Professionalism in Teaching I.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

ED 511(3) **Course ID:012291** **2017-07-13**
Curriculum and Methods of Teaching English
[Formerly EDS 511] Curricular Planning and Instruction for the Teaching of English at the secondary level includes an analysis of secondary language arts curricula including New York State Frameworks for language arts, the Common Core State Standards, instructional techniques and strategies, designing and locating instructional materials, planning, implementing, and evaluating lessons and units.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 512(3) **Course ID:012292** **2017-07-13**
Curriculum and Methods of Teaching Mathematics
[Formerly EDS 512] Curricular Planning and Instruction for the Teaching of Mathematics at the secondary school level will include an analysis of classic and current secondary mathematics curricula including New York State Frameworks for mathematics, the Common Core State Standards, instructional techniques and strategies, designing and locating instructional materials, planning, implementing, and evaluating lessons and units.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 513(3) **Course ID:012293** **2017-07-13**
Curriculum and Methods of Teaching Languages
[Formerly EDS 513] Curricular Planning and Instruction for the Teaching of Second Languages at the secondary school level will include an analysis of secondary language curricula including New York State Frameworks for languages; instructional techniques; the teaching of speaking, listening, reading, and writing; designing and locating instructional materials; planning, implementing, and evaluating lessons and units. This course is based on a view of teaching and learning as facilitated by social interaction and that each individual brings unique background knowledge and beliefs to their learning.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 514(3) **Course ID:012294** **2017-07-13**
Curriculum and Methods of Teaching Sciences
[Formerly EDS 514] Curricular Planning and Instruction for the Teaching of Science at the secondary school level will include an analysis of secondary science curricula including New York State Frameworks for sciences; instructional techniques and strategies for teaching scientific concepts; laboratory methods and safety, designing and locating instructional materials; planning, implementing, and evaluating lessons and units.
Components: Laboratory, Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 515(3) **Course ID:012295** **2017-07-13**
Curriculum and Methods of Teaching Social Studies
[Formerly EDS 515] Curricular Planning and Instruction for the Teaching of Social Studies at the secondary school level will include an analysis of secondary social studies curricula including the New York State Frameworks for social studies; models and techniques for teaching and integrating the various social sciences; designing and locating instructional materials; planning, implementing, and evaluating lessons and units. This course is required for MAT social studies candidates.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 516(3) **Course ID:012296** **2017-07-01**
Curriculum and Methods of Teaching Technology
[Formerly EDS 516] Designed for those with a technology or engineering background, this course will help prepare technology educators to promote students’ learning by the use of multiple instructional models. The course builds teacher skills in lesson planning, content organization, and hard and software evaluation and use. New York State Standards for technology and evolving approaches to integration of technology in the teaching/learning process will also be explored.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 517(3) **Course ID:012927** **2019-02-11**
Curriculum and Methods of Teaching Business and Marketing
The primary objective of this class is to prepare you to teach business and marketing subjects at the 7th - 12th grade levels. This field includes, but is not limited to, accounting, marketing, finance, information systems, data analysis, and keyboarding. The class emphasizes methodology, curriculum planning, unit and lesson planning, and classroom management. It is assumed that students will be able to apply business and marketing subject matter knowledge to their new learning in the field of pedagogy.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ED 518(3) **Course ID:013013** **2020-01-15**
Curriculum and Methods of Teaching Computer Science
Designed for those with a computer science background, this course will help prepare computer science educators to promote students' learning by the use of multiple instructional models. The course builds teacher skills in lesson planning, content organization, and hard and software evaluation and use. New York State Standards for technology and evolving approaches to integration of technology in the teaching/learning process will also be explored.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ED 526(3) **Course ID:013111** **2022-04-08**
Teaching in American Schools
Students will become familiar with American public secondary education through reading, discussion, writing, and on-site school observation. A strong emphasis will be on professional writing, reading, and professional communication skills as required by American teachers. Students will be prepared professionally and culturally to enter the public school classroom.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

ED 540(3) **Course ID:012301** **2017-07-13**
Psychology of Teaching
[Formerly EDS 540] The Psychology of Teaching is a foundational introduction to teaching: audience, planning, instruction, basic concepts, standards, classroom management, assessment, motivation, discipline, and ethical and professional considerations. Theories of learning and memory applied to instruction; models and research on teaching in secondary schools. Includes thematic analysis of relevant teaching topics such as special needs, differentiated instruction, human development, and foundations of education.

In Psychology of Teaching Microteaching Laboratory graduate students prepare and present several lessons using a variety of instructional models. Models include anticipatory sets, discussion concepts, skills and inquiry with attention paid to themes such as special needs, differentiated instruction, literacy, second language, learners and service learning. Lessons are digitally recorded and critiqued by peer-coaches and
Components: Laboratory, Lecture
Attributes: Offered Summer Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 541(3) **Course ID:012303** **2017-07-13**
Essential Reading Literacy
[Formerly EDS 541] Essential Reading Literacy focuses on a teacher-centered exposure to the basic concepts, skills, and contexts for teaching reading in secondary classrooms. Teachers of the 21st century face many challenges, including the large spectrum of reading abilities in their classrooms. Graduate students will be exposed to the concept of adolescent literacy and basic principles of teaching it, including reading habits, skills, extensive knowledge of the reading process, and the development of a repertoire of strategies and skills to help influence and improve the teaching of reading in all classrooms across all disciplines.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 542(3) **Course ID:013128** **2021-09-28**
MAT Preservice Seminar
This course is designed for students who have completed ED 540/41 and are preparing to enter fall teaching residencies in a subsequent school year. In this course, students will gain an understanding of standards-based instruction and best practices in the classroom. Topics including backward design, learning objectives, assessment and differentiation will be reviewed in the framework of modern pedagogical theory. Students will design and peer-review lesson plans for upcoming teaching lab enactments, as well as debrief and revise plans for future instruction. Students will be introduced to academic writing styles employed in reflective journaling and EdTPA writing.
Components: Lecture
Req. Designation: Technology

ED 544(3) **Course ID:012304** **2022-04-08**
Literacy for the Content Classroom
[Formerly EDS 544] This course familiarizes MAT students with the necessity for and techniques of increasing student literacy (skills, attitudes, and dispositions) in each content area. Participants read background information, explore their own literacy skills, and practice applying reading and writing activities in lesson plans. Students will recognize the importance of literacy in all content areas; expand their definitions of literacy, exploring the skills and dispositions which make it possible for students to read and write for meaning for a wide variety of academic and personal purposes; explore and develop their own skills as proficient readers and writers in general and in their chosen content areas; become aware of issues of literacy through readings and discussions; become aware of how the kinds of writing assigned to students shape their thinking; develop, analyze, and integrate literacy skills in classroom lessons; integrate writing into classroom lessons in a variety of ways to stimulate and shape thinking; address NYS standards and CCSS
Components: Seminar
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 550(3) **Course ID:012305** **2021-11-17**
Effective Teaching for All Learners
[Formerly EDS 550A] Effective Teaching for All Learners at the secondary level will explore teaching and assessment for the full range of students a teacher encounters: at-risk students, special needs populations, English as a new language learners, struggling readers, disaffected learners, etc. The resources and strategies available to assist classroom teachers will be discussed and implemented. Graduate students will learn how to evaluate the effectiveness of their teaching as it relates to all their students' progress. In order to gain this understanding, graduate students will evaluate various learning assessments through the lens of different student populations, and design and evaluate a range of assessments. Awareness, empathy, and empowerment are the goals for both teachers and their students.
Components: Seminar
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 551(4) **Course ID:012309** **2022-04-08**
Teaching Residency I
[Formerly EDS 551] The 4-credit internship begins after the Intern completes the New York State required Field Experience or Practicum. The Intern will have been observing and co-teaching with his/her Mentor since the beginning of the school year to fulfill part of the requirements of the Practicum. Once the requirements of the Practicum are completed, the Intern is expected to gradually assume responsibility for two of the mentor’s classes, at first co-teaching with the Mentor, but independently by mid-November if prepared to do so. A full-year intern is in school for a minimum of half of the school day.
Components: Field Studies
Attributes: Offered Each Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 552(4) **Course ID:012310** **2021-10-08**
Teaching Residency II
[Formerly EDS 552] The 4-credit internship begins after the Intern completes the New York State required Field Experience or Practicum. The Intern will have been observing and co-teaching with his/her Mentor since the beginning of the school year to fulfill part of the requirements of the Practicum. Once the requirements of the Practicum are completed, the Intern is expected to gradually assume responsibility for two of the mentor's classes, at first co-teaching with the Mentor, but independently by mid-November if prepared to do so. A full-year intern is in school for a minimum of half of the school day.
Components: Field Studies
Attributes: Offered Spring Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

ED 553(4) **Course ID:013118** **2021-08-06**
Teaching Residency III
This 4-credit residency is intended for an MAT student seeking additional certification. The Resident will be observing and co-teaching with their Mentor for half of a school year to fulfill the requirements of the Residency. The Resident is expected to gradually assume responsibility for two of the Mentor's classes, and will be evaluated using the residency pre-service assessment (RPA).
Components: Field Studies
Attributes: Given When Needed
Req. Designation: Technology

ED 560(3) **Course ID:012307** **2021-10-08**
The Modern Teacher
[Formerly EDS 550C] This course is designed to acquaint students with current school reform issues while exposing students to the large number of digital resources, websites, strategies, software and hardware that will help them in their classroom today.

Students will be able to:
-Analyze and evaluate the school reform movement from a historical perspective.
-Communicate more productively with students, parents and colleagues and streamline their digital workflow.
-Differentiate instruction within their class using digital means and modern pedagogy.
-Work cooperatively to teach their classmates about school reform and technology.
-Design a school reform proposal using digital means.
Components: Seminar
Attributes: Offered Spring Term
Req. Designation: Technology

ED 570(3) **Course ID:012313** **2017-07-13**
Middle School Students, Structures and Standards
[Formerly EDS 570] This course is designed to prepare students for the teaching of grades 5 and 6. It is designed to offer students a chance to explore topics and methodology that are most appropriate for the teaching of students at the middle adolescence level. It is a course based on the theoretical and practical aspects of the teaching experience and on helping develop students into what we need today: competent, energetic and dedicated teachers at the middle level. This is a professional course which demands professional responsibility, a regular commitment, initiative and attentiveness. It is not in any way an exploratory course but one in which a commitment to teaching is assumed. This course and ED 571 qualify students with a grade 7-12 teaching certificate to be also certified to teach grades 5 and 6 in New York State.
Prerequisites: Adolescent 7 – 12 Teacher Certification in a content area.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 571(3) **Course ID:012314** **2017-07-13**
Middle Adolescence Literacy
[Formerly EDS 571] This course is designed to prepare you to teach and develop literacy skills across the curriculum in grades 5 and 6. Completion of this course and ED 570 will qualify you with a grade 7-12 teaching certificate for additional certification in your content area in grades 5-6 in New York state. This course is based on both theoretical and practical aspects of the teaching experience. Students will review research, policy briefs and position statements on developing reading, writings, listening, speaking, viewing, and thinking as it applies to the middle adolescent level. The overall goals of this course will require you to connect, collaborate, and create to expand your concept of literacy; to understand the elements of effective literacy instructions in your content area for grades 5 and 6; and to acknowledge your role as a ""reading teacher"" no matter what your content area specialty is.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

ED 572(3) **Course ID:012797** **2017-07-01**
Teaching Foreign Language to Elementary School Children
This course aims to prepare participating teachers for elementary school foreign language classrooms in light of the ACTFL National Foreign Language Standards. Through discussion, practice and the development of thematic units, participants will become familiar with the process of curriculum development and lesson planning, and will develop strategies for instruction and assessment. Participants will also gain understanding of the working environment and classroom culture of the elementary school setting and build up skills for effective teaching. Multiple modes of learning, methods, instructional strategies, language and literacy development, and resources for teaching foreign languages to elementary school children will be covered. Emphasis is on the development of literacy and communicative skills. Participants will build knowledge and understanding of this grade range through the viewing and analysis of classroom video.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

ED 573(3) **Course ID:013036** **2020-04-01**
Virtual Learning in the P-12 Classroom
In this online class, educators will learn how to shift course interaction and materials from the classroom to an online setting. We will explore elements that create quality online instruction including personalization, communication options and processes, student interactions, and a variety of learning experiences. The course will empower educators to build opportunities for their students to actively interact with each other, with their teacher(s), and with the content of the course.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ED 580(3) **Course ID:012715** **2021-07-28**
Action Research Project
The MAT Action Research Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

ED 590(1) **Course ID:012853** **2017-11-15**
Inquiry Research and Methods
Students will engage in inquiry through the investigation of documents and research-based methodologies. Focus will be placed on practical applications of materials in the full-year residency.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 610(3) **Course ID:012316** **2020-04-07**
Reflective Teaching Practices
Reflective Teaching Practices is designed to teach participants how to become reflective practitioners of their own teaching. Participants will be immersed in an exercise in evaluating their own professional practice with the goal of improving student learning. This will be accomplished by creating a supportive learning environment with teacher colleagues who wish to accomplish the same goal. Participants will critically discuss their teaching practice, and critique each other's practice through the use of videotapes. Participants will demonstrate an embodiment of the National Board for Professional Teaching Standards through the work they bring to the seminar and the manner in which they critique their own and other participants' work.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ED 624(3) **Course ID:012321** **2020-06-05**
School Law
This course is designed to teach the basic tenets of education law – state and federal. Constitutional principles will be explored and debated. The Socratic Method will engage students, creating a learning community in each class. Given the seminar nature of the class, it is expected the professor will explain a concept and engage students in-depth discussions every day. Real life experiences will bring the law to a practical, manageable level. This culture will allow students to challenge presumptions, question reasoning and debate ideas to grasp longstanding and newly formed legal concepts. Students will hone critical thinking and writing skills completing the course equipped to analyze problems and synthesize solutions in practical ways, with the law as their guide.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ED 649(3) **Course ID:013108** **2021-04-27**
Research in Curriculum & Instruction
This course is an introductory course on research methods, designed to prepare students for graduate level research. The course examines the full scope of the research process from the literature review, to research questions, and writing a research proposal. Different data collection methods will be discussed including qualitative, quantitative, mixed-method, meta-analysis, ethnography, case study, survey, interview and focus group, and document analysis. The course culminates with presentations by students which demonstrate an understanding of the research proposal process.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

ED 650(3) **Course ID:013109** **2021-08-06**
Master's Thesis I
Candidates will work toward completing a master's thesis in the Spring semester, individually with guidance from a thesis advisor. The thesis will include an Introduction (Chapter I) and Literature Review (Chapter II). This course will provide guidance to complete a systematic exploration. Candidates will produce Chapters I and II by developing a research question, investigating current research, developing an informed hypothesis in response to their question, and reviewing and synthesizing related research. Candidates will begin to draft their Methodology or Application Plan (Chapter III) by creating a plan to test their hypothesis or engage in further inquiry into their topic.
Components: Thesis Research
Attributes: Given When Needed
Req. Designation: Technology

ED 651(3) **Course ID:013110** **2021-08-06**
Master's Thesis II
In this course and its predecessor, ED 650, candidates will work toward completing a master's thesis. Work will be completed individually with guidance from a thesis advisor. Candidates will continue work begun in ED 650 by creating the final chapters of their thesis and presenting their completed work to their advisors/thesis committee. Coursework will focus on creating a Methodology or Methods of Inquiry (Chapter III), Results (Chapter IV), Discussion and Conclusion (Chapter V) and preparing a presentation of the Master's thesis.
Components: Thesis Research
Attributes: Given When Needed
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Education

ED 988(2) **Course ID:013120** **2022-01-03**
Independent Study in Education
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

ED 989(2) **Course ID:013121** **2022-03-18**
Independent Study in Education II
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 1(2 - 4) **Course ID:008103** **2015-01-13**
Electrical and Computer Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

EE 2(2 - 4) **Course ID:009665** **2016-07-01**
Electrical and Computer Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

EE 211(3) **Course ID:008104** **2020-06-01**
ECE Laboratory I
An introductory course that presents the fundamentals of electrical instrumentation while developing laboratory skills. Experiments explore basic electrical properties of analog and digital circuits. The development of sound techniques for circuit construction and troubleshooting are emphasized, as is the role of the computer in a laboratory environment. Use of CAD/CAE tools such as Pspice and LabView is integrated into the course. Lab safety and the documentation and reporting of laboratory results are covered.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Corequisite: EE221. Prerequisites: ES250 and EE264.
Req. Designation: Technology

EE 221(3) **Course ID:008105** **2019-11-19**
Linear Circuits
Steady state response of linear circuits to both sinusoidal and periodic inputs. AC steady-state power. Magnetically coupled circuits. Network functions, transfer functions, gain and phase shift. Bode plots. Fourier series. Laplace transform. The relationship between the time and frequency domain solutions.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES250.
Req. Designation: Technology

EE 260(3) **Course ID:008108** **2020-09-03**
Embedded Systems
An introductory course covering the fundamentals of microcontroller hardware and software. Topics include microcontroller systems, input/output (I/O) standards and data communication protocols, interfacing with memory systems and sensors, data collection, display, and control of peripheral modules and actuators. The microcontroller will be programmed in the C programming language. Interfacing assembly language to high level language code will be treated as well. A comprehensive term project will allow student teams to apply the theoretical concepts for solving a practical problem using a microcontroller and peripheral devices.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: CS141
Req. Designation: Technology

EE 261(3) **Course ID:008109** **2014-11-19**
Introduction to Programming and Software Design
A first course in programming and software design. Assumes no prior programming experience. The focus is upon the design of well-structured programs using problems selected from engineering applications. Topics include: fundamentals of software engineering design; elements of modern C-family programming language (such as Java, C, or C++); object oriented programming; the specification, design and implementation of numerical algorithms.
Components: Laboratory, Lecture
Course Equivalents: CS 141
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 262(3) **Course ID:008110** **2018-01-29**
Intro to Object-Oriented Programming and Software Design
A thorough introduction to Object Oriented Programming, including classes, inheritance and subtyping, overloading, and overriding. Dynamic memory management. Debugging. Introduction to Testing Driven Development. Introduction to fundamental data structures.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CS141
Req. Designation: Technology

EE 264(3) **Course ID:008111** **2019-11-19**
Introduction to Digital Design
An introductory course covering the fundamentals of computer system hardware. Topics include data representation using number systems and codes, Boolean algebra and logic, digital logic devices, combinational and sequential circuits, arithmetic logic units and simple processor organization including registers, memory, addressing and processing of machine instructions.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

EE 291(1 - 3) **Course ID:008112** **2015-02-03**
Special Project in Electrical and Computer Engineering
Students are involved, individually or working in groups on a special project under the direction of a faculty member. Topics are ordinarily suggested by the faculty member. These projects are limited in scope, ordinarily not requiring a degree of expertise beyond the sophomore year. Not to be used as a professional elective in the Electrical Engineering program or in the Computer Engineering program.
Prerequisites: consent of the department chair.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

EE 301(2 - 4) **Course ID:008113** **2015-08-18**
ECE Area Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy an Area Elective.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EE 311(3) **Course ID:008114** **2015-02-19**
Electrical Engineering Laboratory II
This laboratory course provides students with a series of experiments based on material in required sophomore and junior level courses. The experiments are designed to emphasize model identification, validation, and use. The course includes one or more design projects which include team oriented design, development, testing, and documentation components.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

EE 316(3) **Course ID:008115** **2019-11-20**
Computer Engineering Junior Laboratory
A design laboratory in computer engineering emphasizing the fundamentals of designing and testing computer system components. Sub-system level digital circuits are designed, constructed, and tested using standard small- and medium-scale integrated circuits and programmable logic devices. Software components which interface with hardware and operating systems are also designed, written and tested. All design projects employ a team based approach.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: EE365. Corequisite: EE211.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 321(3) **Course ID:008116** **2019-06-07**
Systems and Signal Processing
Characterization, classification and representation of signals and systems. Convolution. Fourier transforms. Discrete time systems and z transforms. Sampling theorem. Stability.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

EE 324(3) **Course ID:008107** **2021-10-13**
Dynamical Systems
[Cross-listed with AE/ME 324] Dynamic systems classification, mathematical modeling of mechanical, electrical and mixed dynamic systems, state space representation, equilibrium points and linearization, solution of linear input/output and state equations, Laplace transforms, transfer functions and block diagrams, first and second order systems, stability, frequency response and simulation techniques.
Components: Lecture
Course Equivalents: ME 324
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: MA232.
Req. Designation: Technology

EE 331(3) **Course ID:008118** **2015-02-19**
Energy Conversion
Properties of magnetic materials. Magnetic circuits and transformers. Fundamentals of rotating magnetic-field machines. Synchronous machines. Induction machines. Phasor diagrams and equivalent circuits of transformers, induction machines and transformers. DC machines.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: ES250.
Req. Designation: Technology

EE 333(3) **Course ID:008119** **2015-01-20**
Power System Engineering
Transmission line and transformer models. Per unit. Power transfer equations and their solution and interpretation. Maximum power transfer. Symmetrical components and fault current calculation. Computer analysis methods for power systems.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EE221.
Req. Designation: Technology

EE 341(3) **Course ID:008121** **2015-02-19**
Microelectronics
Theory of semiconductor materials, p-n junctions, bipolar and field effect transistors. Analysis of device characteristics, device modeling and equivalent-circuits. PSpice simulation of electronic circuits. Applications including study of biasing, low frequency amplifiers, switching circuits and digital logic operations.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES250.
Req. Designation: Technology

EE 360(3) **Course ID:008126** **2015-01-20**
Microprocessors
An introductory course covering the fundamentals of microcomputer hardware and software. Topics include microprocessor system hardware, assembly language programming, input/output devices and bus discipline. Memory systems, serial interfacing, and interfacing assembly language to high level language code will be treated as well.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: EE264.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 361(3) **Course ID:008127** **2018-12-12**
Fundamentals of Software Engineering
This is a foundation course in the design of computer software. It covers fundamental techniques and methodologies for software design and implementation. Topics include the software engineering life cycle, object-oriented design, data and procedural abstraction, recursion, iteration, file I/O, and elementary data structures.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite:EE262 Introduction to Object Oriented Programming and Software Design
Req. Designation: Technology

EE 363(3) **Course ID:008128** **2018-12-11**
Software Components and Generic Programming
This course is concerned with software design principles that foster creation of reusable software components. Topics include abstract data types, behavioral inheritance and subtyping, generics, interface design, dependency injection, and analysis of algorithmic behavior. Students will gain experience with software development best practices including design of test scenarios, unit testing, code reviews, refactoring and version control in the context of a modern integrated development environment.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: EE262 Introduction to Object Oriented Programming & Software Design
Req. Designation: Technology

EE 365(3) **Course ID:008130** **2015-02-19**
Advanced Digital Circuit Design
An advanced course in digital circuit design. This course begins with an overview of electrical characteristics of logic gates, various standards for I/O buses and communication interfaces. Topics include hierarchical and modular design of digital logic circuits, simulation and synthesis of digital systems on programmable logic devices using computer-aided design software, and debug and verification of design using embedded and standalone logic analyzers.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: EE264 or equivalent.
Req. Designation: Technology

EE 368(3) **Course ID:008131** **2015-01-20**
Software Engineering
Study of the principles and practices of software engineering. Topics include software quality concepts, process models, software requirements analysis, design methodologies, software testing, and software maintenance. Hands-on experience building a software system using the waterfall life cycle model and CASE tools. Students working in teams develop all life cycle deliverables: requirements document, specification and design documents, system codes, and user manuals.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CS344 or EE363 and CS242 or EE408.
Req. Designation: Technology

EE 381(3) **Course ID:008133** **2014-12-05**
Electromagnetic Fields and Waves
Review of electrostatics and the steady magnetic field. Stokes' theorem and the divergence theorem. Time varying fields and Maxwell's equations. Uniform plane wave propagation; reflection and refraction of plane waves. Transmission lines. Introduction to radiation theory.
Components: Lecture
Requirement Group: Prerequisites: MA231 and PH132.
Req. Designation: Technology

EE 400(3) **Course ID:013072** **2020-11-03**
Biomedical Engineering Fundamentals
Cross-listed with BR 400, BY 440, ES 402] This interdisciplinary course will introduce students to basic principles of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medicine and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal and image processing, biomechanics, and biomaterials.
Components: Lecture
Requirement Group: Prerequisites: MA131/132, PH131/132, junior or senior standing.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 401(3) **Course ID:008134** **2016-09-23**
Digital Signal Processing
An introduction to discrete-time signal processing. Topics include: A review of orthogonality, Fourier series, Fourier transforms and sampling theory. Smoothing, interpolation, D/A conversion. Digital filters, windows. Design of nonrecursive filters, recursive filters. Correlation and spectra of random signals, spectral estimation.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: EE321.
Req. Designation: Technology

EE 402(3) **Course ID:013100** **2021-03-26**
Machine Learning on Biomedical Signals
[Crosslisted with EE502] Machine learning methods and their application to the analysis and processing of biomedical signals. Topics include a review of ECG, EMG, EEG, and other biomedical signals. Acquisition of biomedical signals and filtering, spectral analysis, characteristic feature extraction and selection, and dimensionality reduction. In addition, basic classification methods such as LDA, Decision tree, Naïve Bayes, KNN and Support Vector Machines will be studied. Basic regression analysis on biomedical signals for the prediction task will be covered. (Odd Fall)
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisites: MA132, and BR400 or equivalent or instructor approval
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 407(3) **Course ID:008136** **2015-08-15**
Computer Networks
[Cross-listed with CS 455] This course covers layered networking protocols with an emphasis on common Internet protocols such as TCP, IP, HTTP, and SMTP. It also covers local area networking, focusing on link layer standards such as the IEEE standards for Ethernet and wireless. Additional topics such as security and congestion control will also be covered. EE407 and CS455 are offered each fall as one course with multiple listings.

Components: Laboratory, Lecture
Course Equivalents: CS 455
Requirement Group: Prerequisites: One of course in computer architecture (EE264, CS241 or IT502 or equivalent). One cours

Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 408(3) **Course ID:008137** **2019-04-09**
Software Design For Visual Environments
This course is an introduction to object-oriented, event-driven windowing environments. The primary focus will be interface design and development, with an emphasis placed on the event-driven paradigm. Topics will include: a thorough investigation of the underlying windowing framework selected, an examination of static and dynamic control objects used for system input and output, virtual functions, multithread programming, code synchronization and locking, and resource sharing. Several programming projects will be assigned throughout the semester.

Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: EE262.
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 410(3) **Course ID:010603** **2016-01-13**
Computer and Network Security
[Cross-listed with CS 457] Attacks on networked computer systems are an increasingly important problem. This course covers the types of vulnerabilities that are present in modern computer systems and the types of malicious software that exploit these vulnerabilities. It also covers best practices for preventing, detecting and responding to such attacks including anti-virus software, defensive programming techniques, intrusion detection systems, honeypots and firewalls.
Prerequisites: A general course in computer networking such as CS455/555 or EE407/507. Programming experience to the level of CS142 or EE361.
Components: Lecture
Course Equivalents: CS 457, CS 557, EE 510
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 412(3) **Course ID:008138** **2015-02-03**
Senior Design
A series of one or more design projects. Projects typically involve planning, analysis, preliminary design, simulation, construction, testing and evaluation, documentation, class demonstrations and oral presentations. The thrust of this course is to provide the student with an opportunity to develop a complete solution to one or more design problems and to develop broad engineering skills, including communication skills.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Each Term
Requirement Group: Prerequisite: EE311.
Req. Designation: Technology

EE 416(3) **Course ID:008139** **2020-04-20**
Computer Engineering Senior Laboratory
In conjunction with EE464, students develop specifications for design, build, test, debug and document a complete digital system based on an embedded microcomputer and supporting integrated circuits.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisite: EE316 and EE260 Corequisite: EE464
Req. Designation: Technology

EE 418(3) **Course ID:008140** **2015-02-19**
Software Engineering Senior Design
Working in a team environment, students will design and develop a complex software system. Using sound software engineering techniques, the students will take a conceptual idea for a software system and turn it into a well-engineered product.
Components: Lecture
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: EE368 and EE462. Corequisite: EE408.
Req. Designation: Technology

EE 422(3) **Course ID:012876** **2018-04-11**
Signal Processing and Applications
This project-driven course involves qualitative and quantitative descriptions of DSP algorithms, software and applications. The class covers applications in engineering, computing, music, and the arts, with MATLAB, Java and mobile simulations.
Components: Lecture
Course Equivalents: ES 522, ES 422
Attributes: Offered Even Falls
Requirement Group: Prerequisites: MA132 or equivalent, or instructor approval.
Req. Designation: Technology

EE 423(3) **Course ID:012121** **2015-10-08**
Introduction to Biometrics
Biometrics is the automated recognition of an individual based on their physiological or behavioral characteristics. This course is an introduction of fingerprint, face, voice, and iris recognition, as well as related aspects of system design, security, privacy, performance evaluation, and novel biometric modalities.
Components: Discussion, Lecture
Course Equivalents: EE 523
Attributes: Offered Spring Term
Req. Designation: Technology

EE 430(3) **Course ID:008141** **2014-12-05**
High-Voltage Techniques and Measurements
Generation of high-voltage AC, DC and impulse. High-voltage dielectric loss measurements. Discharge measurements. High-voltage insulation problems.
Components: Lecture
Req. Designation: Technology

EE 431(3) **Course ID:008142** **2015-02-19**
Power Transmission and Distribution
Unbalanced fault current calculation, current and voltage transformer characteristics. Distribution system protection, transmission line protection. Generator, bus and transformer protection. Power system controls. Transient stability.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: EE331
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 438(3) **Course ID:010410** **2015-02-23**
Alternate Energy Systems
[Cross-listed with ES 438] The basic technology of emerging renewable or non-carbon based energy sources will be considered, and contrasted with traditional sources of energy. Topics will include photovoltaic, wind and others. The impacts of energy storage and electrified transportation will be discussed. The capability of these technologies will be assessed, and barriers to implementation will be explored. The role of the electric power grid in enabling alternate energy technologies will be covered.
Components: Lecture
Course Equivalents: EE 538, ES 438
Attributes: One Design Credit, Offered Even Springs
Requirement Group: Prerequisite: ES250 or permission of the instructor.
Req. Designation: Technology

EE 439(3) **Course ID:008147** **2015-01-29**
Dielectrics
Dielectric properties of materials and polarization models. Complex permittivity and relaxation spectra. Electric breakdown in gases, liquids and solids.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

EE 441(3) **Course ID:008148** **2020-03-20**
Electronic Devices
[Cross listed with EE541] Study of modern electronic devices, p-n junctions, bipolor junction transistors (BJTs) and metal-oxide-semiconductor field-effect transistors (MOSFETs), for integrated circuit applications. SPICE device models are introduced, and several SPICE simulation projects are given for integrated circuit design and analysis. This course provides a foundation for understanding SPICE device models and the basics of the microelectronic technology.
Components: Lecture
Course Equivalents: EE 541
Attributes: Offered Even Falls
Requirement Group: Corequisites: ES241 or EE341 or equivalent.
Req. Designation: Technology

EE 442(3) **Course ID:011145** **2020-03-20**
CMOS IC Design
An introduction to CMOS integrated circuit design and simulation. Students will learn CMOS device models and study design, simulation and layout of digital CMOS integrated circuit blocks.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: EE264. Corequisite: EE341.
Req. Designation: Technology

EE 443(3) **Course ID:012754** **2016-09-23**
Semiconductor Material and Devices for Engineers
[Cross-listed with EE544] Fundamentals of quantum mechanics, energy band concept in crystalline materials, band structure modeling, band structure modification, semiconductor device physics, carrier recombination processes, carrier transport phenomena, lattice vibrations, advanced concepts in quantum device technology.
Components: Lecture
Course Equivalents: EE 544
Attributes: Offered Spring Term
Req. Designation: Technology

EE 450(3) **Course ID:008152** **2014-11-19**
Control Systems
[Cross-listed with ME 450] Introduction to the analysis and design of continuous-time feedback control systems. Topics include: mathematical representation of physical systems with linear differential equations, Laplace transforms, transfer functions, block diagrams and signal flow graphs, feedback, sensitivity, transient specifications, steady-state tracking errors, stability, root locus plots, compensator design, simulation.
Components: Lecture
Course Equivalents: ME 450
Requirement Group: Prerequisites: AE/EE/ME324 or Corequisite: EE321.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 451(3) **Course ID:008153** **2015-01-20**
Digital Control
Introduction to the analysis and design of discrete-time feedback control systems. Topics include: mathematical representation of physical systems with linear difference equations, z-transforms, transfer functions, sampling, A/D and D/A converters, sampled-data systems, discrete equivalent systems, transient specifications, steady-state tracking errors, stability, controller design, quantization effects.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EE321.
Req. Designation: Technology

EE 452(3) **Course ID:011741** **2015-02-19**
Optimization Techniques in Engineering
Introduction to optimization techniques in engineering. Topics include: engineering applications of optimization, types of optimization problems, linear programming and the simplex method, one-dimensional optimization, unconstrained nonlinear programming, nonlinear programming with equality and inequality constraints, advanced optimization techniques, practical aspects of optimization.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: MA339 or equivalent or consent of instructor.
Req. Designation: Technology

EE 455(3) **Course ID:012847** **2018-01-01**
Robotics I
[Cross-Listed EE555] The course presents an introduction to the fundamentals of mobile robotic systems including common mechanical configurations with sensors and actuators, as well as the typical sensory, perceptual, and cognitive layers that comprise the field of study. Topics explored will include: Mobile Robot Locomotion (e.g., Legged, Wheeled, and Aerial), Mobile Robot Kinematics (e.g., Models and Constraints, Maneuverability, Workspace Analysis, and Motion Control), Mobile Robot Perception (e.g., Exploration of Sensors, Fundamentals of Computer Vision, Fundamentals of Image Processing, Feature Extraction, and Place Recognition), Mobile Robot Localization (e.g., Noise and Aliasing, Localization-Based Navigation, Map Representations, Probabilistic Map-Based Localization and Autonomous Map Building), and Planning and Navigation (Path Planning, Obstacle Avoidance, and Navigation Architectures). Throughout the course, students will work in teams with a supplied robotics kit of parts to design and implement a mobile robot
Components: Lecture
Course Equivalents: EE 555
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EE321, EE/ME324, or MA339; or instructor permission
Req. Designation: Technology

EE 456(3) **Course ID:012863** **2018-02-26**
Robotics II
The course presents an introduction to the fundamentals of industrial robotics. Topics explored will include: Robotic manipulation, direct kinematics, inverse kinematics, workspace analysis and trajectory planning, differential motion and statics, manipulator dynamics, robot control, robot vision and task planning. Throughout the course, students will work in teams with a supplied robotics kit of parts and appropriate software tools to design and implement a robot manipulator that demonstrates various aspects of the course applied to a real-world problem.
Components: Lecture
Course Equivalents: EE 556
Attributes: Offered Fall Term
Req. Designation: Technology

EE 462(3) **Course ID:008155** **2015-01-20**
Software System Architecture
A study of system software components in the context of a modern operating system such as UNIX, together with the necessary tools and utilities for software development. Topics will include software development tools, operating system interfaces and utilities, and network access methods. Emphasis will be placed on conceptual understanding and practical use of system software components rather than on detailed implementation.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 464(3) **Course ID:008156** **2020-04-20**
Digital Systems Design
A study of embedded microcomputer system design. Topics include CPU architecture, memory organization, interrupts, real-time operation, and interfacing with a wide range of external devices. Practical problems in digital design, testability, hardware and software trade-off analysis are covered. In addition to the technical topics, students develop teamwork skills, learn project management, system specification and documentation. Each student does both significant written documentation and oral presentations of his or her work. This course and the senior lab (EE 416) together provide both the conceptual knowledge and practical skills necessary to design application-oriented digital systems.

Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: EE316 and EE260 Corequisites: EE416
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 465(3) **Course ID:008157** **2017-01-24**
Computer Graphics
[Cross-listed with CS 452] An introduction to computer graphics. Graphics hardware, algorithms for generating and displaying two and three-dimensional geometric figures, animation, interactive displays. Programming projects using OpenGL will be assigned.
Prerequisites: Programming experience in C/C++ family language, basic concepts in linear algebra and matrices.

Components: Lecture
Course Equivalents: CS 452
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CS142 or EE361, and MA232 or MA239 (or MA339 as a corequisite)
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 466(3) **Course ID:008158** **2019-11-19**
Computer Architecture
A study of modern processor system architecture including set design and performance enhancement of computer systems will be discussed. Topics include pipelining, cache organization, memory management, and multiprocessors. Tradeoffs in system design and the impact of hardware/software interactions will be discussed.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: EE264.
Req. Designation: Technology

EE 468(3) **Course ID:008159** **2014-11-20**
Database Systems
[Cross-listed with CS 460] An introduction to database systems. The entity-relationship and relational models are presented and applied to the design of typical databases. New developments in object-oriented and multimedia databases are presented. Emphasis will be placed on database design for applications in the context of an existing database management system such as ORACLE or ACCESS.
Components: Lecture
Course Equivalents: CS 460
Attributes: Offered Spring Term
Requirement Group: Prerequisites: Programming experience in a high-level language
Req. Designation: Technology

EE 469(3) **Course ID:012932** **2019-03-05**
High Performance Computing
Principles and practices of high-performance computing (HPC) programming, associated computer architectures, and techniques for computing performance optimization. Topics include concepts of parallel and distributed computing, multicore CPU architecture, POSIX threads programming, OpenMP (Open Multi-Processing), GPGPU (General purpose GPU) architecture, NIVIDIA CUDA programming, computer cluster management system, MPI (Message Passing Interface) programming, and case studies regarding large-scale engineering applications through HPC and computing performance improvement. Hands-on assignments utilizing Linux based open source tools and compilers will be assigned. Students must have basic C/C++ programming skills to enroll. Suitable for junior and senior undergraduate and graduate students in all engineering and computer science majors.
Components: Lecture
Course Equivalents: EE 561, EE 519
Attributes: Given When Needed
Requirement Group: Prerequisites: EE262 or CS142, or consent of instructor.
Req. Designation: Technology

EE 470(3) **Course ID:008132** **2021-12-28**
Coding and Info Transmission
Error detecting and error correcting codes. Encoding of signals and data compression. Huffman codes. Concepts of information. Limits on attainable data compression. Limits on data rates for reliable or errorless transmission.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisite: STAT389
Req. Designation: Technology

EE 471(3) **Course ID:008161** **2021-12-28**
Principles of Digital and Data Communications
Amplitude modulation, double and single sideband, quadrature AM. Frequency and phase modulation. Stationary and ergodic random processes, correlation and spectral density. Noise models, filtering of random signals. Data transmission, frequency and phase shift keying, pulse amplitude modulation, pulse shaping, partial response signaling, channel equalization. Threshold decision receivers. Pulse code modulation, quantization, digital transmission lines.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Corequisite: STAT389
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 485(3) **Course ID:011169** **2014-11-20**
Neural Engineering
[Cross-listed with BY 485, ES 485, EE 585] This course applies engineering principles to the study of neuroscience and to the design of devices or techniques intended to replace missing or augment existing functions such as seeing, hearing, speaking, and walking. The course provides a detailed overview of sensorimotor systems, neurophysiology, neuroanatomy, neuropathology and clinical neurology. The class sequences through the various sensory and movement systems, providing a quantitative basis for how the nervous systems works for these systems, for how it dysfunctions, for the disability produced, and finally for how function can be restored by neuroprostheses. Students will prepare and present a paper on a neural engineering topic.
Components: Lecture
Course Equivalents: EE 585, BY 485, ES 485
Requirement Group: Prerequisites: MA132 and PH132 or PH142.
Req. Designation: Technology

EE 491(1 - 3) **Course ID:008164** **2015-02-03** **Department Consent Required**
Directed Study in Electrical and Computer Engineering
Investigation of a special topic in consultation with a designated faculty member.
Components: Independent Study
Req. Designation: Technology

EE 501(3) **Course ID:008166** **2017-08-18**
Digital Signal Processing
An introduction to discrete-time signal processing. Topics include: A review of orthogonality, Fourier series, Fourier transforms and sampling theory. Smoothing, interpolation, D/A conversion. Digital filters, windows. Design of nonrecursive filters, recursive filters. Correlation and spectra of random signals, spectral estimation. Substantial in depth investigation of advanced topics will be required.
Prerequisite: EE321.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EE 502(3) **Course ID:008167** **2022-02-02**
Machine Learning on Biomedical Signals
[Cross listed with EE402] Machine learning methods and their application to the analysis and processing of biomedical signals. Topics include a review of ECG, EMG, EEG, and other biomedical signals. Acquisition of biomedical signals and filtering, spectral analysis, characteristic feature extraction and selection, and dimensionality reduction. In addition, basic classification methods such as LDA, Decision tree, Naïve Bayes, KNN and Support Vector Machines will be studied. Basic regression analysis on biomedical signals for the prediction task will be covered. (Odd Fall)
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

EE 503(3) **Course ID:012901** **2019-01-14**
Advanced Topics in Neuromorphic Computing
Neuromorphic Computing was originally referred to as the hardware that mimics neuro-biological architectures, and was then extended to the computing systems that can run bio-inspired computing models such as neural networks and deep learning networks. In this course, students will learn the basic knowledge of artificial neural networks and the advanced hardware architectures/systems for efficient neural network computing. We will emphasize both the basic knowledge and practical tricks through a series of hand-on practices including paper readings and projects.
Components: Lecture
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 505(3) **Course ID:008168** **2016-01-13**
Computer Graphics
[Cross-listed with CS 552] An introduction to computer graphics. Graphics hardware, algorithms for generating and displaying two and three-dimensional geometric figures, animation, interactive displays. Programming projects using OpenGL will be assigned. Students will be expected to independently explore some aspects of the course material.
Prerequisites: Programming experience in C/C++ family language, basic concepts in linear algebra and matrices.
Components: Lecture
Course Equivalents: CS 552
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Electrical & Computer Eng

EE 507(3) **Course ID:008170** **2015-08-15**
Computer Networks
[Cross-listed with CS 555] This course covers layered networking protocols with an emphasis on common Internet protocols such as TCP, IP, HTTP, and SMTP. It also covers local area networking, focusing on link layer standards such as the IEEE standards for Ethernet and wireless. Additional topics such as security and congestion control will also be covered. EE407 and CS455 are offered each fall as one course with multiple listings.
Prerequisites: One of course in computer architecture (EE264, CS241 or IT502 or equivalent). One course in computer programming (EE261, CS141 or equivalent.) Note: IT501 also satisfies the programming requirement.
Components: Laboratory, Lecture
Course Equivalents: CS 555
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 510(3) **Course ID:010604** **2015-08-15**
Computer and Network Security
[Cross-listed with CS 557] Attacks on networked computer systems are an increasingly important problem. This course covers the types of vulnerabilities that are present in modern computer systems and the types of malicious software that exploit these vulnerabilities. It also covers best practices for preventing, detecting and responding to such attacks including anti-virus software, defensive programming techniques, intrusion detection systems, honeypots and firewalls.
Prerequisites: A general course in computer networking such as CS455/555 or EE407/507. Programming experience to the level of CS142 or EE361.
Components: Lecture
Course Equivalents: CS 457, CS 557, EE 410
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 511(3) **Course ID:012016** **2014-12-05**
Wireless Sensor Networks
This course will present state-of-the-art wireless sensor networks. Both hardware and operating system considerations based on the OSI protocol stack will be covered. Clustering and localization techniques will be presented along with security threats and solutions. Various wireless senor network applications will be presented.
Prerequisites: EE408/CS455 Computer Networks or permission of the instructor.
Components: Lecture
Req. Designation: Technology

EE 519(3) **Course ID:012948** **2019-06-07**
High Performance Computing
Principles and practices of high-performance computing (HPC) programming, associated computer architectures, and techniques for computing performance optimization. Topics include concepts of parallel and distributed computing, multicore CPU architecture, POSIX threads programming, OpenMP (Open Multi-Processing), GPGPU (General purpose GPU) architecture, NIVIDIA CUDA programming, computer cluster management system, MPI (Message Passing Interface) programming, and case studies regarding large-scale engineering applications through HPC and computing performance improvement. Hands-on assignments utilizing Linux based open source tools and compilers will be assigned. Students must have basic C/C++ programming skills to enroll. Suitable for junior and senior undergraduate and graduate students in all engineering and computer science majors.
Components: Lecture
Course Equivalents: EE 561, EE 469
Attributes: Given When Needed
Requirement Group: Prerequisites: EE262 or CS142, or consent of instructor.
Req. Designation: Technology

EE 520(3) **Course ID:012790** **2017-02-06**
Data Driven Analysis of Complex Systems
The goal of this course will be an integration of concepts of complex systems with big data analysis. Methodology will be drawn from statistical and Bayesian analysis, time-frequency analysis, image processing, linear algebra and principal component analysis, machine learning and image recognition, dimensionality reduction for dynamical systems, system identification, data assimilation, compressed sensing, and equation free modeling. Applications may include PDEs such as advection diffusion from atmospheric data and also steady flow, networked and social data-sets, feature identification in neurological applications, music analysis and identification, and image denoising.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EE 522(3) **Course ID:011059** **2016-09-23**
Advanced Signal Processing with Biomedical and Other Applications
Statistical aspects of signal processing that includes such topics as: autocorrelation/crosscorrelation, autoregressive, moving average models, linear prediction, power spectral density, adaptive filers. Each student will utilize real data for an application from his/her research or data from a biomedical application can be provided. Each subject will be approached in three states: fundamental, advanced, and application. Class participation is critical through presentations which include: (1) journal papers for Advanced section, (2) results from their data for Application section, and (3) semester project results.
Prerequisites: Programming experience in C/C++ or Matlab, basic understanding of signal processing and probability.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisites: EE529 Recommended: EE401 or EE501
Req. Designation: Technology

EE 523(3) **Course ID:012122** **2015-10-08**
Introduction to Biometrics
Biometrics is the automated recognition of an individual based on their physiological or behavioral characteristics. This course is an introduction of fingerprint, face, voice, and iris recognition, as well as related aspects of system design, security, privacy, performance evaluation, and novel biometric modalities.
Components: Discussion, Lecture
Course Equivalents: EE 423
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 526(3) **Course ID:012096** **2016-09-23**
Detection and Estimation Theory
Combines the classical techniques of statistical inference and the random process characterization of communication, radar, and other modern data processing systems.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisites: EE529 or equivalent, or instructor approval Restriction: Admission to the graduate Elec

Req. Designation: Technology

EE 529(3) **Course ID:012090** **2015-04-29**
Stochastic Processes in Engineering
[Cross-listed as ME 529] Review of the theory of probability. Single and multiple random variables topics, such as distributions, moments, conditioning, central limit theorem, and Laws of Large Numbers. Stochastic processes. Stationary and nonstationary processes. Time averaging and ergodicity. Correlation and power spectrum. Langevin's equation and Markov processes. Poisson and Gaussian processes. Response of linear systems. Approximate methods for analysis of nonlinear stochastic equations Application to engineering problems, such as random vibrations, turbulence, estimation theory, signal detection, and others.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EE 530(3) **Course ID:008174** **2014-12-05**
High-Voltage Techniques and Measurements
Generation of high-voltage AC, DC and impulse. High-voltage dielectric loss measurements. Discharge measurements. High-voltage insulation problems.
Components: Lecture
Req. Designation: Technology

EE 531(3) **Course ID:008175** **2021-01-14**
Power System Planning
Long-term planning will identify a financially viable and physically feasible mix of resources, including traditional generation and transmission sources as well as advanced techniques such as renewable generation, demand response, and the microgrid, to enhance the overall reliability of power systems. This course will introduce the students generation and transmission expansion planning of a vertically integrated utility and in a competitive market.
Components: Lecture
Same As Offering: EE 531
Attributes: Given When Needed
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 531(3) **Course ID:008175** **2021-01-14**
Power System Planning
Long-term planning will identify a financially viable and physically feasible mix of resources, including traditional generation and transmission sources as well as advanced techniques such as renewable generation, demand response, and the microgrid, to enhance the overall reliability of power systems. This course will introduce the students generation and transmission expansion planning of a vertically integrated utility and in a competitive market.

Components: Lecture
Same As Offering: EE 531
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 532(3) **Course ID:008176** **2014-12-05**
Advanced Electric Machines and Drives
Development of state models of conventional and electronically controlled electric machinery and drive systems. Use of linear transformations in the development of dynamic models of synchronous, induction, permanent magnet, and other rotating machinery, as well as electronically controlled drive systems. Study of the dynamic and transient characteristics of these machinery and drive systems by computer-aided methods. Study of the effects of electronic power conditioning and associated harmonics on the design of these machinery systems, including nonlinearities.
Prerequisite: EE 331 (Energy Conversion) or equivalent
Components: Lecture
Req. Designation: Technology

EE 533(3) **Course ID:008177** **2016-07-12**
Operation and Control of Electric Power Systems
Course topics include: modeling of generators and transmission networks; security-constrained economic dispatch and security-constrained unit commitment formulations (linear programming and mixed-integer programming) and methodologies (dynamic programming, Lagrangian relaxation, and Benders decomposition); market clearing under different time scales; locational marginal price.
Prerequisite: EE 333 or equivalent.
Components: Lecture
Req. Designation: Technology

EE 536(3) **Course ID:008173** **2022-01-04**
Advanced Topics in Energy Power Systems
This course is designed to discuss advanced topics in emerging power systems. In particular, this course will cover various issues related to the Microgrid. This course will discuss concepts, technical features, operational and management issues, economic viability and market participation in deregulated environment of Microgrid with the presence of significant distributed energy resources (DER).
Prerequisite: EE331.
Components: Lecture
Req. Designation: Technology

EE 537(3) **Course ID:008181** **2019-09-30**
Power System Protection
Power system fault performance, protective system goals, fault sensing and protection algorithms. Applications to generator, transformer, bus transmission line, and distribution line protection. Distributed generation and the connection to the grid.
Prerequisite: EE333, or knowledge of symmetrical components and fault current calculations
Components: Lecture
Same As Offering: EE 537
Req. Designation: Technology

EE 537(3) **Course ID:008181** **2019-09-30**
Power System Protection
Power system fault performance, protective system goals, fault sensing and protection algorithms. Applications to generator, transformer, bus transmission line, and distribution line protection. Distributed generation and the connection to the grid.
Prerequisite: EE333, or knowledge of symmetrical components and fault current calculations
Components: Lecture
Same As Offering: EE 537
Req. Designation: Technology

EE 538(3) **Course ID:008182** **2014-12-05**
Alternate Energy Systems
The basic technology of emerging renewable or non-carbon based energy sources will be considered, and contrasted with traditional sources of energy. Topics will include photovoltaic, wind and others. The impacts of energy storage and electrified transportation will be discussed. The capability of these technologies will be assessed, and barriers to implementation will be explored. The role of the electric power grid in enabling alternate energy technologies will be covered.
Components: Lecture
Course Equivalents: EE 438, ES 438
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 539(3) **Course ID:008183** **2015-01-29**
Dielectrics
Dielectric properties of materials and polarization models. Complex permittivity and relaxation spectra. Electrical breakdown in gases, liquids and solids.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

EE 541(3) **Course ID:008184** **2020-03-20**
Electronic Devices
[Cross listed with EE441] Study of modern electronic devices, p-n junctions, bipolor junction transistors (BJTs) and metal-oxide-semiconductor field-effect transistors (MOSFETs), for integrated circuit applications. SPICE device models are introduced, and several SPICE simulation projects are given for integrated circuit design and analysis. This course provides a foundation for understanding SPICE device models and the basics of the microelectronic technology.
Prerequisites: ES260 and EE341, or consent of the instructor.
Components: Lecture
Course Equivalents: EE 441
Attributes: Offered Even Falls
Requirement Group: Prerequisites: ES241 or EE341, or equivalent
Req. Designation: Technology

EE 542(3) **Course ID:008185** **2020-03-20**
CMOS IC Design
An introduction to CMOS integrated circuit design and simulation. Students will learn CMOS device models and study design, simulation and layout of digital CMOS integrated circuit blocks.
Prerequisites: EE264 and EE341, or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: EE264 and EE341, or consent of the instructor.
Req. Designation: Technology

EE 544(3) **Course ID:012757** **2016-09-23**
Semiconductor Material and Devices for Engineers
[Cross-listed with EE443] Fundamentals of quantum mechanics, energy band concept in crystalline materials, band structure modeling, band structure modification, semiconductor device physics, carrier recombination processes, carrier transport phenomena, lattice vibrations, advanced concepts in quantum device technology.
Components: Lecture
Course Equivalents: EE 443
Attributes: Offered Spring Term
Req. Designation: Technology

EE 550(3) **Course ID:008188** **2015-02-19**
Control Systems
Introduction to the analysis and design of continuous-time feedback control systems. Topics include: mathematical representation of physical systems with linear differential equations, Laplace transforms, transfer functions, block diagrams and signal flow graphs, feedback, sensitivity, transient specifications, steady-state tracking errors, stability, root locus plots, compensator design, simulation.
Prerequisite: EE321.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EE 551(3) **Course ID:008189** **2015-01-20**
Digital Control
Introduction to the analysis and design of discrete-time feedback control systems. Topics include: mathematical representation of physical systems with linear difference equations, z-transforms, transfer functions, sampling, A/D and D/A converters, sampled-data systems, discrete equivalent systems, transient specifications, steady-state tracking errors, stability, controller design, quantization effects. Significant independent investigation of advanced topics will be required.
Prerequisite: EE321.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 552(3) **Course ID:011742** **2015-02-19**
Optimization Techniques in Engineering
Introduction to optimization techniques in engineering. Topics include: engineering applications of optimization, types of optimization problems, linear programming and the simplex method, one-dimensional optimization, unconstrained nonlinear programming, nonlinear programming with equality and inequality constraints, advanced optimization techniques, practical aspects of optimization.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: MA339 or equivalent or consent of instructor.
Req. Designation: Technology

EE 555(3) **Course ID:012846** **2017-10-18**
Robotics I
[Cross-Listed EE445] The course presents an introduction to the fundamentals of mobile robotic systems including common mechanical configurations with sensors and actuators, as well as the typical sensory, perceptual, and cognitive layers that comprise the field of study. Topics explored will include: Mobile Robot Locomotion (e.g., Legged, Wheeled, and Aerial), Mobile Robot Kinematics (e.g., Models and Constraints, Maneuverability, Workspace Analysis, and Motion Control), Mobile Robot Perception (e.g., Exploration of Sensors, Fundamentals of Computer Vision, Fundamentals of Image Processing, Feature Extraction, and Place Recognition), Mobile Robot Localization (e.g., Noise and Aliasing, Localization-Based Navigation, Map Representations, Probabilistic Map-Based Localization and Autonomous Map Building), and Planning and Navigation (Path Planning, Obstacle Avoidance, and Navigation Architectures). Throughout the course, students will work in teams with a supplied robotics kit of parts to design and implement a mobile robot
Components: Lecture
Course Equivalents: EE 455
Attributes: Offered Spring Term
Req. Designation: Technology

EE 556(3) **Course ID:008194** **2018-02-26**
Robotics II
The course presents an introduction to the fundamentals of industrial robotics. Topics explored will include: Robotic manipulation, direct kinematics, inverse kinematics, workspace analysis and trajectory planning, differential motion and statics, manipulator dynamics, robot control, robot vision and task planning. Throughout the course, students will work in teams with a supplied robotics kit of parts and appropriate software tools to design and implement a robot manipulator that demonstrates various aspects of the course applied to a real-world problem.
Components: Lecture
Course Equivalents: EE 456
Attributes: Offered Fall Term
Req. Designation: Technology

EE 559(3) **Course ID:012902** **2020-10-19**
Microgrid Design and Control
The focus of the course will be microgrid design with PV, Wind, and Energy Storage, and their control and integration into the power systems using power electronics devices. Various topics will be covered in this course to provide students with cutting-edge knowledge in microgrid applications, design, and control. In this course, students will have a chance to 1) learn power converters (DC/DC,DC/AC, and AC/DC) and utilize the converters to create an AC or DC Microgrid with PV, Wind, or Batteries, 2) learn how to control the power quality (voltage, frequency) in islanded and grid-connected modes, 3) learn how to regulate the power flow in islanded and grid-connected modes, and 4) learn about anti-islanding controls and low voltage ride through requirements.
Components: Lecture
Same As Offering: EE 559
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 559(3) **Course ID:012902** **2020-10-19**
Microgrid Design and Control
The focus of the course will be microgrid design with PV, Wind, and Energy Storage, and their control and integration into the power systems using power electronics devices. Various topics will be covered in this course to provide students with cutting-edge knowledge in microgrid applications, design, and control. In this course, students will have a chance to 1) learn power converters (DC/DC,DC/AC, and AC/DC) and utilize the converters to create an AC or DC Microgrid with PV, Wind, or Batteries, 2) learn how to control the power quality (voltage, frequency) in islanded and grid-connected modes, 3) learn how to regulate the power flow in islanded and grid-connected modes, and 4) learn about anti-islanding controls and low voltage ride through requirements.
Components: Lecture
Same As Offering: EE 559
Attributes: Given When Needed
Req. Designation: Technology

EE 561(3) **Course ID:011744** **2019-03-05** **Instructor Consent Required**
Many-Core Architecture and Programming Model
This course will introduce students with the concepts of the state-of-the-art many-core processors. It intends to provide students with deep understandings of hardware architecture as well as the software programming model of such processors. The advanced dynamic power management features will also be covered. The students will have the opportunity to gain hands-on experience through programming a real many-core processor.
Prerequisites: EE446 or equivalent or consent of instructor.
Components: Lecture
Course Equivalents: EE 469, EE 519
Attributes: Offered Fall Term
Req. Designation: Technology

EE 562(3) **Course ID:008199** **2015-01-23**
Field Programmable Gate Arrays for Digital Signal Processing
This is an advanced project based graduate level course on embedded digital signal processing (DSP) system design using Field Programmable Gate Arrays (FPGAs). FPGAs provide a highly reliable and high performance alternative to the ubiquitous microprocessor based DSP platforms. This course introduces advanced DSP theory and algorithms and applications that can be implemented using MATLAB/Simulink blocks from leading FPGA vendors. The course will have a strong lab compenent. Students will use tools to design DSP systems using demo FPGA boards.
Components: Lecture
Attributes: Offered Spring When Needed
Req. Designation: Technology

EE 563(3) **Course ID:008200** **2016-11-18** **Instructor Consent Required**
Advanced Software Engineering
Study of the principles and practices of software engineering. Topics include software quality concepts, process models, software requirements analysis, design methodologies, software testing, and software maintenance. Hands-on experience building a software system using the waterfall life cycle model and CASE tools. Students working in teams develop all life cycle deliverables: requirements document, specification and design documents, system codes, and user manuals. Students will learn theoretical concepts from research, such as APFD and PORT for test case prioritization, and apply these concepts to their project.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

EE 564(3) **Course ID:010463** **2014-12-05**
Enterprise Software Development
This course will examine the design, implementation, and deployment of distributed applications in the J2EE environment. Common J2EE architectures, models, technologies, and components will be discussed including RMI, SOAP, JDBC, servlets, JSP, MVC, EJB, and JMS. Students will be required to design and develop a multi-tier, enterprise application using the J2EE and a state-of-the-art J2EE application development tool.
Prerequisites: EE408, CS242 or equivalent.
Components: Lecture
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Electrical & Computer Eng

EE 565(3) **Course ID:008201** **2021-11-30**
Artificial Intelligence: Theory and Practice
[Cross-listed with CS 551] This course is an introduction to the computational study of intelligent systems. Topics include heuristic search, knowledge representation, automated reasoning, knowledge-based systems, reasoning under uncertainty, planning, and intelligent agents. Additional topics may be drawn from machine learning, neural networks, computer vision, and natural language understanding. AI programming techniques and methods will also be covered throughout the course.
Prerequisites: CS344 or equivalent or consent of the instructor.
Components: Lecture
Course Equivalents: CS 551
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 566(3) **Course ID:008202** **2015-02-19**
Computer Architecture
A study of computer system design. Topics include system structure, instruction sets and addressing modes, software control structures, microprogramming, cache memory and different replacement policies, memory hierarchies, paging, vector processing, pipeline techniques, parallel architectures and interconnection networks. Independent investigation of advanced topics is required.
Prerequisite: EE264.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EE 567(3) **Course ID:008203** **2015-01-20**
Software System Architecture
A study of system software components in the context of a modern operating system such as UNIX, together with the necessary tools and utilities for software development. Topics will include software development tools, operating system interfaces and utilities, and network access methods. Emphasis will be placed on conceptual understanding and practical use of system software components rather than on detailed implementation. Independent investigation of advanced topics will be required.
Prerequisite: EE261 or equivalent programming experience in C.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

EE 568(3) **Course ID:008204** **2014-11-18**
Database Systems
[Cross-listed with CS 560] An introduction to database systems. The entity-relationship and relational models are presented and applied to the design of typical databases. New developments in object-oriented and multimedia databases are presented. Emphasis will be placed on database design for applications in the context of an existing database management system such as ORACLE or ACCESS. Substantial independent investigation of advanced topics will be required.
Prerequisite: programming experience in a high level language.
Components: Lecture
Course Equivalents: CS 560
Attributes: Offered Spring Term
Req. Designation: Technology

EE 570(3) **Course ID:008206** **2016-09-23**
Coding and Information Transmission
Error detecting and error correcting codes. Encoding of sources and data compression. Huffman codes. Concepts of entropy. Limits on attainable data compression. Limits on data rates for reliable or errorless transmission. Selected advanced topics from rate distortion theory, channel capacity theorem, and the asymptotic equipartition property.
Corequisite: MA/STAT381 or MA/STAT383 (MA/STAT381 is preferred.)
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: STAT383 or STAT381 or equivalent, or instructor approval
Req. Designation: Technology

EE 572(3) **Course ID:012753** **2016-09-23**
Digital Communications
A graduate course covering the foundations of digital communications. Topics covered include EM propagation, multipath and antennas for wireless communications. Communication standards for 3G, WiFi and LTE. Advanced topics include channel capacity, digital modulation techniques, and error correcting codes for data communications.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisites: EE321, and STAT383 or STAT381 or equivalent, or instructor approval
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 573(3) **Course ID:013073** **2020-11-04**
Computer Vision
[Cross-Listed CS473/CS573] This course will cover an overview of basic theoretical underpinnings and practical applications of computer vision, with particular emphasis on geometrical techniques underlying 2D and 3D vision. Topics covered include, but are not restricted to, estimation of image transformations, image formation, pose estimation, camera calibration, epipolar geometry, structure-from-motion, stereo reconstruction, filtering, interest point detection, motion estimation, image segmentation, and object recognition.
Components: Lecture
Requirement Group: Prerequisites:CS142 or EE262, and MA339 (or equivalent, with consent from the instructor)EE573 Requisi
Req. Designation: Technology

EE 574(3) **Course ID:008209** **2022-02-09**
Pattern Recognition and Machine Intelligence
Bayes decision theory, discriminant functions and decision surfaces. Supervised learning, parametric methods, Parzan windows, nearest neighbor classification, Fisher's linear discriminant. Unsupervised learning and clustering. Neural networks, single-layer perceptron convergence algorithm, gradient descent training, generalizations to multilayer feed-forward networks. Classifier complexity and sample size. Hopfield networks for autoassociative memory, unsupervised and self-organizing networks.
Prerequisite: MA/STAT381 or equivalent.
Components: Lecture
Attributes: Offered Even Falls
Requirement Group: Prerequisites: MA/STAT383, or MA/STAT381, or EE529 or equivalent
Req. Designation: Technology

EE 576(3) **Course ID:012800** **2017-03-29** **Instructor Consent Required**
Secure Computer System Design
An advanced course on cybersecurity with focus on hardware security. Roles that computer hardware plays in cybersecurity which include: implementing cryptography primitives in hardware, security threats from hardware and their countermeasures, and enhancement of system security and trust by hardware.
Components: Lecture
Req. Designation: Technology

EE 579(3) **Course ID:012869** **2018-03-19**
Distributed Algorithms for Wireless Sensor Networks
This research-driven course involves the study of state-of-the-art distributed algorithms for wireless sensor networks. We will study algorithms for inference. We will also examine algorithms that are fully distributed, specifically, algorithms in the family of consensus methods.
Components: Research
Attributes: Offered Even Falls
Requirement Group: Prerequisites: EE529 or instructor approval. A graduate course in detection and estimation theory and
Req. Designation: Technology

EE 582(3) **Course ID:012794** **2017-02-27** **Instructor Consent Required**
Advanced Electromagnetics
Study of time-varying electromagnetic fields and applications. Fundamental electromagnetic theory will be covered in order to analyze the solutions of time-varying Maxwell's equations in problems involving wave propagation, radiation and guidance.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EE 583(3) **Course ID:012848** **2018-01-23**
Modeling and Design of Electromagnetic Structures
This course will cover the theory, analytical and numerical modeling and design of various composite engineered structures that operate in different spectral ranges, including devices that operate in the optical region, others that operate in the IR, and others in microwave spectral range. Devices and structures that will be studied include: surface plasmonic structures, photonic crystals, metamaterials, diffraction grating, antennas. The modeling tools HFSS and Lumerical FDTD will be covered.
Components: Lecture
Same As Offering: EE 583
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 583(3) **Course ID:012848** **2018-01-23**
Modeling and Design of Electromagnetic Structures
This course will cover the theory, analytical and numerical modeling and design of various composite engineered structures that operate in different spectral ranges, including devices that operate in the optical region, others that operate in the IR, and others in microwave spectral range. Devices and structures that will be studied include: surface plasmonic structures, photonic crystals, metamaterials, diffraction grating, antennas. The modeling tools HFSS and Lumerical FDTD will be covered.

Components: Lecture
Same As Offering: EE 583
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 584(3) **Course ID:012920** **2018-12-11**
Metamaterials
This course will teach the theory and application on metamaterials. The different types of metamaterials that are covered include materials that operate in the ultraviolet, visible, infrared and microwave spectral ranges. Acoustic metamaterials are also covered. Negative index of refraction, hyperbolic metamaterials, near-zero metamaterials, cloaking materials, and light trapping structures will be studied.
Components: Lecture
Attributes: Offered Odd Springs
Requirement Group: Prerequisite: EE583 or permission of the instructor
Req. Designation: Technology

EE 585(3) **Course ID:011168** **2014-11-20**
Neural Engineering
This course applies engineering principles to the study of neuroscience and to the design of devices or techniques intended to replace missing or augment existing functions such as seeing, hearing, speaking, and walking. The course provides a detailed overview of sensorimotor systems, neurophysiology, neuroanatomy, neuropathology and clinical neurology. The class sequences through the various sensory and movement systems, providing a quantitative basis for how the nervous systems works for these systems, for how it dysfunctions, for the disability produced, and finally for how function can be restored by neuroprostheses. Students will prepare and present a paper on a neural engineering topic.
Prerequisites: MA132 and PH132 or PH142.
Components: Lecture
Course Equivalents: EE 485, BY 485, ES 485
Req. Designation: Technology

EE 586(3) **Course ID:012877** **2018-04-26**
Advanced Electromagnetics II
This course will cover the second half of Balanis's book Advanced Engineering Electromagnetics. The topics covered will be waveguides and cavities, transmission lines, scattering, integral equations and method of moments, the geometrical theory of diffraction, diffraction by wedges and Green's functions.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: EE582 and PH580
Req. Designation: Technology

EE 591(3) **Course ID:012878** **2018-05-02**
Blockchain Technology: Cryptocurrencies and Beyond
Blockchains, the basis of the foundational technology underpinning cryptocurrencies, offer many desirable features to end users such as anonymity, immutability, and direct, peer-to-peer transactions. There is immense interest in applying this technology to disrupt and reshape other areas such as cybersecurity, supply chains, health-care, finance & taxation, media, government & administration, and transportation. Goals of adopting this technology include minimizing fraud, providing decentralization, and maximizing efficiency, security, and transparency. This course will introduce blockchain design, including the blockchain data structure, distributed systems, consensus management, public key cryptography, hashing, transactions, smart contracts, proofs of work, and wallets. Based on this groundwork, the course will explore political, economic and social implications of blockchain technology in the context of course projects. Basic knowledge of computer programming is expected. Students from different disciplines are welcome to enroll and encouraged to
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EE 593(3) **Course ID:013169** **2022-06-02**
Control and Management of Modern Electric Power Distribution System
This course is the operation and control technology of modern electric power distribution systems. The selected topics will cover: the modeling & design of electric power distribution systems (overhead/underground lines, distribution transformers, and capacitor banks), technology for fault detection, isolation, and service restoration (FLISR), Volt/Var Optimization and Conservation Voltage Reduction (CVR) technologies, State Estimation for Distribution Systems, Smart Inverter/AMIs data to support grid operation, and Distribution grid impacts from Electric Vehicles (EVs).

Prerequisites: EE333 or equivalent.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 600(3) **Course ID:012361** **2020-07-16**
Disruptive Technology
[Cross-listed with ME 600] [Formerly EER 600] This course is designed to prepare the student to be able to efficiently evaluate potential disruptive technologies and their potential for application/commercialization. The course will cover such topics as the CO2 Mitigation, Solid state Energy Systems, Bio Energy and Fusion that have potential to impact the future. In order to cover this broad range of technical topics, the course will utilize multiple instructors that have technical depths as well as experience in the field.
Components: Lecture
Same As Offering: EE 600
Req. Designation: Technology

EE 600(3) **Course ID:012361** **2020-07-16**
Disruptive Technology
[Cross-listed with ME 600] [Formerly EER 600] This course is designed to prepare the student to be able to efficiently evaluate potential disruptive technologies and their potential for application/commercialization. The course will cover such topics as the CO2 Mitigation, Solid state Energy Systems, Bio Energy and Fusion that have potential to impact the future. In order to cover this broad range of technical topics, the course will utilize multiple instructors that have technical depths as well as experience in the field.
Components: Lecture
Same As Offering: EE 600
Req. Designation: Technology

EE 602(3) **Course ID:012342** **2016-07-01**
Engineering Statistics
[Cross-listed with CS 506, ME 577] [Formerly EER 572] Modern engineering practice makes extensive use of statistical methods for the efficient collection and analysis of engineering data, and to support data-based decision making. This course will introduce the statistical tools that are of greatest importance for practicing engineers. Core topics to be covered will include probability and distribution theory, the construction and interpretation of statistical intervals, statistical hypothesis testing, regression analysis and empirical modeling, statistical experimental design, and statistical quality/process control. Additional specialized topics may also be covered, depending upon the interests of the class; possible topics include system reliability analysis, measurement system analysis, process capability analysis (and “six-sigma”), accelerated life testing, and acceptance sampling.
Components: Lecture
Course Equivalents: CS 506, ME 577
Req. Designation: Technology

EE 603(3) **Course ID:012971** **2019-11-11**
Statistical Methods for Reliability and Life Data Analysis
[Cross-listed with ME578 and BOE623]
Reliability analysis is concerned with understanding the failure modes that affect an engineered product, estimating the expected life of the product under service conditions, and predicting the failure rate of the product
as a function of time in service. The primary response variable in reliability analysis is time to failure, which may
be measured in controlled laboratory experiments, or observed empirically from post-introduction studies of products “in the field”. The analysis of data for which the primary variable of interest is time to failure requires
specialized statistical concepts and tools; this course will cover some of the most useful approaches.
Components: Lecture
Same As Offering: EE 603
Course Equivalents: ME 578, ME 578, BOE 623
Attributes: Offered Winter Term
Requirement Group: Prerequisites: EE602, ME577, or CS506 or instructor consent.
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 603(3) **Course ID:012971** **2019-11-11**
Statistical Methods for Reliability and Life Data Analysis
[Cross-listed with ME578 and BOE623]
Reliability analysis is concerned with understanding the failure modes that affect an engineered product, estimating the expected life of the product under service conditions, and predicting the failure rate of the product
as a function of time in service. The primary response variable in reliability analysis is time to failure, which may
be measured in controlled laboratory experiments, or observed empirically from post-introduction studies of products “in the field”. The analysis of data for which the primary variable of interest is time to failure requires
specialized statistical concepts and tools; this course will cover some of the most useful approaches.
Components: Lecture
Same As Offering: EE 603
Course Equivalents: ME 578, ME 578, BOE 623
Attributes: Offered Winter Term
Req. Designation: Technology

EE 610(1 - 0) **Course ID:008212** **2020-04-24**
ECE Seminar
Components: Seminar
Same As Offering: EE 610
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 610(1 - 0) **Course ID:008212** **2020-04-24**
ECE Seminar
Components: Seminar
Same As Offering: EE 610
Req. Designation: Technology

EE 613(1 - 15) **Course ID:008213** **2020-04-24**
Thesis, Dissertation Credits
Analytical or experimental studies in electrical and computer engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Same As Offering: EE 613
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 613(1 - 15) **Course ID:008213** **2020-04-24**
Thesis, Dissertation Credits
Analytical or experimental studies in electrical and computer engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.

Components: Thesis Research
Same As Offering: EE 613
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 616(1 - 7) **Course ID:011460** **2015-02-03**
Special Project Credits
Engineering project credits associated with a Masters of Engineering degree under the direction of a faculty advisor.
Components: Project Team
Attributes: Offered Each Term
Req. Designation: Technology

EE 622(3) **Course ID:012030** **2016-09-23**
Advanced Biometrics
This special topics graduate level course will focus on the field of biometrics. With increasing reliance on the cyber-domain, knowledge of the individual plays a vital role in trusted electronic transactions, whether they be social, professional or financial. The course will be driven by in-depth review and discussion of journal papers, as well as a semester long project. Students will explore a variety of topics within biometrics including various modalities (fingerprint, iris, face, voice, keystroke, ECG), multi-modal fusion, image processing, pattern recognition, quality assessment, vulnerabilities, social implications, and performance evaluation.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: EE523 or equivalent
Req. Designation: Technology

EE 628(3) **Course ID:012752** **2016-09-22**
Adaptive Signal Processing
An introduction to adaptive signal processing. Topics include; Applications of adaptive systems, adaptive linear combiner, Wiener least-squares solution, gradient search, the LMS/RLS algorithms, block time/frequency domain LMS, system identification.
Components: Lecture
Attributes: Offered Odd Springs
Requirement Group: Prerequisites: EE401/501 or equivalent, and EE529 or equivalent, or instructor approval.
Req. Designation: Technology

EE 630(3) **Course ID:013093** **2021-02-26**
Data Analytics for Power System Applications
A graduate level course on data analytics for power system applications with selected topics covering: 1) remote terminal unit data and its application for state estimation; 2) PMU data and its application for event detection and linear state estimation; 3) Electricity data for load forecasting (including multi-variable linear regression & Artificial Neural Network (ANN) methodology, Singular Value Machine based load forecasting, and recent development of probabilistic load forecasting technologies); 4) Wind generation forecasting and wind resource assessment; 5) Solar generation forecasting.
Components: Lecture
Same As Offering: EE 630
Attributes: Given When Needed
Requirement Group: Prerequisite: EE333 or Equivalent
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 630(3) **Course ID:013093** **2021-02-26**
Data Analytics for Power System Applications
A graduate level course on data analytics for power system applications with selected topics covering: 1) remote terminal unit data and its application for state estimation; 2) PMU data and its application for event detection and linear state estimation; 3) Electricity data for load forecasting (including multi-variable linear regression & Artificial Neural Network (ANN) methodology, Singular Value Machine based load forecasting, and recent development of probabilistic load forecasting technologies); 4) Wind generation forecasting and wind resource assessment; 5) Solar generation forecasting.

Components: Lecture
Same As Offering: EE 630
Attributes: Given When Needed
Requirement Group: Prerequisite: EE333 or Equivalent
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 637(3) **Course ID:013114** **2021-07-06**
Interconnection of Distributed Energy Resources to the Power System
This is a graduate level course on the topic interconnection of Distributed Energy Resources (DER) to the power system. It covers DER technology types such as PV, fuel cell, battery storage, wind, ICE, combustion turbines and others. The course shows students how to evaluate and analyze the power system impacts of DER, and determine the allowable penetration limits of DER. It deals with various interconnection issues such as voltage regulation, ground fault overvoltage, system grounding, load rejection overvoltage, overcurrent protection coordination, islanding protection, synchronization, voltage flicker, harmonics and other factors. Solutions to common problems are explained and addressed. Includes many examples and methodologies. Also covers various industry interconnection standards such as IEEE1547 and the application of various utility, federal and state interconnection protocols. Future DER trends in interconnection technology and emerging solutions are discussed as well.
Components: Lecture
Requirement Group: Prerequisite: EE681 or equivalent.
Req. Designation: Technology

EE 638(3) **Course ID:013014** **2020-01-17**
Grid Connected Renewable Energy Systems
Power grid energy resources. The solar resource, photovoltaic cell characteristics, solar array performance. Wind energy principles, wind turbine characteristics. Maximum power point operation. Energy storage systems. Grid integration issues.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: EE681 or equivalent.
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 639(3) **Course ID:013015** **2021-09-23**
Electric Power Distribution Systems - Part 1
A graduate level course on modern electric power distribution systems, with topics selected from: distribution feeder & substation layouts, overhead and underground line configurations, voltage regulation, capacitor applications, distribution faults and protection, reliability and power quality, lightning protection, grounding, interconnection of
distributed generation, basic distribution planning. This is part 1 of a 2 part series.
Components: Lecture
Same As Offering: EE 639
Attributes: Given When Needed
Requirement Group: Prerequisites: EE681 or equivalent.
Req. Designation: Technology

EE 639(3) **Course ID:013015** **2021-09-23**
Electric Power Distribution Systems - Part 1
A graduate level course on modern electric power distribution systems, with topics selected from: distribution feeder & substation layouts, overhead and underground line configurations, voltage regulation, capacitor applications, distribution faults and protection, reliability and power quality, lightning protection, grounding, interconnection of
distributed generation, basic distribution planning. This is part 1 of a 2 part series.
Components: Lecture
Same As Offering: EE 639
Attributes: Given When Needed
Requirement Group: Prerequisites: EE681 or equivalent.
Req. Designation: Technology

EE 640(3) **Course ID:012346** **2016-06-13**
Fuel Cell Science and Hydrogen Engineering
[Cross-listed with ME 581] [Formerly EER 580] Introduce the student to the science and engineering of fuel cell technology. Emphasis will be on developing an understanding of different types of fuel cells, their applications, and the engineering of complete fuel cell systems. Elements of the class will include: electrochemistry; polymer materials science for proton exchange membrane (PEM) based systems; ceramics for solid oxide fuel cells; liquid-electrolytes for phosphoric acid and alkaline fuel cells; and other methods of generating power directly from a fuel and an oxidant. They system requirements of the fuel cell stack will be introduced to provide a complete picture of the technology. Other elements addressed during the course will include thermochemistry; electrochemistry; fuel processing or reforming; electrical & power management; polymer science and systems engineering. Developing an understanding of the proton exchange membrane fuel cell will be the primary objective. After completing this course, the student is expected to have an
Components: Lecture
Course Equivalents: ME 581
Req. Designation: Technology

EE 642(3) **Course ID:008215** **2016-07-01**
Electronic Power Conversion
[Formerly EER 542] This course examines the application of power semiconductor devices to the efficient conversion of electrical energy. Circuit analysis, signal analysis, and energy concepts are integrated to develop steady-state and dynamic models of generic power converters. Specific topics include AC/DC conversion, DC/DC conversion, DC/AC conversion, and AC/AC conversion. These generic converters are applied as controlled rectifiers, switching power supplies, motor drives, HVDC transmission, induction heating, and others. Ancillary circuits needed for the proper operation and control of power semiconductor devices are also discussed. Prerequisites: Courses in circuit analysis, signals and systems.
Components: Lecture
Req. Designation: Technology

EE 643(3) **Course ID:012347** **2016-07-01**
Photovoltaic Engineering
[Cross-listed with ME 582] [Formerly EER 580A] The course focuses on the physical principles, technology, and design of efficient semiconductor photovoltaics. Course goals equip students with the concepts and analytical skills to understand efficiency limitations, to assess the viability of various solar and thermophotovoltaic technologies, and to introduce the physics required for understanding photovoltaic energy conversion. The course will focus on three primary aspects of photovoltaic energy conversion, (i) the transfer and conversion of solar (i.e. thermal) radiation to electronic energy, (ii) the theory and design of the semiconductor photovoltaic cell and (iii) photovoltaic systems and applications.
Components: Lecture
Course Equivalents: ME 582
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 644(3) **Course ID:012344** **2016-07-01**
Solid State Electronics
[Formerly EER 574] Course reviews the physics and technology of semiconductor electronic devices and their dynamic behavior. Emphasis will be placed on semiconductor devices used in high-power and high frequency applications such as power electronic switching elements and microwave power amplifiers. Course emphasizes physical understanding of device operation and limitations through energy band diagrams, electron carrier statistics and transport, charge control equations, and equivalent circuit models. Derivation of electrical characteristics and dynamic limitations will be presented for (1) power diodes, (2) bipolar devices such as the power bipolar junction transistor and thyristors, (3) unipolar devices such as the microwave field effect devices and (4) new classes of controlled power electronic devices such as the insulated gate bipolar transistor. Issues such as reduction of parasitic electrical losses, high band-gap semiconductor material development, and thermal management will be discussed.
Components: Lecture
Req. Designation: Technology

Engineering - Computer Science - Subject: Electrical & Computer Eng

EE 652(3) **Course ID:011279** **2016-01-13**
Computer Vision
[Cross-listed with CS 652] This course will cover both classical and recent progress in the field of computer vision, both on the theory and practice. Material covered will be from both the textbook and relevant research papers in the area. After taking this course, students will achieve the necessary knowledge to solve various practical computer-vision problems and build a solid background for further computer-vision research. Topics covered include: Early vision on one and multiple images (linear filters, edge detection, stereopsis), mid-level vision (segmentation, object tracking), high-level vision (model-based vision, graph-based image segmentation) and applications (medical image analysis, image-based rendering).
Prerequisites: CS344 and MA339 (or equivalent, with consent from the instructor)
Components: Lecture
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 653(3) **Course ID:012330** **2016-07-01**
Modeling and Control of Energy Conversion
[Formerly EER 542A] This course examines modeling and control techniques appropriate for application to power electronic and electric machine systems. The course will involve examination of the appropriate theory, followed by application through examples and small design projects. Simulation will be used to evaluate the merits of various techniques.
Components: Lecture
Req. Designation: Technology

EE 657(3) **Course ID:012327** **2016-07-01**
Linear Control Systems
[Cross-listed with ME 560] [Formerly EER 522] This course addresses practical control system design primarily from a classical perspective. Beginning with transfer function modeling of dynamic systems, the course moves through transient, root locus, and frequency response analysis to end with frequency domain techniques for controller design.
Components: Lecture
Course Equivalents: ME 560
Req. Designation: Technology

EE 658(3) **Course ID:012328** **2016-07-01**
Digital Control Systems
[Formerly EER 528] The course begins with a brief review of continuous-time control methods before transitioning to the theory and implementation techniques for control of dynamic processes by digital computers. Topics covered include discrete system analysis, sampled data systems, quantization effects, state space representation of digital control systems, and the design of digital control algorithms.
Components: Lecture
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 659(3) **Course ID:013126** **2022-02-03**
Electric Power Distribution Systems - Part 2
A graduate level course on modern electric power distribution systems, with advanced topics selected from: distribution automation and smart grid, advanced lightning protection, microgrid architectures/systems, DC systems, advanced planning, reliability and power quality concepts, energy conservation and efficiency concepts.

Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: EE 639 or equivalent
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Electrical & Computer Eng

EE 667(3) **Course ID:008218** **2015-08-15**
Computer Algorithms
[Cross-listed with CS 547] This course will study and contrast a variety of computational algorithms and develop tools for algorithm analysis. Methods and topics such as dynamic programming, greedy algorithms, graph algorithms, circuits, parallel algorithms, matrix and polynomial algorithms, string matching, and geometrical algorithms will be explored. The theory of NP-completeness and methods of managing NP-complete problems will also be covered.
Prerequisites: CS344, MA211 or MA346.
Components: Lecture
Course Equivalents: CS 547
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 680(3) **Course ID:012338** **2016-07-01**
Power System Analysis I
[Formerly EER 560] Power and energy in AC circuits. Single-phase, three-phase and poly-phase circuits in balanced and unbalanced regimes. Measurement of three-phase power. Determination of three-phase sequence. Single-line diagrams. Per-unit method of representation and computations. Transformers and synchronous machines in power systems. Parameters of transmission lines.
Prerequisite: Electric Circuits or equivalent.
Components: Lecture
Req. Designation: Technology

EE 681(3) **Course ID:012339** **2016-07-01**
Power System Analysis II
[Formerly EER 561] Wave-propagation in transmission lines. Analysis of power networks, load-flow solutions and control. Three-phase faults and symmetrical components. Power system protection. Stability of power systems.
Prerequisites: Electric Circuits or equivalent.
Components: Lecture
Req. Designation: Technology

EE 682(3) **Course ID:012331** **2016-07-01**
Electromechanical Energy Conversion
[Formerly EER 542B] This course is designed to introduce the student to the inside of AC electric machinery. It begins with a review of computing inductance using the integral form of Maxwell’s equations. Next, the energy method for computing the forces of electrical origin is introduced. These forces are then combined with circuit equations and the equations of mechanics to obtain dynamic models of electromechanical systems. The methodology developed is applied to simple electromechanical structures and then to various types of synchronous machines; induction machines are also considered. Consideration will be given to the electronic control of electric machines.
Prerequisite: A undergraduate course in electromagnetics.
Components: Lecture
Req. Designation: Technology

EE 683(3) **Course ID:012348** **2016-07-01**
Turbine Engineering
[Cross-listed as ME 583] [Formerly EER 580B] Course on fundamentals of design, analysis, and technology of turbo machinery – jet engines, gas turbines, steam turbines, water turbines, and wind turbines. The course will provide an understanding of all aspects of system development: thermodynamic cycles, design-point and off-design performance; function and design of components (inlets, compressors, combustors, turbines, outlets), operational limits, and environmental concerns; structural analysis, lifting, and materials; rotor dynamics and blade aeromechanics; clearance analysis, sealing, and packing; heat transfer, blade and component cooling; starting and control; power and thrust generation; testing and instrumentation. The student is expected to develop a broad understanding of the state-of-the-art, challenges, and future of turbine systems.
Components: Lecture
Course Equivalents: ME 583
Req. Designation: Technology

EE 684(3) **Course ID:012349** **2016-07-01**
Wind Energy Engineering
[Cross-listed with ME 588] [Formerly EER 580D] The course focuses on 'Wind Farm Project Design and Development' and 'Wind Turbine Technology.' Part I: Teams will demonstrate understanding of complete wind farm design/development process inclusive of site selection, wind resource evaluating target land area, turbine choice, location, energy projection, cost, transmission. Part 2: Focuses on technical understanding of Wind Turbine attributes such as structural, blade system, Nacelle system, electrical system, performance, and future opportunities.
Components: Lecture
Course Equivalents: ME 588
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 685(3) **Course ID:012350** **2016-07-01**
Solar Energy Engineering
[Cross-listed as ME 587] [Formerly EER 580E] This course is designed to enable the student to effectively grasp the complex and quickly changing solar industry. The course will cover such topics as the economy of solar, photovoltaic devices, systems and applications. In order to cover this broad range of technical topics, the course will utilize multiple instructors. Each instructor has significant expertise and depth in the given field and the student will be able to draw from their experience. Students completing this course will develop knowledge of the solar industry, looking at the past, present and future of this technology area. Students will gain key technical background in every aspect of the industry and will be able to assess new technologies as they are developed. Understanding of the economics of solar and its future will also be obtained.
Components: Lecture
Course Equivalents: ME 587
Req. Designation: Technology

EE 686(3) **Course ID:012351** **2016-07-01**
Synchronous Electrical Generators
[Cross-listed with ME 589] [Formerly EER 580G] Course on fundamentals of design and analysis of power generators, such as those used in thermal power plants and wind turbines. The course will address the basic operating principles of the synchronous machine and consider configurations such as would field, permanent magnet, and doubly fed generators. Key topics will include understanding and analysis of the magnetics within the machine, losses and efficiency, thermal performance, mechanical behavior, operation on the power system, and key IEEE and IEC standards. Further topics will include the duty imposed on the machine during service as well as the duty it imposes on the turbine. The student is expected to develop a broad functional understanding of the current engineering technology, challenges, and future of generator technology.
Components: Lecture
Course Equivalents: ME 589
Req. Designation: Technology

EE 687(3) **Course ID:012341** **2016-07-01**
Nuclear Engineering
[Cross-listed with ME 575] [Formerly EER 570] The purpose of this course is provide students of various engineering disciplines a functional knowledge of nuclear engineering principles and those most important to the design of nuclear power generation systems. The course will focus both on the nuclear reactor core as well as plant systems. The intent is that students will gain a physical understanding of nuclear engineering principles as they relate to their own field of interest. Class participation will be highly encouraged and focused through the discussion of current events in the nuclear industry as well as proposed future nuclear technologies.
Components: Lecture
Course Equivalents: ME 575
Req. Designation: Technology

EE 690(3) **Course ID:012355** **2019-08-30**
Independent Study
[Formerly EER 590] Advanced graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Independent Study
Same As Offering: EE 690
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 690(3) **Course ID:012355** **2019-08-30**
Independent Study
[Formerly EER 590] Advanced graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Independent Study
Same As Offering: EE 690
Attributes: Given When Needed
Req. Designation: Technology

EE 691(3) **Course ID:012352** **2019-08-30**
Special Topics in Electrical Engineering
[Formerly EER 581] Topics chosen from the current literature according to faculty and student interest. Possible topics include new developments in the major areas of electrical engineering such as electromagnetic fields, communications, controls, circuits, power, devices, electronics, and computer design. Topics may include but not be limited to image processing, machine vision, speech synthesis, integrated optics, antenna systems, adaptive filtering, variational methods, stochastic processes, optical communications, space and satellite communications, and computer networks. Each of these special topics courses has a variable content addressing specific current areas of interest to students.
Components: Lecture
Same As Offering: EE 691
Attributes: Given When Needed
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 691(3) **Course ID:012352** **2019-08-30**
Special Topics in Electrical Engineering
[Formerly EER 581] Topics chosen from the current literature according to faculty and student interest. Possible topics include new developments in the major areas of electrical engineering such as electromagnetic fields, communications, controls, circuits, power, devices, electronics, and computer design. Topics may include but not be limited to image processing, machine vision, speech synthesis, integrated optics, antenna systems, adaptive filtering, variational methods, stochastic processes, optical communications, space and satellite communications, and computer networks. Each of these special topics courses has a variable content addressing specific current areas of interest to students.
Components: Lecture
Same As Offering: EE 691
Attributes: Given When Needed
Req. Designation: Technology

EE 692(3) **Course ID:008219** **2022-01-01**
Independent Study
Advance graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 693(1 - 3) **Course ID:008220** **2015-02-03** **Instructor Consent Required**
Directed Study in Electrical and Computer Engineering
Investigation of topics of current interest in selected areas of electrical and computer engineering.
Components: Independent Study
Req. Designation: Technology

EE 694(1 - 3) **Course ID:008221** **2014-12-04** **Instructor Consent Required**
Directed Study in Electrical & Computer Engineering
Investigation of topics of current interest in selected areas of electrical and computer engineering.
Components: Independent Study
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Electrical & Computer Eng

EE 698(0) **Course ID:013007** **2020-01-02**
MS-EE Graduate Project - Studies
This non-credit Seminar project provides a capstone experience for Electrical Engineering graduate students not completing a thesis or independent study (i.e., all course work). The candidate and faculty advisor agree on project scope and evaluation process. The candidate performs required analytical and/or experimental studies to complete a Graduate Project Paper and Presentation.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

EE 699(0) **Course ID:012360** **2020-01-02**
MS-EE Graduate Project - Defense
[Formerly EER 599] This non-credit Seminar project provides a capstone experience for Electrical Engineering graduate students not completing a thesis or independent study (i.e., all course work). The candidate will deliver and defend results from studies documented in a Graduate Project Paper and Presentation. The candidate receives a pass/fail grade which appears on the official transcript.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Electrical & Computer Eng

EE 739(1 - 10) **Course ID:012784** **2018-01-03**
Seminar in Nonlinear Processes
Seminar in Nonlinear Processes
Components: Seminar
Course Equivalents: MA 739
Attributes: Given When Needed
Req. Designation: Technology

EE 999(1 - 10) **Course ID:011129** **2015-01-13**
Special Topics in Electrical Engineering
Used for graduate transfer credit for which Clarkson does not have an equivalent EE course number.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: English

EGL 575(3) **Course ID:012906** **2022-04-08**
Interdisciplinary Connections of History and Multicultural Literature
Framed around universal concepts of humanity (change, diversity, intolerance, ethics, creativity, freedom, and legacy), this course is designed to illustrate the interdisciplinary connections between secondary social studies and English language arts. Recognition that these key concepts span time and place, and are applicable to every period in history, will help to develop a broad understanding of the human experience, and the unity of humanity, through the study of history and multicultural literature. In addition to the historic and literature specific content of the course, other goals include development of empathy and a respect for diversity, as well as learning how to guide discussions that value different points of view.
Components: Seminar
Course Equivalents: HST 575
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

EGL 580(3) **Course ID:012375** **2021-10-08**
MAT Project in English (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

EGL 585(3) **Course ID:012378** **2018-01-16**
Nonfiction in the English Classroom
The Common Core Standards for ELA mandate a shift in the English classroom towards the use of more nonfiction/informational texts. The precise nature of this mandate and its impact on the practices of English teachers continues to be a source of controversy and confusion. In this 3-credit course, we will come to terms with this controversy, and articulate a vision for using nonfiction texts in the English classroom. Additionally, we will explore reading and writing in the literary genres that comprise the category of nonfiction, including memoir, the essay, argumentative writing, and literary journalism.
Components: Lecture
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Health Scien

EHS 1(2 - 4) **Course ID:008406** **2022-01-26**
Industrial Hygiene Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

EHS 2(2 - 4) **Course ID:008407** **2022-01-26**
Industrial Hygiene Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

EHS 309(3) **Course ID:008408** **2022-01-26**
Introduction to Environmental and Occupational Helath
[Cross-listed with BY309] Study of the recognition, evaluation and control of chemical, biological, radiological, physical and ergonomic hazards found in the work environment and surrounding community. Key aspects of the course will include hazard assessment, basic anatomy and physiology associated with routes of entry and toxicology of hazardous agents, environmental, health and safety regulations, exposure monitoring instrumentation, and effective controls to minimize the risk of illness or injury.
Components: Lecture
Course Equivalents: BY 309
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM132 or CM104/106
Req. Designation: Technology

EHS 310(2) **Course ID:008409** **2022-01-26**
Introduction to Industrial Hygiene Laboratory
This is a lab course that meets for three hours a week. The course consists of weekly labs. Students must prepare lab reports on a weekly basis. These lab reports are evaluated for consistency, accuracy, presentation and overall quality. The course ends with students individually presenting scenarios that encompass knowledge gained over the length of the course. Students are expected to communicate knowledge of both environmental health and public health. In addition, each student must prepare a final report to accompany their presentation. The written material will be critiqued by the instructor and feedback will be provided to each student. A portion of the labs will be dedicated to instruction on writing and presentation skills.
Components: Laboratory
Attributes: One communication unit, Offered Spring Term
Requirement Group: Corequisite: EHS309
Req. Designation: Technology

EHS 330(3) **Course ID:010321** **2022-01-26**
Occupational Safety and Ergonomics
This course will provide students with an overview of the contemporary Environmental, Health and Safety (EHS) management techniques for occupational settings. The EHS management systems of today have evolved over many years (ISO 14001, ISO 45001). The Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency are the primary regulatory organizations in the United States. However, compliance is the minimum standard of care. Cost effective systems to minimize risk among the community and workers as well as ensure compliance with state and federal regulation must include a comprehensive and integrated Environment, Health, and Safety Management System (EHS-MS) that is sustainable for the long term. The course will introduce techniques used to assess the risk of injury including job safety analysis, fault tree analysis, systems safety and design for safety . In addition, this course will provide the students with the fundamental elements of occupational ergonomic assessments, risk factors and controls. The course will be a
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Health Scien

EHS 405(4) **Course ID:008412** **2022-03-08**
Methods and Analysis
IH405, Methods and Analysis, is a combined lecture/laboratory course. Students complete nine full laboratory assignments requiring complete reports (~10 pages) to be turned in weekly or bi-weekly. Students are provided feedback on content and writing mechanics (technical reporting) and are offered (sometimes requested) the opportunity to resubmit.
Components: Laboratory, Lecture
Attributes: One communication unit, Given When Needed
Requirement Group: Prerequisites: EHS 309 and open to students majoring in EHS, ES&P and Chemistry only. Two years of col

Req. Designation: Technology

EHS 406(3) **Course ID:008413** **2022-03-08**
Industrial Hygiene Control Methods
Various ways to prevent and solve common industrial hygiene problems will be considered; topics will include typical engineering controls, administrative controls and personal protection to control chemistry exposure and releases. In addition controls for temperature extremes, noise and vibration exposure, and ergonomic stressors will be studied. About two-thirds of the course is devoted to industrial exhaust ventilation design. (2 credits of design, for Civil and Environmental Engineering Majors)
Components: Lecture
Course Equivalents: EHS 506
Attributes: Two Design Credits, Offered Even Falls
Requirement Group: Prerequisite: EHS309 or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Inst for a Sustainable Environ - Subject: Environmental Health Scienc

EHS 408(1) **Course ID:013143** **2022-01-26**
Exposure Assessment Laboratory
This class is a laboratory based course exploring human exposure. Each class (once per week, 3 hour lab) will include a 30-45 minute lecture addressing the theory and application of the laboratory material. The laboratory experiments are designed to acquaint students with a variety of environmental and occupational field sampling methods and their corresponding laboratory analytical methods.
Many analytical techniques are used to analyze industrial hygiene and environmental samples. Some techniques provide immediate results while others require laboratory analysis. This course will allow the student to use a variety of methods to analyze contaminants, and an opportunity to compare and contrast sampling and analytical methods. In addition to collecting the samples, data analysis techniques and modeling exposures will be used to analyze the data with a few types of software. While the course will focus on sampling and sample analysis, related topics will be discussed briefly. Variables and conditions such as, who, when, how

Components: Laboratory
Course Equivalents: EHS 508
Attributes: Offered Even Falls
Requirement Group: Prerequisites: EHS309, and CE433, or consent of the instructor.
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Health Scien

EHS 416(3) **Course ID:008415** **2022-03-08**
Principles of Toxicology and Epidemiology
[Cross-listed with BY 416] This is an introductory course in toxicology and epidemiology. Toxicology is the study of the harmful interactions, including absorption, distribution, metabolism and disease effects, of chemical, biological and physical agents with biological systems, when administered by accident or design. Epidemiology is the study of the distribution and determinants of disease frequency in populations exposed to these toxicants and stressors. The first two thirds of this course will focus on the toxicological interaction and effects of environmentally and occupationally derived toxicants with the human body. The last third of the course will focus on the epidemiological tools to evaluate the risk of exposure to such toxins, and will examine, in detail, several important historical and recent case studies of toxic exposures to individuals and populations in the home, the outdoor environment, and the work place. Toxicology and Epidemiology are important sciences that provide a sound basis for developing measures to reduce the risk of

Components: Lecture
Course Equivalents: BY 416, EHS 518, BY 518
Attributes: Offered Fall Term
Requirement Group: Prerequisites: EHS 309 or consent of the instructor.
Req. Designation: Technology

EHS 481(3) **Course ID:008416** **2022-01-26**
Advanced Topics in Environmental and Occupational Health
This course is a project based course that requires students to work on a broad array of topics in environmental health. Students will have multiple projects (6-8) running simultaneously and each will require writing assignments and presentations. Literature and text reviews will be necessary for most of the projects. Group communication skills are also developed as some projects are done in groups. Course work and lab preparation call for combining both lab work and lecture material in a cohesive and accessible format. The course also involves consistent review of student work by the instructor, in the form of both written and oral feedback. IH481 also requires for a minimum of three oral presentations by individuals.

Components: Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisite: Senior standing in the following majors or minors: EHS or ES&P, or consent of the instru

Req. Designation: Technology

Science - Inst for a Sustainable Environ - Subject: Environmental Health Science

EHS 490(0 - 3) **Course ID:011300** **2022-03-08**
Internship/Co-op
Students who obtain a (summer) internship/co-op position may obtain credit for the work experience by registering for this course the semester following the position. Students will be required to keep a daily journal of work activities and submit the journal entries to the EHS Program Director every two weeks. During the semester following the internship/co-op, a 10-page report on some aspect of their work experience and a 30 minute presentation will be required.

Components: Independent Study
Attributes: Offered Spring Term
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Health Scien

EHS 494(1 - 3) **Course ID:011306** **2022-03-08**
Directed Research for Undergraduates
A research project will be completed; research projects may include laboratory projects or individual study of industrial hygiene topics not available in other industrial hygiene courses.
Components: Research
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EHS 495(1 - 3) **Course ID:011307** **2022-03-08**
Directed Research for Undergraduates
A research project will be completed; research projects may include laboratory projects or individual study of industrial hygiene topics not available in other industrial hygiene courses.
Components: Research
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EHS 497(1 - 3) **Course ID:011316** **2022-03-08**
Directed Study
A research project will be completed; research projects may include laboratory projects or individual study of industrial hygiene topics not available in other industrial hygiene courses.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EHS 505(4) **Course ID:008420** **2022-03-08**
Methods and Analysis
This course covers the same topics as IH405 and includes additional material on the graduate leve.
Prerequisites: two years' college chemistry and major Industrial Hygiene, IH309.
Components: Laboratory, Lecture
Attributes: Given When Needed
Req. Designation: Technology

EHS 506(3) **Course ID:008421** **2022-03-08**
Industrial Hygiene Control Methods
This course covers the same topics as IH 406 and includes additional material on the graduate level.
Prerequisites: IH309 or consent of the instructor.
Components: Lecture
Course Equivalents: EHS 406
Attributes: Offered Even Falls
Req. Designation: Technology

EHS 508(1) **Course ID:013142** **2022-01-26**
Exposure Assessment Laboratory
This class is a laboratory based course exploring human exposure. Each class (once per week, 3 hour lab) will include a 30-45 minute lecture addressing the theory and application of the laboratory material. The laboratory experiments are designed to acquaint students with a variety of environmental and occupational field sampling methods and their corresponding laboratory analytical methods.
Many analytical techniques are used to analyze industrial hygiene and environmental samples. Some techniques provide immediate results while others require laboratory analysis. This course will allow the student to use a variety of methods to analyze contaminants, and an opportunity to compare and contrast sampling and analytical methods. In addition to collecting the samples, data analysis techniques and modeling exposures will be used to analyze the data with a few types of software. While the course will focus on sampling and sample analysis, related topics will be discussed briefly. Variables and conditions such as, who, when, how
Components: Laboratory
Course Equivalents: EHS 408
Attributes: Offered Even Falls
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Health Scien

EHS 518(3) **Course ID:010303** **2022-01-26**
Principles of Toxicology and Epidemiology
[Cross-listed with BY 518] This course covers the same topics as EHS 416 and includes additional material on the graduate level.
Components: Lecture
Course Equivalents: BY 416, EHS 416, BY 518
Req. Designation: Technology

EHS 581(3) **Course ID:010316** **2022-01-26**
Advanced Topics in Environmental and Occupational Health
This course covers the same topics as IH481 and includes additional material on the graduate level.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

EHS 999(1 - 10) **Course ID:011111** **2022-01-26**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 1(2 - 4) **Course ID:008224** **2015-01-19**
Engineering and Management Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EM 2(2 - 4) **Course ID:009666** **2015-01-19**
Engineering & Management
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EM 120(3) **Course ID:008225** **2015-02-19**
Team-based Design and Innovation
The first in a two-course sequence, this course is required for all first-year students in the Engineering & Management Program. Students will undertake a yearlong project to design, produce, and potentially commercialize a product. Projects will require the application of both engineering and management tools and principles. The primary focus of the fall semester is to build functional teams, introduce design tools and complete a conceptual design of the product. Open only to E&M, University Studies, Engineering Studies, and Science Studies first-year students unless approved by E&M Director.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

EM 121(2) **Course ID:008226** **2015-10-20**
Technological Entrepreneurship
The second in a two-course sequence, this course is required for all first-year students in the Engineering & Management Program. Students will undertake a yearlong project to design, produce, and potentially commercialize a product. The primary focus of the spring semester is to build a business plan from the fall semester conceptual design. Open only to E&M, University Studies, Engineering Studies, and Science Studies first-year students unless approved by E&M Director.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisite: EM120.
Req. Designation: Technology

EM 190(1 - 3) **Course ID:008227** **2015-01-23**
Independent Study
An investigation of an interdisciplinary socio-technical problem undertaken by an upperclass student under the guidance of a faculty member.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

EM 205(3) **Course ID:011133** **2022-02-10**
Introduction to Financial and Managerial Accounting
[Cross-listed with AC 205] An introductory survey of accounting information to guide and improve decision making. Many course topics involve cost planning and control techniques used to evaluate and improve the financial performance of organizations and/or products.
Components: Lecture
Course Equivalents: AC 205
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: Restricted to E&M majors only
Req. Designation: Technology

Business - School of Business - Subject: Engineering & Mgmt

EM 211(3) **Course ID:011134** **2020-05-13**
Intro to Enterprise Information Systems
This course will introduce students to enterprise information systems, their components, integration, and use as part of the business process. The distributed, accurate, real time flow of information is a critical success factor for most organizations. The ability of an organization to collect and analyze this information is crucial in today's data-driven economy. The focus of this course is on the functional and strategic use of enterprise resource planning (ERP) software, its application, input devices, implementation issues and use. Hands-on experience with SAP ERP is integral to this course. Offered fall and spring semesters.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: students may not receive credit for IS200 as well as EM211 and restricted to E&M majors
Req. Designation: Technology

EM 286(3) **Course ID:011135** **2016-02-19**
Organizational Behavior I
[Cross-listed with OS 286, PY 286] (May be used to satisfy a CUSB MBA or MS foundation requirement.) An introduction to the processes required to manage contemporary organizations with a focus on individual behaviors as they relate to the functions of planning, organizing, controlling, and leading. The most recent concepts of behavioral science in the practice of management are presented to assist the student in gaining understanding of the pervasiveness of the discipline in all types of organizations and processes. Topics include motivation, leadership, perceptions, personality theory, learning theory, personnel issues, stress management, organizational culture, and decision making.
Components: Lecture
Course Equivalents: OS 286, PY 286
Attributes: Individual and Group Behavior, Offered Each Term
Requirement Group: Prerequisites: sophomore standing and restricted to E&M majors.
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 301(3) **Course ID:013106** **2022-03-17**
Applied Data Analytics
[Cross-listed with IS301] Proper utilization of modern analytical tools is a critical component of effective and timely creation and use of organizational intelligence in a variety of fields of human endeavor: management, social science, health care, engineering etc. This course focuses on critical skills for using software tools such as Excel, SQL, and Tableau (or their equivalents) for the purpose of conducting a variety of analytics tasks and operations to improve gathering, generation and presentation of organizational intelligence. Focus is on proper data gathering and preparation, followed by the use of key analysis grouping and summation tools as well as data presentation and visualization.
Components: Lecture
Course Equivalents: IS 301
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: IS110
Req. Designation: Technology

EM 310(0) **Course ID:011873** **2022-02-10**
E&M Professional Experience
Project-based professional experience in engineering & management, related to student career interests and/or field of study. Fulfills Clarkson Common Experience Professional Experience requirement for E&M students. Course registration requires E&M approval of application. Completion of course requires approval of E&M Director.
Components: Independent Study
Attributes: Offered Fall and Spring
Req. Designation: Technology

School of Arts and Sciences - Engineering & Management - Subject: Engineering & Mgmt

EM 313(3) **Course ID:012967** **2022-02-10**
Professional Communication
[Cross-listed with COMM313] This course presents students opportunities to learn how to design and present effective professional documents. The course emphasizes a rhetorical approach to analyzing the issues and details important to the communication to be produced (e.g., audience, style, format, purpose). Students will practice writing both individually and collaboratively and will be expected to present their work orally on occasion. Students will encounter topics such as, but not limited to, abstracts, email, instructions, letters, memoranda, proposals, and various types of reports. Students of any major may take this course.
Components: Lecture
Course Equivalents: COMM 313
Attributes: Two communication units, Offered Fall and Spring
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 314(3) **Course ID:011634** **2014-11-19**
Database Design & Management
[Cross-listed with IS 314] This course provides the student with in-depth knowledge of database analysis, design, and implementation principles. Students who successfully complete this course will be able to use the entity-relationship data model to represent business data requirements, to translate that model into a relational schema, to normalize this schema and to build and use a relational database that implements the schema, using the Standard Query Language (SQL).
Components: Lecture
Course Equivalents: IS 314
Requirement Group: Prerequisite: Restricted to E&M students
Req. Designation: Technology

EM 331(3) **Course ID:011137** **2022-02-10**
Operations & Supply Chain Management
[Cross-listed with OM 331] (May be used to satisfy a CUSB MBA and MS foundation requirement.) An introduction to the planning, analysis and control of production systems. Topics include product and service design, manufacturing processes, aggregate production planning, inventory models and MRP, just-in-time systems, facility layout, forecasting/demand planning, project management, and quality management. Students acquire problem solving experience using ERP software.
Components: Lecture
Course Equivalents: OM 331
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: STAT 282 or STAT 383 or MA 330, and at least sophomore standing
Req. Designation: Technology

EM 333(3) **Course ID:011280** **2022-02-10**
Elements of Operations Research
Application of optimization models to typical engineering and management situations and problems. Topics include: optimization theory (linear programming, transportation and assignment models), decision analysis under uncertainty, queuing theory and Monte Carlo simulation.
Components: Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: STAT383 and at least junior standing, and restricted to E&M majors only.
Req. Designation: Technology

EM 341(3) **Course ID:011139** **2017-10-11**
Supply Chain Design & Management
[Cross-listed with OM 341] Fierce competition in today's global markets has forced business enterprises to focus on reducing costs while meeting rising customer expectations by designing and managing effective and sustainable supply chains. This course focuses on a systems approach to review state-of-the-art models and practical tools for inventory and materials management, design for supply chain, as well as supply chain integration. Topics covered include managing inventories in the supply chain, the bullwhip effect, risk pooling, delayed differentiation, measuring the financial performance of supply chains, the value of information and the role of information technology in the supply chain, coordination and collaboration with channel partners, supply chain related strategic alliances, and outsourcing/off-shoring/reshoring trends. Several team projects and hand-on experiences are utilized to demonstrate real world issues and applications.
Components: Lecture
Course Equivalents: OM 341
Attributes: Offered Spring Term
Requirement Group: Prerequisites: EM331 and restricted to E&M majors.
Req. Designation: Technology

EM 356(3) **Course ID:012871** **2022-02-10**
Invention Development and Protection
[Cross-listed with SB356] In this course, students learn how to develop inventions and protect them. Students will work in small teams to develop and describe their inventions in a form suitable for filing provisional patent applications with the U.S. Patent and Trademark Office. Aspects of intellectual property laws in the US and other countries will be covered to guide the student inventing process. Open only to E&M students.
Components: Lecture
Course Equivalents: SB 356
Attributes: Given When Needed
Requirement Group: Requirements: E&M major and Junior standing
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 361(3) **Course ID:011144** **2014-11-18**
Supply Chain Environmental Management
[Cross-listed with SB 361] This course aims to gain a greater understanding of supply chain environmental management by examining: (i) the advantages and business risks of adopting and implementing environmental practices and technologies in the supply chain, (ii) the role of suppliers and customers to facilitate the adoption/ implementation of environmental practices and technologies, and (iii) the implications of such supply chain activities on an organization's operations strategy. This course consists of a mix of lectures and class discussion.

Components: Lecture
Course Equivalents: SB 361
Attributes: Offered Spring Term
Requirement Group: Prerequisite: EM331 and restricted to E&M majors.
Req. Designation: Technology

Business - School of Business - Subject: Engineering & Mgmt

EM 371(3) **Course ID:012841** **2022-02-10**
Strategic Sourcing
This course provides an in-depth analysis of the procurement process and supplier management, with strong emphasis on managing a supplier base for both products and services. Topics covered include the strategic role of sourcing in supply chains, the identification and evaluation of requirements, the strategic make versus buy decision, supplier selection, development and evaluation processes, the supplier coordination and control mechanisms, the relationship between product design and the supplier base and the impact of information technology on strategic sourcing. Both theoretical and quantitative perspectives will be offered. In addition, the topics will be addressed from strategic, financial, sustainability and global perspectives. Students will also develop practical skills in using quantitative tools to select and evaluate suppliers.

Components: Lecture
Course Equivalents: OM 371
Attributes: Offered Fall Term
Requirement Group: Prerequisites: OM/EM331 and at least junior standing
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 380(3) **Course ID:011142** **2022-03-09**
Project Management
[Cross-listed with OM 380] This course will introduce students to all phases of project management from project initiation to termination. Topics covered include project selection, organization, contracts, planning and scheduling (PERT and CPM), estimating, budgeting and cost control, procurement, resource allocation, variance analysis, auditing and termination procedures. Project management software, case studies, and student team projects will be an integral part of the course.
Components: Lecture
Course Equivalents: OM 380
Attributes: Economics and Organizations, Offered Fall and Spring
Requirement Group: Restrictions: Enrollment is limited to students in E&M, or consent of instructor. Corequisites: STAT

Req. Designation: Technology

EM 381(3) **Course ID:012742** **2022-03-09**
Logistics Management
[Cross-Listed SB381]Logistics involves planning, implementation and control of the forward and reverse flow and storage of goods, services, and information in the supply chain in order to effectively meet customer demand. Primary topics covered include management and location of facilities, management of channel networks, warehousing, transportation, management and design of integrated logistics networks, distribution strategies, third-party logistics, international logistics, and vehicle routing. In addition to lectures, case studies, numerical assignments and simulation of logistics systems may be utilized.
Components: Lecture
Course Equivalents: SB 381
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MK 320 and OM/EM 331
Req. Designation: Technology

Business - School of Business - Subject: Engineering & Mgmt

EM 415(3) **Course ID:011691** **2022-03-09**
Data Warehousing for Analytics
[Cross-listed with IS 415] This course covers the fundamental concepts, design, management and application of data warehouses and business/enterprise intelligence systems. Specific topics covered include the logical design of a data warehouse, the data staging area and extraction-transformation-loading process, the design, implementation and utilization of multi-dimensional data analysis systems, as well as key business/enterprise intelligence concepts, processes and techniques including knowledge discovery and exploratory analysis. Offered Fall semesters.

Components: Lecture
Course Equivalents: IS 415
Attributes: Offered Spring Term
Requirement Group: Prerequisite: EM314 or CS460/EE468 and Restricted to E&M students.
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 432(3) **Course ID:011138** **2015-03-03**
Organizational Policy and Strategy
[Cross-listed with OS 432] A capstone course designed to integrate the functional areas and tools of management studied in previous courses within a strategic planning framework giving due attention to ethical and social responsibility concerns and international business issues. Emphasis is placed on the business environment in a global economy, industry analysis, tactical planning, overall strategic planning, policy establishment and implementation. Case analysis, in the small group setting, is utilized, enabling students to share their expertise and explore their value structure. Students present results via written and oral reports.
Components: Lecture
Course Equivalents: OS 432
Attributes: Two communication units, Offered Each Term
Requirement Group: Prerequisites: FN361, EM331, EM286, MK320, senior standing, and restricted to E&M majors.
Req. Designation: Technology

EM 441(3) **Course ID:011143** **2014-11-18**
Advanced Topics in Global Supply Chain Management
[Cross-listed with SB 441] This course introduces several emerging topics in supply chain management, including: demand management, revenue management, risk management, supply chain agility and flexibility, supply chain disruption management, and supply chain contracts. This course also provides students with the opportunity to gain experience dealing with complex supply chain issues by utilizing a simulation game. The simulation deals with both strategic and tactical aspects of managing the supply chain.
Components: Lecture
Course Equivalents: SB 441
Requirement Group: Prerequisite: EM341 and restricted to E&M majors.
Req. Designation: Technology

EM 451(3) **Course ID:011140** **2022-02-10**
Quality Management & Lean Enterprise
[Cross-listed with OM 451] This course will introduce the students to both the managerial and technical aspects of quality improvement. The course emphasizes statistical applications to quality related topics such as process/product design, process capability, quality control, design of experiment, and inspections/sampling. Other topics of interest include: Juran quality trilogy, six-sigma project methodology, and cost of quality. The course consists of a series of lecture and problems solved in class.
Components: Lecture
Course Equivalents: OM 451
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: STAT 383 and restricted to E&M majors.
Req. Designation: Technology

EM 456(3) **Course ID:010732** **2022-02-10**
Process Engineering and Design
This course is a capstone design experience for students who have completed a foundation engineering science education. Primarily designed for the Engineering & Management (E&M) program, this course involves solution of a real world technical problem. Requires both written reports and oral presentations.
Components: Lecture
Attributes: One communication unit, Offered Fall and Spring
Requirement Group: Prerequisites: Senior Standing in E&M or iE&M, ES220, and two of: ES250, ES330, or ES340. Corequisites

Req. Designation: Technology

EM 476(3) **Course ID:011141** **2022-02-10**
Management of Technology
[Cross-listed with OM 476] Management of technology links together the engineering, science, and management disciplines to plan, develop, and implement technological capabilities to be competitive in the global arena. Students taking the course will gain an understanding of the following topics: innovation, product life cycles, product development process, concurrent engineering, management of technology strategy, selecting technical projects, management of the R&D process, initiating new ventures, international technology transfer, and the management of complex projects.
Components: Lecture
Course Equivalents: OM 476
Attributes: Science, Technology and Society, Offered Fall and Spring
Requirement Group: Prerequisites: EM331 and restricted to E&M majors.
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 482(3) **Course ID:012744** **2022-02-10**
Systems Engineering and Management
Systems Engineering (SE) is an iterative process of top-down synthesis, development, and operation of real-world systems that combines technical leadership and systems management. Technical leadership is necessary for incorporating and balancing the contributions of structural, mechanical, electrical, software, systems safety, and power engineers, among others, to produce a coherent whole.Through the interdisciplinary approach of SE, systems management is focused on effectively and efficiently managing the development and operation of complex systems that result from integrating physical, smart, software, and connectivity components. Students taking this course will gain an understanding of how to create a design that considers both the business and technical needs of all customers with the goal of providing a quality product that meets customers' needs and maintain its integrity throughout its life cycle. Topics include but are not limited to fundamental concepts of systems theory and systems thinking used for SE, life cycle process
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Restrictions: Junior or Senior standing in an engineering or EM major, or permission by the instructor
Req. Designation: Technology

EM 484(3) **Course ID:012746** **2022-02-10**
Advanced Project Management
[Cross listed with OM484] This course builds on the foundation of EM/OM380 (Project Management) by introducing advanced topics in decision making, risk, and cost control as well as providing comprehensive knowledge of project scheduling and other PM tools. This course also provides an opportunity for students to further extend their PM skills in managing and controlling projects by applying the PM methods in a project management simulation using typical project management software. Students are exposed to advanced research topics in the emerging PM areas.
Components: Lecture
Course Equivalents: OM 484
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: EM/OM380
Req. Designation: Technology

Business - School of Business - Subject: Engineering & Mgmt

EM 487(1 - 3) **Course ID:012148** **2017-08-27** **Instructor Consent Required**
Special Project in Engineering and Management
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member. Prerequisites: Permission of instuctor

Components: Research
Attributes: Given When Needed
Req. Designation: Technology

Business - Engineering & Management - Subject: Engineering & Mgmt

EM 490(1 - 3) **Course ID:008228** **2016-04-05** **Instructor Consent Required**
Internship
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member. Prerequisiste: Permission from the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

EM 494(1 - 3) **Course ID:012918** **2018-11-14**
Directed Research
A research project will be completed; research projects may include laboratory projects, literature research, or individual study of interdisciplinary engineering and management topics not available in other Clarkson courses.
Components: Research
Attributes: Given When Needed
Requirement Group: Restriction: Open to Engineering and Management majors only
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Engineering & Mgmt

EM 505(3) **Course ID:013045** **2020-08-25**
Project Controls and Lean Methods in Construction
[Cross-listed with CE 505] This course will cover the use of construction project management controls typical in varying scales of projects. Using the Lean Construction model, the course will cover Lean as both a system and culture, while emphasizing the central place of project delivery processes. Topics in project controls will include: Goal Setting, Scheduling, Budgeting, Problem Solving, and Decision-Making.
Prerequisites: Graduate standing, CE 305, or consent of the instructor
Components: Lecture
Course Equivalents: CE 505
Attributes: Offered Spring Term
Req. Designation: Technology

Graduate Interdisciplinary - Engineering Management MS - Subject: Engineering & Mgmt

EM 610(3) **Course ID:012855** **2017-12-07**
Operations Management and Factory Physics
This course introduces the principles of manufacturing and service management while taking a cursory and scientific look at the processes and operations that impact an organization. The course exposes the student to a wide range of management terms and theories as they relate to strategic and tactical decision making. As such, it provides a basis on which to assess, evaluate, and recommend corrective management actions. In addition, focus is placed on developing an understanding of the relationship between operations and other business functions, such as marketing, finance, accounting, and human resources. Another aspect of the course is Factory Dynamics. This is the study of the factory interactions between people, equipment, raw materials and operations. It is the scientific study of how best to manage these complex interactions so the factory or operations as a whole will work effectively.

Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: This course requires admission to the Engineering Management MS program.
Req. Designation: Technology

Engineering - Engineering Management MS - Subject: Engineering & Mgmt

EM 620(3) **Course ID:012946** **2019-05-21**
Introduction to Artificial Intelligence: Principles and Techniques
This course will explore and discuss various theories, models, techniques and practical applications revolving around the topics of Artificial Intelligence and Machine Learning. In a rapidly changing and increasingly global economy, AI or Artificial Intelligence has become the all-powerful and an omnipresent tool/solution and is being used in some form or fashion by every industry. Artificial Intelligence is the machines which are designed and programmed in such a manner that they think and act like humans. The greatest advantage of artificial intelligence is that machines do not require sleep or breaks and are able to function without stopping. They can continuously perform the same task without getting bored or tired. When employed to carry out dangerous tasks, the risk to human health and safety is reduced. AI systems have the ability to execute tasks naturally associated with human intelligence, like speech recognition, decision-making, visual perception, and translating languages. AI would have a low error rate compared to
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EM 625(3) **Course ID:013144** **2021-11-05**
Analytics for Decision Making
The overall course objective is to provide a broad data science foundation that enables students to grasp the fundamental methods, techniques and software used to design, develop, and deploy solutions. This objective is met by introducing frameworks for understanding descriptive, predictive, and prescriptive analytics and their relationship with real life applications.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Graduate Interdisciplinary - Engineering Management MS - Subject: Engineering & Mgmt

EM 630(3) **Course ID:012857** **2018-01-11**
Law for Engineers
This course provides engineers the legal background and introductory knowledge they need to successfully navigate the many different areas of law they will encounter throughout their careers. Students will learn critical aspects of corporate law, tort (liability/accident) law, intellectual property (IP) law, and contract law during the course. They will also become familiar with, and learn to recognize, key areas of constitutional law, comparative/international law, environmental law, administrative law, and computer network/cyber law which often affect technical work on a daily basis.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: This course requires admission to the Engineering Management MS program.
Req. Designation: Technology

EM 640(3) **Course ID:012928** **2019-02-13**
Leading and Managing Organizations
Success in leading people and managing performance demands that you have an understanding of how work groups operate and what motivates employees, as well as a candid assessment of your own personality and style. The purpose of this course is to help you understand the general principles and processes of effective leadership so that you can lead in a wide variety of organizational situations. Leadership development is relevant for any student pursuing a managerial career, and is particularly relevant to students who already hold leadership positions in their organizations. Topics covered in the on-campus sessions will focus on aspects of interpersonal behavior, including personality, leadership, teamwork, and conflict management. During the online sessions we will take a more macro perspective, examining firm-level issues such as power and influence, culture, and organizational congruence.

Components: Seminar
Attributes: Given When Needed
Requirement Group: Restriction: This course requires admission to the Engineering Management MS program.
Req. Designation: Technology

EM 650(3) **Course ID:012930** **2019-03-01**
Enterprise Sustainability
There is a growing sense of urgency around climate change and resource scarcity, and a lack of trust in the ability of global economic and political systems to solve large-scale societal environmental and social problems. Increasingly, the general public expects business to proactively contribute to solving these societal problems, striving towards making a net positive environmental and social impact on the world. Sustainability managers need to know how to lead projects, and more importantly how to help bring about a cultural change within their organizations so that ultimately sustainability is fully integrated into every function. The goal of this course is to empower managers in any function (not just sustainability managers) to lead in sustainability.

This course will provide an introduction to corporate sustainability in manufacturing companies. We will
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: This course requires admission to the Engineering Management MS program.
Req. Designation: Technology

EM 660(3) **Course ID:012721** **2017-01-12**
Cost Management and Financial Analysis
The overall course objective is to increase the student's ability to deliver a project within cost expectations and to make decisions within the corporate financial perspective. This objective is met by understanding the technical underpinning of engineering economic and simulation based costing analysis, understanding how project decisions impact the organization's profit/financial health, and understanding the role of life cycle costing.
Components: Lecture
Same As Offering: EM 660
Attributes: Given When Needed
Req. Designation: Technology

Graduate Interdisciplinary - Engineering Management MS - Subject: Engineering & Mgmt

EM 660(3) **Course ID:012721** **2017-01-12**
Cost Management and Financial Analysis
The overall course objective is to increase the student's ability to deliver a project within cost expectations and to make decisions within the corporate financial perspective. This objective is met by understanding the technical underpinning of engineering economic and simulation based costing analysis, understanding how project decisions impact the organization's profit/financial health, and understanding the role of life cycle costing.
Components: Lecture
Same As Offering: EM 660
Attributes: Given When Needed
Req. Designation: Technology

EM 680(3) **Course ID:012720** **2017-01-12**
Decision Analysis and Risk Management
A successful manager needs to be equipped with the techniques and tools of decision analysis in today's competitive business environment. The primary goal of this course is to develop the student's ability to define business problems, construct quantitative models and effectively utilize decision making tools (such as MS Excel Solver, Analytic Solver Platform, and decision trees). This course introduces decision modeling techniques by focusing on the development and analysis of models for a variety of business management problems. Topics include supply chain network design, transshipment and logistics management, capital budgeting and fixed charge problems, and decision making under uncertainty and risk.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Business - Engineering Management MS - Subject: Engineering & Mgmt

EM 690(3) **Course ID:011777** **2017-01-12**
Capstone Project
Students complete a semester-long project which applies engineering management problem-solving skills to a real-world problem. Students demonstrate the application of engineering problem-solving methodology and project management. Students must demonstrate the ability to engage with a client, define a problem, derive specifications for a successful solution, generate and evaluate appropriate solutions, generate the optimal solution, successfully complete the process and present the result professionally in both oral and written format.
Components: Lecture
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 1(2 - 4) **Course ID:008229** **2015-01-19**
Engineering Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

ES 2(2 - 4) **Course ID:008230** **2015-01-19**
Engineering Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

ES 41(1) **Course ID:011738** **2015-01-23**
Spatial Thinking Skills
This course develops 3D spatial visualization skills through tutorials and exercises. Coverage includes (as time permits): surfaces and solids of revolution, combining solid objects, isometric drawings and coded plans, orthographic drawings, orthographic projections and inclined and curved surfaces, flat patterns, rotation of objects about axes, object reflections and symmetry, and cutting planes and cross sections.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ES 100(2) **Course ID:008232** **2014-11-20**
Introduction to Engineering Use of the Computer
[Cross-listed with HP 103] Introduction to computer programming using equation solving software applied to engineering problems.
Components: Laboratory, Lecture
Course Equivalents: HP 103
Attributes: Offered Spring Term
Req. Designation: Technology

ES 110(3) **Course ID:009795** **2015-08-26**
Engineering and Society
Engineers apply scientific knowledge and principles, and use the engineering design process to develop technology. While engineers frequently develop solutions to problems in controlled environments, the products that are developed are used by 'real people' in the 'real world.' Thus, it is essential that engineers have an understanding o the interactions between engineering, technology development, and society. This course will highlight the diverse applications of engineering and technological skills in addition to ethical and other concerns about the societal consequences of technological developments. Students will gain an understanding of ways that conceptual models can be used to frame how both science and technology shape society and how society can shape science and technology. Students will be introduced to the engineering design process and use it to solve a simple engineering problem. Then, through case study, they will apply the societal models and gain an understanding of how the design process can be used to solve complex,
Components: Lecture
Attributes: One communication unit, Science, Technology and Society, Offered Each Term
Requirement Group: Corequisites: MA 180 or equivalent. Open to all majors - engineering majors must be first year student

Req. Designation: Technology

ES 147(0) **Course ID:011288** **2017-01-13** **Instructor Consent Required**
First Year Research Experience
The student conducts research under the guidance of a research advisor. Appropriate for paid or voluntary non-credit bearing research experiences. By permission of research advisor or academic advisor only. Pass/no credit only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 220(3) **Course ID:008236** **2015-02-09**
Statics
Fundamental concepts of the statics of rigid bodies using a vector analysis approach; force systems, analysis of simple structures, centroids and centers of gravity, free body diagrams, equilibrium, friction and moments of inertia.
Components: Lecture, Tutorial
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA131 and PH131
Req. Designation: Technology

ES 222(3) **Course ID:008238** **2015-09-11**
Strength of Materials
Elementary analysis of the strength and deformation of deformable bodies; stress and strain at a point, Mohr's circle, axial loads, flexure, torsion, deflections and column action. Introduction to design concepts.
Components: Lecture, Tutorial
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: ES220 or consent of instructor
Req. Designation: Technology

ES 223(3) **Course ID:008239** **2022-04-06**
Rigid Body Dynamics
Introduction to the basic principles of Newtonian mechanics. Topics covered include kinematics of particles; Newton's laws of motion, energy and momentum methods; systems of particles; planar kinematics of rigid bodies; planar dynamics of rigid bodies; forces and acceleration energy and momentum methods. Special topics such as non-inertial reference frames may be introduced.
Components: Lecture
Requirement Group: Prerequisites: ES220
Req. Designation: Technology

ES 238(3) **Course ID:011252** **2020-11-05**
Introduction to Energy Systems
The focus of this course is to introduce fundamental energy principles and discuss various energy resources and options currently available, including the supply and availability as well as the demand for these energy resources. Primary consideration is given to current strategies for energy production, conversion and use, with a brief overview of renewable technologies. The course topics are presented within a social, economic, political, and environmental context to provide a comprehensive understanding of the role of energy in our current and future society. Students examine the sustainability of our current and future systems of energy resource consumption, including U.S. and global energy consumption rates as well as societal and environmental impacts. Issues such as energy efficiency, conservation, systems analysis and life cycle analysis, and the environmental and economic consequences of various sources, will be discussed. Finally, implications and relationships between global climate change and growing global energy use in the 21st
Components: Lecture
Attributes: Science, Technology and Society, Offered Spring Term
Requirement Group: Prerequisite: ES110 OR Corequisite: ES110
Req. Designation: Technology

ES 241(3) **Course ID:012860** **2018-01-29**
Solid-State Material Systems for Advanced Technologies
Topics include: Crystal structure of solid-state materials system, structural stability of materials, electronic properties of materials, optoelectronic properties of materials, engineered materials, metamaterials, low-dimensional materials, introduction of solid-state materials-based device technologies.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PH131, CM103 or CM131, and MA131 Corequisites: MA132
Req. Designation: Technology

ES 243(1 - 4) **Course ID:011282** **2017-01-20** **Instructor Consent Required**
Introductory Undergraduate Research I
The student participates in the research process under the guidance of a faculty research advisor. May include some independent work. For 1-2 credits, student prepare a short paper or report. For 3-4 credits, student prepares a paper and gives an oral presentation. By permission of research advisor only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 244(1 - 4) **Course ID:011283** **2017-01-12** **Instructor Consent Required**
Introductory Undergraduate Research II
A Continuation of ES 243. By permission of research advisor only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 247(0) **Course ID:011289** **2017-01-13** **Instructor Consent Required**
Sophomore Research Experience
The student conducts research under the guidance of a research advisor. Appropriate for paid or voluntary non-credit bearing research experiences. By permission of research advisor or academic advisor only. Pass/no credit only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 250(3) **Course ID:008240** **2016-06-27**
Electrical Science
Network concepts. DC circuits: mesh and node equations, network theorems, operational amplifiers. Complex numbers, effective values, sinusoids and phasors. AC circuits: phasor diagrams, power. Time domain solution of first order circuits.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Corequisites: MA232, and PH132
Req. Designation: Technology

ES 260(3) **Course ID:008241** **2015-02-03**
Materials Science and Engineering I
The fundamentals of the interactions between structure, processing, properties and applications of solid metals, non-metallic elements, inorganic compounds, and polymers. Topics include atomic bonding, structure, imperfections, diffusion, mechanical properties, deformation and strengthening mechanisms, failure. Possible additional topics include phase diagrams, phase transformations, electrical properties, processing, composites, corrosion, thermal properties, and environmental consideration.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: PH131, CM103 or CM131, MA131 Co-requisite: MA132
Req. Designation: Technology

ES 330(3) **Course ID:008246** **2015-02-09**
Fluid Mechanics
Basic principles of fluid mechanics. Topics include statics, forces on plane and curve surfaces, kinematics of fluid motion, integral and differential representation of conservation of mass, balance of linear and angular momenta, the first Law of Thermodynamics, Bernoulli's equation, dimensional analysis, and elementary viscous flow. Frictional losses, simple pipeline analysis and steady channel flow are covered. Understanding of the physical phenomena is stressed and vector notation is used wherever suitable.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA232 or MA231 and ES220.
Req. Designation: Technology

ES 340(3) **Course ID:008247** **2015-02-12**
Thermodynamics
The fundamental concepts of thermodynamics and their application to pure substances. Topics include: properties of pure substances; work, heat, energy and the First Law of Thermodynamics; technique of First Law analysis; disorder, entropy and the Second Law of Thermodynamics; technique of Second Law analysis.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA231 and PH132
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 347(0) **Course ID:011290** **2017-01-13** **Instructor Consent Required**
Junior Research Experience
The student conducts research under the guidance of a research advisor. Appropriate for paid or voluntary non-credit bearing research experiences. By permission of research advisor or academic advisor only. Pass/no credit only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 360(3) **Course ID:008253** **2015-01-20**
Materials Science and Engineering II
Continuation of the study of the science and engineering of materials. Emphasis is placed on the processing of materials to achieve optimum engineering properties. Topics include: heat treatment of metals and ceramics to yield strength and toughness at high temperatures; formation of composite materials (directionally solidified superalloys, transformation strengthened ceramics, fiber reinforced polymers); processing of amorphous materials for optical applications (lens, fibers, lasers); processing of magnetic materials for both hard and soft applications; and, protection of materials in corrosive environments.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES260.
Req. Designation: Technology

ES 361(3) **Course ID:008254** **2015-02-19**
Fine Particle Technology
An introduction to the characterization, processing and applications of ceramic, metal and polymer fine particles and composites. Analysis of property-structure relationships. Formation of novel bulk materials from fine powders through sintering.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CM104 or CM132.
Req. Designation: Technology

ES 375(1 - 4) **Course ID:012923** **2019-01-09** **Instructor Consent Required**
Directed Study
Special reading or laboratory study of a specific problem or subject area under the direction of a member of the faculty.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Engineering Science

ES 380(3) **Course ID:010957** **2014-11-18**
Special Topics: Biomechanics
[Cross-listed with ME 380] This course will examine the application of engineering principles to biologic systems. The structure and function of biologic tissue will be examined in the context of engineering mechanics. Emphasis will be placed on the biomechanics of human movement, including the basic principles of orthopedic biomechanics. Students will develop the skills necessary to explore biomechanics in the contemporary scientific literature and will write a term paper on a biomechanics topic of their choice.
Components: Discussion, Lecture
Course Equivalents: ME 380
Requirement Group: Prerequisites: PH131 and MA132
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Engineering Science

ES 400(3) **Course ID:008259** **2015-01-23**
Numerical and Engineering Computing
Topical coverage includes numerical methods for solving single nonlinear equations, matrix computations, systems of nonlinear equations, ordinary differential equations, partial differential equations, differential algebraic equations, and much more.

Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: ES100 or consent of the instructor.
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Engineering Science

ES 402(3) **Course ID:010940** **2014-11-20**
Biomedical Engineering Fundamentals
[Cross-listed with BR 400, BY 440] This interdisciplinary course will introduce students to basic principles of biomedical rehabilitation engineering. The course will present principles of disability and the diverse roles of engineering in medicine and rehabilitation. Students will use engineering methods to study anatomical and physiological systems including applications in rehabilitation engineering, bioinstrumentation, biosignal and image processing, biomechanics, and biomaterials.
Components: Lecture
Course Equivalents: BY 440, BR 400, BR 500, BY 540
Requirement Group: Prerequisites: MA131/132, PH131/132, junior or senior standing.
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 422(3) **Course ID:012870** **2018-04-11**
Signal Processing and Applications
This project-driven course involves qualitative and quantitative descriptions of DSP algorithms, software and applications. The class covers applications in engineering, computing, music, and the arts, with MATLAB, Java and mobile simulations.

Components: Lecture
Course Equivalents: ES 522, EE 422
Attributes: Offered Even Falls
Requirement Group: Prerequisites: MA132 or equivalent, or instructor approval.
Req. Designation: Technology

Engineering - Environmental Science & Policy - Subject: Engineering Science

ES 432(3) **Course ID:010619** **2015-02-23**
Risk Analysis
Risk assessment entails the evaluation of the hazardous properties of substances, the extent of human exposure to them and the characterization of resulting risk. It is a systematic approach to organizing and analyzing the scientific knowledge regarding potentially hazardous activities or substances. Variability and uncertainty are used to estimate the level of confidence in the risk assessment. The general approach to risk assessment including the use of default assumptions and uncertainty analysis will be presented along with illustrative examples. Graduate Students will be required to do an additional work at the graduate level.

Components: Lecture
Course Equivalents: EV 532
Attributes: 1.5 Design Credits, One communication unit, Offered Spring Term
Requirement Group: Prerequisites: CM131 or CM103.
Req. Designation: Technology

Engineering - Inst for a Sustainable Environ - Subject: Engineering Science

ES 436(3) **Course ID:011399** **2015-03-05**
Global Climate Change: Science, Engineering & Policy
The primary objective of the course is to provide the necessary background that will permit undergraduate students to understand and accurately describe the workings of the Earth's climate system, the interactions between the atmosphere, ocean, and climate, and human's involvement in altering these processes. The course is broken into four primary components: earth science, energy, policy, and programming. The highly quantitative course will use project-based experiences to allow each student an opportunity to complete a data acquisition/modeling project of their own design to show correlations between human activities, current atmospheric concentrations and resulting ecosystem change. Students will use computational programming tools (Matlab) in combination with mapping tools (Google Maps API) to quantify, analyze, and display geographical variations of integrated and averaged values of quantities studied.
Prerequisites: Quantitative and modeling skills (Matlab, Excel) are required, statistics is recommended.

Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Odd Springs
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 438(3) **Course ID:011253** **2015-02-23**
Alternate Energy Systems
[Cross-listed with EE 438] The basic technology of emerging renewable or non-carbon based energy sources will be considered, and contrasted with traditional sources of energy. Topics will include photovoltaic, wind and others. The impacts of energy storage and electrified transportation will be discussed. The capability of these technologies will be assessed, and barriers to implementation will be explored. The role of the electric power grid in enabling alternate energy technologies will be covered.
Components: Lecture
Course Equivalents: EE 538, EE 438
Attributes: One Design Credit, Offered Even Springs
Requirement Group: Prerequisite: ES250 or permission of the instructor.
Req. Designation: Technology

ES 443(1 - 4) **Course ID:011284** **2017-01-13** **Instructor Consent Required**
Undergraduate Research I
The student develops and conducts a self-contained independent research project under the guidance from a faculty research advisor. For 1-2 credits, student prepares a short paper or report. For 3-4 credits, student prepares a paper and gives an oral presentation. Junior standing required. By permission of research advisor only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 444(1 - 4) **Course ID:011285** **2017-01-13** **Instructor Consent Required**
Undergraduate Research II
A Continuation of ES 443. Junior standing required. By permission of research advisor only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 445(1 - 4) **Course ID:011286** **2015-02-03** **Instructor Consent Required**
Undergraduate Research III
A Continuation of ES 444. Junior standing required. By permission of research advisor only.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

ES 446(1 - 4) **Course ID:011287** **2017-01-13** **Instructor Consent Required**
Undergraduate Research IV
A Continuation of ES 445. Junior standing required. By permission of research advisor only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 447(0) **Course ID:011291** **2021-12-16** **Instructor Consent Required**
Senior Research Experience
The student conducts research under the guidance of a research advisor. Appropriate for paid or voluntary non-credit bearing research experiences. By permission of research advisor or academic advisor only. Pass/no credit only.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Engineering Science

ES 452(3) **Course ID:011046** **2021-08-06**
Biomaterials and Biomedical Engineering Applications
This course will examine the biomaterials, biomolecular engineering, and tissue engineering aspects of biomedical engineering. Topics covered will include metallic, ceramic, and polymeric biomaterials; manufacturing technologies; sterilization and degradation; the characterization of bulk and surface properties; mechanical and electrical properties of tissues; the interactions between biomaterials and the physiological environment; orthopedic, neural, and cardiovascular biomaterials; and biomaterials for drug delivery and medical imaging.
Components: Lecture
Requirement Group: Requirement: Junior or Senior Standing
Req. Designation: Technology

ES 459(3) **Course ID:012965** **2021-11-08**
Electrochemical Processes for Sustainability
[Cross-listed with ES559] This course introduces the fundamentals of electrochemistry and applications of electrochemical technologies for sustainability. General theory, electroanalytical techniques, and interfacial structure are discussed. These principles are then used to describe and quantify the controlling features in electrochemical separations, electrochemical water treatment, and electrochemical energy systems.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisites: CM132 (or CM104) and Corequisites: ES340 (CH260 or CM371) and junior or senior standing
Req. Designation: Technology

ES 464(3) **Course ID:008268** **2020-03-02**
Corrosion of Metals
[Cross-listed with EE564] Mechanisms of environmental degradation of materials. Methods for eliminating or reducing environmental degradation.
Components: Lecture
Course Equivalents: ES 564
Attributes: Offered Fall Term
Requirement Group: Prerequisite: CM132 (or CM104), and ES 260
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 485(3) **Course ID:011672** **2014-11-20**
Neural Engineering
[Cross-listed with EE 485, BY 485] This course applies engineering principles to the study of neuroscience and to the design of devices or techniques intended to replace missing or augment existing functions such as seeing, hearing, speaking, and walking. The course provides a detailed overview of sensorimotor systems, neurophysiology, neuroanatomy, neuropathology and clinical neurology. The class sequences through the various sensory and movement systems, providing a quantitative basis for how the nervous systems works for these systems, for how it dysfunctions, for the disability produced, and finally for how function can be restored by neuroprostheses. Students will prepare and present a paper on a neural engineering topic.
Components: Lecture
Course Equivalents: EE 585, EE 485, BY 485
Requirement Group: Prerequisites: MA132 and PH132 or PH142.
Req. Designation: Technology

ES 499(0) **Course ID:011237** **2022-02-11** **Instructor Consent Required**
Professional Experience for Engineering Majors
This course number is used to matriculate the Professional Experience requirement of the Clarkson Common Experience curriculum. The student must participate in a project-based professional experience such as a co-op, internship, directed research, significant responsibility in an appropriate team project, or a community project clearly related to the student's professional goals. Enrollment is restricted to engineering majors.
Prerequisite: Pre-approval (using the PRE-APPROVAL WORKSHEET for the PROFESSIONAL EXPERIENCE Requirement in the Wallace H. Coulter School of Engineering.)
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

ES 500(3) **Course ID:010658** **2021-04-02**
Numerical and Engineering Computing
Advanced programming course. Topical coverage includes numerical methods for solving single, nonlinear equations, matrix computations, systems of nonlinear equations, ordinary differential equations, partial differential equations, differential algebraic equations, and much more. Nonstandard graphical imagery.
Components: Lecture
Same As Offering: ES 500
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Engineering Science

ES 500(3) **Course ID:010658** **2021-04-02**
Numerical and Engineering Computing
Advanced programming course. Topical coverage includes numerical methods for solving single, nonlinear equations, matrix computations, systems of nonlinear equations, ordinary differential equations, partial differential equations, differential algebraic equations, and much more. Nonstandard graphical imagery.
Components: Lecture
Same As Offering: ES 500
Attributes: Offered Fall Term
Req. Designation: Technology

ES 510(3) **Course ID:008277** **2021-08-17**
Strategic Project Management
[Cross-listed with OM 680, OM 681] A project is a one-time or infrequently occurring operation with a unique goal, a limited lifespan and limited resources. This course will focus on project management from a decision-making perspective and how projects can be used to implement organizational strategy. The course follows the project life cycle model from project initiation to implementation to termination. Topics covered include such things as project scope development, project selection, organizational strategy, leadership, team building, planning, conflict resolution, budgeting, resource allocation, information management, control, auditing, and termination procedures. Computer applications such as MS Project, case studies, project simulations and student project teams will be an integral part of the course. This course satisfies the educational prerequisite for the Project Management Institute’s (PMI) Certified Associate in Project Management (CAPM) and Project Management Professional (PMP) certifications.
Components: Lecture
Course Equivalents: OM 680, OM 681
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Electrical & Computer Eng - Subject: Engineering Science

ES 522(3) **Course ID:011060** **2018-03-22**
Signal Processing and Applications
This project-driven course involves qualitative and quantitative descriptions of DSP algorithms, software, and applications. The class covers applications in engineering, computing, music, and the arts, with MATLAB, Java, and mobile simulations. Prerequisites: EE321 Signals and Systems, or equivalent, or instructor approval.

Components: Lecture
Course Equivalents: ES 422, EE 422
Attributes: Offered Even Falls
Req. Designation: Technology

Engineering - Chemical & Biomolecular Eng - Subject: Engineering Science

ES 552(3) **Course ID:011047** **2019-10-09**
Biomaterials and Biomedical Engineering Applications
This course will examine the biomaterials, biomolecular engineering, and tissue engineering aspects of biomedical engineering. Topics covered will include metallic, ceramic, and polymeric biomaterials; manufacturing technologies; sterilization and degradation; the characterization of bulk and surface properties; mechanical and electrical properties of tissues; the interactions between biomaterials and the physiological environment; orthopedic, neural, and cardiovascular biomaterials; and biomaterials for drug delivery and medical imaging. Students enrolled in ES552 will be expected to complete extra assignments in addition to those given to ES452 students.
Components: Lecture
Req. Designation: Technology

ES 559(3) **Course ID:012966** **2019-09-26**
Electrochemical Processes for Sustainability
[Cross-listed with ES459] This course introduces the fundamentals of electrochemistry and applications of electrochemical technologies for sustainability. General theory, electroanalytical techniques, and interfacial structure are discussed. These principles are then used to describe and quantify the controlling features in electrochemical separations, electrochemical water treatment, and electrochemical energy systems. The topics are the same as ES459 but there are additional assignments required of graduate students.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

ES 564(3) **Course ID:008285** **2020-03-02**
Corrosion of Metals
[Cross-listed with ES464] Mechanisms of environmental degradation of materials. Methods for eliminating or reducing environmental degradation.Prerequisite: CM132.
Components: Lecture
Course Equivalents: ES 464
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Engineering Science

ES 575(3) **Course ID:012127** **2015-10-19**
Sustainable Nanotechnology
[Cross-listed with CM 575, and MSE 575] The goal of this course is to provide graduate students and advanced undergraduates with a modern view of current and emerging research in nanotechnology. Topics will include: fundamental nanoscale properties and applications, green manufacturing and assembly in functional devices, interaction of nanomaterials with biological systems, the physical and chemical phenomena at nano-bio interfaces, fate, transport and transformation of engineered nanomaterials, environmental and health impact, nanometrology, nanotoxicology and hazard identification of nano-based products. Development of analytical methods and characterization tools for assessing nanoscale properties and materials will also be discussed. Students will be exposed to interdisciplinary topics and an integrated training bridging material and environmental sciences with biology and analytical chemistry. Students will be able to demonstrate a basic awareness of risks and benefits of emerging technologies and evaluate overall environmental and societal

Components: Lecture
Course Equivalents: CM 475, CM 575, MSE 575
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 580(3) **Course ID:011921** **2015-02-19**
Foundations of Teaching College Engineering Courses
The course introduces students to the foundations of engineering education. It couples pedagogical theory and best practices with practical approaches to provide a basis for teaching college level engineering courses. Topics to be covered include: theories of student learning, educational research and best practices, design of courses, delivery of course material, and developing, delivering, and assessing college level engineering courses.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

ES 581(3) **Course ID:011922** **2015-01-23**
Selected Topics in Engineering Science
An advanced graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ES 587(3) **Course ID:012912** **2018-11-02**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: PH 587, CM 487, CM 587, PH 487, MSE 587
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Engineering Science

ES 601(3) **Course ID:008270** **2014-12-05**
Mechanics of Fracture I
A study of the fundamentals of fracture mechanics is presented. Linear elastic fracture mechanics (LEFM): elastic solutions, energy balance approach, LEFM testing. Elastic-plastic fracture mechanics (EPFM): EPFM testing. Concepts for crack growth: fatigue crack growth, dynamic crack growth and arrest. Mechanism and mechanics of fracture in metallic materials, polymers, ice, composites.
Prerequisites: ES222, CE/ME554, CE/ME551, or consent of instructor.
Components: Lecture
Req. Designation: Technology

Engineering - School of Engineering - Subject: Engineering Science

ES 610(1 - 2) **Course ID:008289** **2015-02-03**
Engineering Science Seminar
Students, staff and visiting lecturers present research results and topics of current interest.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

ES 612(1 - 4) **Course ID:008291** **2017-08-27**
Directed Study in Engineering Science
For graduate students with baccalaureate degree in an engineering field.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

ES 615(1 - 15) **Course ID:008294** **2015-02-03**
Thesis, Dissertation Credits
Analytical or experimental studies in interdisciplinary engineering science under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

ES 999(1 - 10) **Course ID:011130** **2015-01-19**
Special Topics in Engineering Science
Used for graduate transfer credit for which Clarkson does not have an equivalent course number.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Pol

EV 1(2 - 4) **Course ID:008298** **2022-01-26**
Environmental Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EV 2(2 - 4) **Course ID:008299** **2022-01-26**
Environmental Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Professional Elective requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

EV 100(1) **Course ID:008300** **2022-01-26**
Introduction to Environmental Science & Policy Professions
The purpose of this course is to introduce students to environmental science and policy issues. The course is an overview of local and global issues relating to safety, health, environmental science and policy, and industrial hygiene concerns in the community and the work place. Students will review journal articles on selected topics and attend 1-2 field trips to local industries. The course will provide an open forum for discussion of curriculum choices and career options in environmental science and policy.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

EV 280(3) **Course ID:009806** **2022-03-08**
Environmental Science
This course will investigate the key concepts and principles of environmental science, emphasizing human impacts to the earth. The themes will include, energy flows through nature, and biogeochemical systems and how they have been perturbed by human activities. Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment. Quantitative analysis or air, soil, and water quality on local, regional, and global scales will be a significant component of the course. Emerging principles in environment science, including sustainability, industrial ecology, risk assessment, and the precautionary principle will be introduced. The course will prepare students to qualitatively and quantitatively analyze fluid and contaminant flow in varied biological and geologic systems.
Components: Lecture
Course Equivalents: BY 280
Attributes: Offered Fall Term
Requirement Group: Prerequisites: sophomore standing, CM131/CM132 or CM103/CM104, or consent of the instructor.
Req. Designation: Technology

EV 305(3) **Course ID:008301** **2022-03-08**
Sustainability & the Environment
This course is an introduction to sustainability and the environment. Students are expected to harness initial knowledge from science, engineering, and policy courses to collectively address environmental problems and issues on campus, or in the local community. Class time is split between lectures on sustainability and the environment, and a projects (real-world) on a local community or campus environmental issue. In addition, EV 305 allows for direct review and instructor on the quality of the written and oral communication by the students. Written and oral progress reports will be required throughout the semester by each student/group. The papers and presentations are intended to be professional format to motivate.
Components: Lecture
Attributes: One communication unit, Offered Odd Falls
Requirement Group: Prerequisite: At least Sophomore standing
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Pol

EV 312(3) **Course ID:011659** **2022-03-08** **Instructor Consent Required**
Adirondack Ecology and Environmental Science
[Cross-listed with BY 312] This course introduces ecological and environmental science concepts relevant for understanding the structure and function of terrestrial, aquatic, and human systems in the Adirondack Park. Students will learn to identify important plant and animal species representative of the Adirondack Mountains, and learn major features of ecological systems in the Park. The course will also provide the students an assessment of human impacts on the ecology of the Adirondack Park.
Enrollment is limited to those students participating in the Adirondack Semester Program.
Components: Laboratory, Lecture
Course Equivalents: BY 312
Attributes: Offered Fall Term
Req. Designation: Technology

EV 313(3) **Course ID:011377** **2022-01-26**
Biogeochemical Earth Systems Science
[Cross-listed with BY 313, CE 313] This course will investigate the key concepts and principles of environmental science emphasizing the earth's biogeochemical cycles and how they have been perturbed by human activities. Quantitative analysis or air, soil and water quality on local, regional and global scales will be a significant component of the course. Emerging principles in environmental science, including sustainability, industrial ecology, risk assessment and the precautionary principle will be introduced. In addition to the quantitative aspects, the course will consider the historical, social, and political contexts in which the practice of environmental science takes place.
Components: Lecture
Course Equivalents: BY 313, CE 313
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM132 (or CM104), or consent of the instructor
Req. Designation: Technology

EV 314(3) **Course ID:011660** **2022-03-08** **Instructor Consent Required**
Adirondack Integrated Research Project
This problem-based learning course will task students to analyze and suggest solutions to complex problems relevant to the economic, social, and environmental welfare of the Adirondack Park. The course is intended to reinforce what students have learned in other Adirondack courses.
Enrollment is limited to students participating in the Adirondack Semester Program.
Components: Research
Attributes: One Design Credit, Two communication units, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Fall Term
Req. Designation: Technology

EV 316(1 - 3) **Course ID:011640** **2022-01-26** **Instructor Consent Required**
Adirondack Environmental Science
A brief history of air, soil, and water pollution in the Adirondacks followed by an investigation into the major sources and concerns of pollution in the region. Through lectures and laboratory experiences the following areas will be studied: air, water and soil quality parameters and their measurements; material and energy balances; water, air and soil chemistry concepts; toxicology and risk assessment.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EV 320(3) **Course ID:011642** **2022-03-08** **Instructor Consent Required**
Social and Political Issues in the Adirondacks
[Cross-listed with SS 320] The historical, social, political, and environmental factors contributing to the fabric of the Adirondack Park is an evolving social experiment. The course readings will focus upon the New York State constitutional provisions that engendered the park, the policies that shaped the park, along with the political actions that influence the park today. The Adirondack State Park is extraordinary for its history and because it is a place where human residents live and recreate in sustainable ways that conserve resources and 'forever wild' regions of the park.
Enrollment is limited to those students participating in the Adirondack Semester Program.
Components: Lecture
Course Equivalents: SS 320
Attributes: Two communication units, Cultures and Societies, Offered Fall Term
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Pol

EV 322(3) **Course ID:011643** **2022-03-08** **Instructor Consent Required**
Adirondack Park
To understand a place, one must often understand the views of nature and the environment as seen by writers and essayists. Students will explore the Adirondacks through literature while experiencing the lakes, rivers, streams, and mountains. The readings, discussions, and written assignments will explore the aesthetics, the social and political climate, and the prevailing attitudes toward the environment that helped create the Adirondack Park. In addition, the course will provide students will an opportunity to participate in seasonal outdoor activities to learn how recreational activities have impacted the social, cultural, economic, and physical aspects of the Park.
Enrollment is limited to those students participating in the Adirondack Semester Program.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Fall Term
Req. Designation: Technology

EV 330(3) **Course ID:011413** **2022-01-26**
Great Lakes Water Protection
[Cross-listed with BY 330] The Laurentian Great Lakes contain 20% of the world's surface fresh water and serve both water supply and waste disposal services for over 30 million residents in the United States and Canada. Technological advances have controlled the outflow of the Great Lakes at the St. Lawrence River and this has brought with it social benefits and environmental costs. The United States and Canada share the management of this resource and have shared notable success controlling environmental consequences of development yet are faced with emerging issues. The LGL/SLR system will be examined from a multidisciplinary, multinational perspective to illustrate that a shared resource can be maintained. Students will be able to understand the forces (geomorphic, biological, chemical, social, economic, and political) that have shaped and impacted a globally significant resource.
Components: Lecture
Course Equivalents: BY 330
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Spring Term
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

EV 390(3) **Course ID:011676** **2022-01-26** **Instructor Consent Required**
Sustainability Project Experience
This course prepares students for and includes a two-week intensive work/study experience at a business with a stated sustainability focus. Students will study the nature of the business and their current sustainability practices through structured class time prior to traveling. Students successfully completing this course will gain a better perspective on the technology, business, cultural and regulatory constraints and opportunities that enable the enterprise to operate in a sustainable fashion. Interdisciplinary teams of students will identify additional possible projects to creatively overcome complex, real-world sustainability challenges for the business, and complete a preliminary feasibility study that includes interdependent technical, economic and environmental considerations. Project ideas and progress will be communicated through oral presentations and progress reports throughout the semester, culminating in a presentation and report to the business staff.
Components: Lecture
Attributes: Three Design Credits, Two communication units, Science, Technology and Society, Offered Spring Term
Requirement Group: Prerequisites: At least sophomore standing & permission of the instructor
Req. Designation: Technology

EV 400(1 - 3) **Course ID:008308** **2022-03-08**
Environmental Science Capstone
This course is part one of a two course sequence with EV 401 that acts as the cornerstone of the Environmental Science and Policy and Environmental Health Science Programs. Each student will conduct a research project as an individual or in a group that involves several components of the scientific process. Students will be given lectures on research methods and will be required to have weekly meetings with a capstone advisor. At these meetings, work that has been completed will be evaluated and subsequent goals will be planned and established. In addition, several drafts of a final Capstone report will be written throughout the semester. The final paper is meant to be similar to the process of writing a thesis, both in scope and quality. The final presentation of this course is designed to be the culmination of a student's experience in the Environmental Science & Policy and Environmental Health Science Program, and the projects will be presented at the SURE conference or a similar type of forum.
Components: Lecture
Attributes: One communication unit, Offered Fall and Spring
Requirement Group: Prerequisites: Senior status in EHS or ES&P or consent of the instructor
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Pol

EV 401(1 - 3) **Course ID:010966** **2022-03-08**
Capstone Project (continuation)
This senior level course is the conclusion of the Capstone Project. The course is for students who have taken EV400 and will be finishing their Capstone Project. The course will conclude with a final paper and presentation.
Components: Independent Study
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: EV400 or consent of the instructor.
Req. Designation: Technology

EV 490(0 - 3) **Course ID:008312** **2022-03-08**
Internship/Co-op
Students who obtain a internship/co-op position should register for this course to document their professional experience on their transcript. During the fall semester, spring semester, or summer, a student must complete a professional experience that is not necessarily directly environmental science or environmental health science related, but clearly meets the professional goals of the student and the Clarkson university-wide requirements for a professional experience. The experience must involve a minimum of 120 hours of training and work, and must be pre-approved by the student's faculty advisor or director of the program. The student can obtain credit for the work experience by registering for this course the semester following the position, then writing a paper 20 page paper and doing a formal presentation. The amount of credit will be commiserate with the amount of work. Students will be required to keep a journal of work activities and submit the journal entries to the EHS program director upon completion of the professional
Components: Independent Study
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EV 492(0 - 3) **Course ID:010330** **2022-03-08**
Internship/Co-op
Students who obtain a (summer) internship/co-op position may obtain credit for the work experience by registering for this course the semester following the position. Students will be required to keep a daily journal of work activities and submit the journal entries to the ES&P Program Director every two weeks. During the semester following the internship/co-op, a 10-page report on some aspect of their work experience and a 30 minute presentation will be required.
Components: Independent Study
Attributes: Offered Fall Term
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EV 494(1 - 3) **Course ID:010352** **2022-03-08**
Directed Research for Undergraduates
A research project will be completed; research projects may include laboratory projects, literature research, or individual study of environmental science, environmental engineering, and/or environmental policy topics not available in other Clarkson courses.
Components: Research
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EV 495(1 - 3) **Course ID:011304** **2022-03-08**
Directed Research for Undergraduates
A research project will be completed; research projects may include laboratory projects, literature research, or individual study of environmental science, environmental engineering, and/or environmental policy topics not available in other Clarkson courses.
Components: Research
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

EV 496(1 - 3) **Course ID:011305** **2022-03-08**
Directed Research for Undergraduates
A research project will be completed; research projects may include laboratory projects, literature research, or individual study of environmental science, environmental engineering, and/or environmental policy topics not available in other Clarkson courses.
Components: Research
Attributes: Offered Spring Term
Requirement Group: Prerequisite: Open to EHS or ES&P major or minor only, or by consent of the program director
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Environmental Science & Policy

EV 502(3) **Course ID:013050** **2022-06-06**
Applications in Geospatial Analytics, Science, and Engineering
[Cross-listed with CE 502, SC 502] This course will use techniques in geospatial analytics, science, and engineering to address applied challenges in various contextual situations. Geotagging, network analysis, spatial visualization, geospatial data manipulation, cartographic presentations, and other similar methods will be studied and applied to real-world or research applications. Students will develop a set of tools that enable completion of projects in the major field using geospatial capabilities.
Prerequisites: Graduate standing, CE 301, or consent of the instructor
Components: Laboratory, Lecture
Course Equivalents: CE 502, SC 502
Attributes: Offered Spring Term
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Pol

EV 532(3) **Course ID:008278** **2022-01-26**
Risk Analysis
Risk assessment entails the evaluation of the hazardous properties of substances, the extent of human exposure to them and the characterization of resulting risk. It is a systematic approach to organizing and analyzing the scientific knowledge regarding potentially hazardous activities or substances. Variability and uncertainty are used to estimate the level of confidence in the risk assessment. The general approach to risk assessment including the use of default assumptions and uncertainty analysis will be presented along with illustrative examples.
Prerequisites: graduate standing or senior with >B average.
Components: Lecture
Course Equivalents: ES 432
Attributes: Offered Spring Term
Req. Designation: Technology

EV 536(3) **Course ID:011518** **2022-01-26**
Global Climate Change: Science, Engineering & Policy
The primary objective of the course is to provide the necessary background that will permit students to understand and accurately describe the workings of the Earth's climate system, the interactions between the atmosphere, ocean, and climate, and human's involvement in altering these processes. The course is broken into four components covering earth science, energy, policy, and database access/programming. This highly quantitative course will use project-based experiences to allow each student an opportunity to complete a data acquisition/modeling project of their own design to show correlations between human activities, current atmospheric concentrations, and resulting ecosystem change. For example, the global spatial and temporal distributions of greenhouse gases, clouds, aerosols, radiation, etc. Students will use computational programming tools (Matlab, Excel) in combination with mapping tools (Google Maps, API) to quantify, analyze, and display geographical variations of integrated and averaged values of quantities studied. The project will
Components: Lecture
Req. Designation: Technology

EV 590(1 - 3) **Course ID:011924** **2022-01-26**
Special Topics in Environmental Science and Engineering
Advanced study of special topics in the area of environmental science and engineering.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

EV 591(1 - 3) **Course ID:011923** **2022-01-26**
Special Topics in Environmental Politics and Governance
Advanced study of special topics in the area of environmental politics and governance. With approval, students may take this class up to three times as long as the topical area is substantially different and the course is not repeated in the same semester.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

EV 610(1) **Course ID:011012** **2022-01-26**
ISE Graduate Seminar
Seminar course for ISE graduate students in the Environmental Science and Engineering and the Environmental Politics and Governance (EPG) programs.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

EV 612(1 - 15) **Course ID:010920** **2022-01-26**
Thesis, Dissertation or Special Project
Analytical or experimental studies in civil and environmental engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis, dissertation, or project report as appropriate to the degree program.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Environmental Science & Po

EV 999(1 - 10) **Course ID:011098** **2022-01-26**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Film Studies

FILM 1(2 - 4) **Course ID:010814** **2015-01-19**
FILM Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

FILM 2(2 - 4) **Course ID:010815** **2015-01-19**
FILM Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

FILM 226(3) **Course ID:011931** **2015-03-05**
Short Film Screenwriting
[Cross-listed with COMM 226] In this course, you will learn the process of writing short screenplays for narrative fiction films of any genre. Short films can be anywhere from 30 seconds to 40 minutes long, though the majority of them fall between seven and fifteen minutes. Each student will complete two short scripts and then revise one of these from the ground up. Since this is a workshop, you are expected to comment thoughtfully on your classmates' work, as they will comment thoughtfully on yours. Though there is some reading in this course, your primary concern should be writing, writing, writing!
Components: Lecture
Course Equivalents: COMM 226
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

FILM 230(3) **Course ID:012113** **2015-10-21**
Cinemas of Resistance
This course means to explore major film-making movements that fall within a category of “cinema of resistance.” We will discuss concepts in and approaches to film theory and film-making that resist a Western, hetero-normative, white, and/or patriarchal discourse and will contextualize feminist and queer cinema, black cinema, postcolonial, imperfect, and third cinema, among others. We will furthermore emphasize how films are tied to the political reality of their time and pace, including major historical moments of resistance such as decolonization, the feminist movements, the Civil Rights Movement, LGBTQ rights movements, and others. While these will be our major points of discussion, we will also touch on issues like genre, spectatorship, and politics of marketing and distribution. We will watch and discuss films by filmmakers such as Vittorio De Sica, Ousmane Sembene, Julie Dash, Sally Potter, Spike Lee, Gillo Pontecorvo, and Stephen Frears, among others.
Components: Laboratory, Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

FILM 235(3) **Course ID:012136** **2018-02-23**
Crossing Borders
In this class, we want to take a close look at the representation of migration and border crossings in global cinema from the U.S., Canada, Germany, France, the U.K. Senegal, Nigeria, Algeria, Iran, Israel, Mexico, Argentina, and China.
More often than not, conversations approach the issue of migration on a policy level, but in this class we want to take a look at how filmmakers from around the world imagine individual migrant stories and get a sense of the body of migration films that has emerged over the past three decades. Although we will certainly address policy issues, political debates, and legal frameworks, we want to focus on how cinema can create an individual humanity of migrant and refugee characters. What are the politics of representation in an unequal world order? How is the migrant humanized or de-humanized? Does a certain way of representing immigrants indicate specific national anxieties? We will discuss issues such as clandestine border crossings, migrant
Components: Laboratory, Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Film Studies

FILM 237(3) **Course ID:012882** **2022-02-11**
The Horror Film
In addition to being one of the most consistently profitable film genres, horror movies also provide a window into the culture anxieties captured at the time these films were made. This course examines horror films across a variety of sub-genres over the past several decades. In addition to watching these films, students will read commentary by critics and scholars that has shaped the way we think about horror films. Students will also have an opportunity to learn the basic tools of film studies while also honing their writing abilities.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Even Falls
Req. Designation: Technology

FILM 250(3) **Course ID:012759** **2016-09-27**
Dystopian Visions in International Cinema
In this course we want to explore the representations of various forms of dystopias in international cinema and our own fascination with these ""bad"" fictional places. How might dystopian films represent and recreate societal developments and anxieties? How do filmmakers and authors respond to different socio-political contexts and concerns, such as oppressive totalitarian regimes, environmental destruction, natural disasters, and/or medical catastrophes? Finally, we will investigate issues such as religion, gender, sexuality, race, and class as they relate to dystopian scenarios.
Components: Laboratory, Lecture
Attributes: One communication unit, Imaginative Arts, Given When Needed
Req. Designation: Technology

FILM 260(3) **Course ID:013137** **2022-02-11**
Major Marginalized Movie-Makers
Using the lens of the director, or auteur, and mainly focusing on American films from the last 20 years, this class will study the productions of people who have historically been—and continue to be—underrepresented in mainstream cinema: BIPOC, LGBTQIA2+ people, and women. We will consider, for example, how directors implement their creative vision in a largely collaborative industry, as well as how directors from marginalized groups have “broken into” Hollywood. Over the course of the semester we will watch two or three films by each director and discuss not only social and cultural aspects of each film but also how to analyze theme and style across an auteur’s body of work. Our primary objectives will be to consider how marginalized peoples use fictional narrative films to engage audiences with cultural and social worldviews to which they may not have been previously exposed, AND for audiences who don’t often see their own cultural and social experiences reflected on screen. We might think, for example, about how Taika Waititi’s vision for Thor: Ragnarock can be
Components: Laboratory, Lecture
Attributes: One communication unit, Imaginative Arts, Offered Even Springs
Req. Designation: Technology

FILM 322(3) **Course ID:008590** **2015-03-05**
The Hollywood Cinema
[Formerly LF373] The Hollywood Cinema was launched in the early part of this century when a group of New Yorkers transferred their operations to the warmth and bright natural light of Los Angeles. Since then, the Hollywood style of filmmaking has grown to be a dominant influence in world cinema. In this course, students will study the history, economics, technology and theory of Hollywood filmmaking. The course will explore the different means through which movies communicate with views, focusing on technical components such as photography, frame compositions, movement, sound, and editing, as well as more literary components such as screenplay, acting, and directing. It will explore as well the cultural components of film viewing, since the ultimate goal of the course is to gain a better understanding of the movies that both reflect and affect the lives and times of those who make and see them.
Components: Laboratory, Lecture
Attributes: One communication unit, Economics and Organizations, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Film Studies

FILM 326(3) **Course ID:011955** **2015-03-05**
Feature Film Screenwriting
In this course, you will learn the process of writing a feature-length screenplay. You will devise an original story idea, craft intermediate documents (i.e. logline, treatment, and beat sheet), and then write a first draft. Our goal is not to complete a polished draft (most screenplays go through at least a dozen revisions), but rather to execute a full draft in proper screenplay format that hits all the dramatic turning points, fleshes out characters and dialog, and leaves you will a document ready for substantive revision - now that you know what you're writing. Since this is a workshop, you are expected to comment thoughtfully on your classmates' work, as they will comment thoughtfully on yours. Along the way, you will read several professional scripts and complete a brief critique of each. We will also learn about the profession of screenwriting, including what to do with finished scripts, how to seek representation, and what the Writers Guild of America is. Though there is a good amount of reading in this course, your primary concern should be
Components: Lecture
Same As Offering: COMM 326
Attributes: Two communication units, Imaginative Arts, Given When Needed
Req. Designation: Technology

FILM 340(3) **Course ID:008587** **2022-02-11**
World in a Frame
[Formerly LF370] Film is a complex medium that surrounds its participants, conveying ideas and emotions through the combination of words, images, sounds, and music. This course will explore the different means through which movies communicate with viewers, focusing on technical components such as photography, frame composition, movement, sound, and editing, as well as on more literary components such as screenplay, acting, directing, and producing. In the process of this exploration, class members will also learn about the major areas of film theory, since the ultimate goal of the course is to gain a better understanding of the movies that both reflect and affect the lives and times of those who make and see them.
Components: Laboratory, Lecture
Attributes: One communication unit, Imaginative Arts, Offered Odd Springs
Req. Designation: Technology

FILM 345(3) **Course ID:013086** **2022-02-11**
Film and Native America
This course focuses on the filmmaking practices of Native American and global Indigenous communities over the past 30 years. We will consider such concepts as Fourth Cinema, self-representation, authorship and genre definitions. How, for example, does Indigenous horror or documentary film have its own aesthetic and cultural concerns? Students will be introduced to both the history and theory of Indigenous cinema, from the factors motivating its emergence to the major movements and representative filmmakers. Further, students will become acquainted with aesthetic and narrative practices in Indigenous filmmaking. Although our focus will be on Turtle Island (the landmass now known as North America), we will also broaden our perspective to compare global Indigenous movements. Through the study of films by Native American and global Indigenous peoples, along with critical readings about film studies and Indigenous cultures, students will be introduced to, discuss, research, and analyze the complex nature of Indigenous cultures and societies. While the focus of
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Offered Odd Springs
Req. Designation: Technology

FILM 490(1 - 10) **Course ID:010765** **2015-02-03** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in film studies for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

Business - School of Business - Subject: Finance

FN 1(2 - 4) **Course ID:008333** **2015-06-30**
Finance Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

FN 2(2 - 4) **Course ID:008334** **2015-06-30**
Finance Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

FN 361(3) **Course ID:008335** **2017-07-06**
Financial Management
(May be used to satisfy a CUSB M.B.A. or M.S. foundation requirement.)
The basic goals of this introductory finance course are to familiarize students with the concepts and tools used in corporate financial management decisions. These include the analysis of financial statements for long-term financial planning, the notion of present value in addition to the relationship between risk and return. The concepts and techniques are, in turn, used to evaluate and make decisions regarding the firm's capital expenditures and capital structure as well as security valuation.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA/STAT282, MA/STAT383 or MA330, EC150 or EC350, AC203 or AC/EM205 (or their equivalent

Req. Designation: Technology

FN 455(3) **Course ID:008337** **2015-06-30**
Venture Capital and Private Equity
Course is designed to address financial issues relating to high tech industries and the new economy. Topics covered will include venture capital, and in-depth study of the IPO process, valuation, capital structure, long run performance and other issues related to new industries.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: FN361.
Req. Designation: Technology

FN 462(3) **Course ID:008338** **2022-02-10**
Investments
Beginning with the formulation of individual and institutional investment objectives and policies, this course examines the various assets, securities, and contracts provided in the private and public sector. Besides the characteristics of these investments vehicles, the course also looks at how trades occur in the respective markets and the general investment-decision making process.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: FN361.
Req. Designation: Technology

FN 464(3) **Course ID:008339** **2015-06-30**
Financial Management II
This course introduces students to the complexities of financial management while providing a comprehensive overview of the major issues in Financial Management. Picking up where FN361 left off, FN464 will focus on financial strategy and the right-hand side of the balance sheet. Specific topics will include: an introduction to capital markets and the issuing of securities, capital structure issues, dividend policy, working capital considerations, mergers and acquisitions, and corporate governance. The course will integrate concepts from accounting, statistics, and economics.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: A grade of C or better in FN361; Corequisite: AC 312
Req. Designation: Technology

Business - School of Business - Subject: Finance

FN 467(3) **Course ID:008340** **2015-06-30**
International Finance
This course explores issues in international finance, especially as they pertain to financial management. Coverage includes an overview of the international financial environment, encompassing topics such as the international monetary system, balance-of-payments, trade agreements, and capital flows such as foreign direct investment. Specific attention is given to understanding exchange rate systems, purchasing-power parity (PPP), interest rate parity and international arbitrage. Techniques for measuring and managing exchange rate risk are covered in detail.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: FN361, EC/EM150 and EC151 or EC350.
Req. Designation: Technology

FN 468(3) **Course ID:008341** **2022-02-10**
Financial Markets and Institutions
[Cross-listed with EC 468] Emphasis is placed on understanding the basics of managing financial institutions, such as banks, the flow of funds, markets, and regulatory agencies that affect the institutions. The course addresses risk management, term structure of interest rates, international and domestic market operations and policy questions about financial markets and related topics.
Components: Lecture
Course Equivalents: EC 468
Attributes: Offered Spring Term
Requirement Group: Prerequisite: FN361.
Req. Designation: Technology

FN 470(3) **Course ID:011335** **2015-07-08**
Strategic Financial Management
This case oriented capstone Finance course is designed to acquaint students with the fundamental issues in strategic financial management using financial markets. Using the underlying principle of shareholder wealth maximization, the key role of valuation in the strategic planning process will be highlighted by studying corporate decisions that interface with financial markets. Both theoretical valuation models and methods used in practice 'on the street' will be discussed, compared and implemented to measure the value created by investment, divestment, and restructuring decisions. The course examines the causes of value gaps in firms and develops methods to close the gaps and unlock hidden value. We will rely heavily on material from all previous Finance and Accounting courses.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: FN464
Req. Designation: Technology

FN 474(3) **Course ID:008343** **2022-02-10**
Models for Financial Analysis
The objective of the course is to understand how financial statement information affects the market value of securities. This course examines assessment of the firm through in-depth analysis of the financial statements. In addition to direct and ratio analysis of the financial statements, the course examines analysis of such topics as short and long-lived assets, tax strategy, leasing, pension plans & benefits, hedging, off-balance sheet considerations, business combinations, other forms of restructuring, mutlinational operations, credit and other risk analysis. The impacts of import FASB and international accounting and tax rules are examined. Coverage is done within a CFA (TM) framework.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: FN361.
Req. Designation: Technology

FN 575(1 - 3) **Course ID:012002** **2015-07-08**
Professional Fund Management I
Professional fund management involves two principal topic areas: Portfolio management and security analysis. Portfolio management involves establishing an investment strategy and constructing a portfolio of financial assets consistent with said strategy. Security analysis on the other hand involves the evaluation of individual financial securities. While we address both areas throughout the semester, the focus of this class is security analysis. The primary structure of this course is an application of fund management with a focus on a rotating investment style. Each semester, students will be directed to follow different investment styles such as, sector rotation, growth, or quantitative analysis. Furthermore the class will be responsible for managing a designated portion of the Clarkson University endowment. This student managed investment fund (SMIF) will be primarily invested in equity securities; security selection within the equity assets class will be made by the current class members.
Components: Lecture
Req. Designation: Technology

Business - School of Business - Subject: Finance

FN 576(1 - 3) **Course ID:012003** **2015-07-08**
Professional Fund Management II
Professional fund management involves two principal topic areas: Portfolio management and security analysis. Portfolio management involves establishing an investment strategy and constructing a portfolio of financial assets consistent with said strategy. Security analysis on the other hand involves the evaluation of individual financial securities. While we address both areas throughout the semester, the focus of this class is security analysis. The primary structure of this course is an application of fund management with a focus on a rotating investment style. Each semester, students will be directed to follow different investment styles such as, sector rotation, growth, or quantitative analysis. Furthermore the class will be responsible for managing a designated portion of the Clarkson University endowment. This student managed investment fund (SMIF) will be primarily invested in equity securities; security selection within the equity assets class will be made by the current class members.
Components: Lecture
Req. Designation: Technology

FN 607(2) **Course ID:008348** **2015-06-30**
Financial Management (MBA Module)
[Cross-listed with FN 608, FN 610] An application of the tools and models that produce better decisions for the firm in short and long term. Asset selection, risk management, inventory management, credit and capital acquisition, and overall value enhancement are covered. Emphasis is put on the quantitative tools, the practices of existing corporations, and the international environment.
Components: Discussion, Lecture
Course Equivalents: FN 608, FN 608
Attributes: Offered Spring Term
Requirement Group: Restriction: Admission to the MBA program required
Req. Designation: Technology

FN 608(3) **Course ID:008349** **2018-05-20**
Financial Management
[Cross-listed with FN 607, FN 610] This course introduces students to the complexities of financial valuation and decision-making while providing a comprehensive overview of the major issues in Corporate Finance. Specific topics will include: valuation of financial instruments, capital budgeting, an introduction to capital markets, the assessment and pricing of risk, capital structure issues, dividend policy, and working capital considerations. The course will integrate concepts from Accounting (Income Statement and Balance Sheet Analysis as well as pro forma statements), Decision Sciences (Excel, modeling and sensitivity analysis), and Economics (wealth maximization, demand estimation and forecasting).
Components: Lecture
Same As Offering: FN 608
Course Equivalents: FN 607
Attributes: Offered Summer Term
Req. Designation: Technology

Business - CRC Business - Subject: Finance

FN 608(3) **Course ID:008349** **2018-05-20**
Financial Management
[Cross-listed with FN 607, FN 610] This course introduces students to the complexities of financial valuation and decision-making while providing a comprehensive overview of the major issues in Corporate Finance. Specific topics will include: valuation of financial instruments, capital budgeting, an introduction to capital markets, the assessment and pricing of risk, capital structure issues, dividend policy, and working capital considerations. The course will integrate concepts from Accounting (Income Statement and Balance Sheet Analysis as well as pro forma statements), Decision Sciences (Excel, modeling and sensitivity analysis), and Economics (wealth maximization, demand estimation and forecasting).

Components: Lecture
Same As Offering: FN 608
Course Equivalents: FN 607
Attributes: Offered Summer Term
Req. Designation: Technology

Business - School of Business - Subject: Finance

FN 610(3) **Course ID:011965** **2019-11-01**
Financial Analytics
This course introduces methods and tools for financial data analysis in SAS and Python, focusing on analyzing financial information data and stock return data. Topics covered in this course include, but are not limited to, univariate analysis, regression analysis, panel data models, event studies, stock return anomalies, high-frequency data analysis, and Monte Carlo simulations. A variety of data sources are used: financial websites, government sites, and finance research databases such as WRDS. Students will become proficient in financial data analysis, which will prepare them for careers in the financial industry.

Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: IA 530 or equivalent.
Req. Designation: Technology

Business - CRC Business - Subject: Finance

FN 615(3) **Course ID:013104** **2021-04-23**
Financial Modeling and Analysis
The objective for this course is to develop the financial modeling skills used in the application of financial theory to practical problems in investment analysis, portfolio management, and valuation. Financial models have become increasingly complicated over the years, and this course is intended as an introduction to some of the modeling techniques used by professionals in the finance field. Topics covered include construction of free cash flows, forecasting cash flows, capital budgeting, risk measurement, and portfolio choice subject to constraints. The course is suitable for students seeking a career in finance, but also for students with broader interests who wish to strengthen their general modeling skills.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: FN608
Req. Designation: Technology

FN 619(3) **Course ID:012546** **2016-07-01**
Investments
[Formerly MBA 619] This course provides an in-depth analysis of modern investment strategies and portfolio management techniques. Current theory, empirical evidence, and institutional practices are considered. Topics covered include portfolio theory and asset pricing models, market efficiency, fixed-income portfolio management and immunization, equity valuation models, the valuation of options and option strategies, and portfolio management and performance evaluation.
Components: Lecture
Req. Designation: Technology

FN 629(3) **Course ID:012556** **2016-07-01**
Money, Markets, and Banking
[Formerly MBA 629] The course covers the nature and functions of money and finance in the economy. Commercial and central banking, monetary theory, and monetary policy are also considered.
Components: Lecture
Req. Designation: Technology

FN 661(3) **Course ID:012570** **2016-07-25**
International Finance
[Formerly MBA 661] An analysis is made of international financial markets and the special problems and opportunities associated with the financial management of multinational firms. The international monetary and banking system (including the World Bank and IMF), balance of payments, and economic relationships are also examined. Foreign exchange and interest rate risk management, arbitrage, international equity and debt financing activities, derivatives, multinational capital budgeting, political risk, international taxation and accounting issues are considered. Coursework involves an intensive team research project focused on a specific country and the international financial exposures of select global corporations.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Business - School of Business - Subject: Finance

FN 680(3) **Course ID:008357** **2015-06-30**
Strategic Financial Management
This course examines in depth (1) financing courses for entrepreneurs and business developers, as well as (2) risk management methods. Besides the capital markets, the sources for operating and fixed asset financing for firms in development or with strategic alliances include venture capital, vendor and customer financing, bank and insurance company loans, and leasing. In addition to financing topics, commodity price risk management, as achieved with forward contracting, futures contracts, over-the-counter options and swaps, is examined as means to control price uncertainty.

Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: FN607 or consent of the instructor
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: French Language

FRN 580(3) **Course ID:012396** **2021-10-08**
MAT Project in French (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

FRN 585(3) **Course ID:013107** **2021-04-27**
Advanced French Grammar
This course is designed to give students who already have a deep understanding of the French language and French and francophone cultures the opportunity to more fully develop grammatical knowledge and accuracy in French. Emphasis will be placed on listening, speaking, reading, and writing in French using complex grammatical structures. Students will complete a systematic exploration of functional and stylistic features and gain a firmer grasp on grammar, understanding what grammar is and what purposes it serves, in addition to knowing grammatical rules.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

FRN 988(3) **Course ID:012408** **2017-07-01**
Independent Study in French
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

FRN 989(3) **Course ID:012409** **2017-07-01**
Independent Study in French
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Other - Student Affairs - Subject: First Year

FY 100(1) **Course ID:008361** **2022-01-21**
First Year Seminar
[Cross-listed with PE 100] With a focus on group work and team dynamics, this adjustment course is required for all first-year students. It introduces the mission and expectations of the learning process at Clarkson; builds communication and teamwork skills; and provides some fundamental content relating to wellness and relationships during the college experience. Discussion, team activities, leadership opportunities, and interaction with upperclass peer educators form the foundation of the course.

Components: Seminar
Course Equivalents: UNIV 100
Requirement Group: Restriction: Freshman standing
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Geology

GEO 580(3) **Course ID:012413** **2021-10-08**
MAT Project in Earth Science (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?

Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: German Language

GER 580(3) **Course ID:012420** **2021-10-08**
MAT Project in German (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

GER 988(3) **Course ID:012424** **2018-06-13**
Independent Study in German
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

GER 989(3) **Course ID:012425** **2018-06-13**
Independent Study in German
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Health Sciences - Lewis School - Subject: Health Management

HC 190(4) **Course ID:013125** **2021-08-30**
EMT Basic
This course will provide students with the knowledge and skills necessary to care for the sick and injured in the prehospital setting as an Emergency Medical Technician (EMT). Course topics include the recognition and treatment of respiratory, cardiac, diabetic, and other medical emergencies. Environmental exposure, traumatic injuries, emergency childbirth, and psychological emergencies will also be examined. Successfully completing this course will fulfill the educational requirements for the student to take the New York State EMT certification exam. Once certified, students may utilize their skills in a variety of settings including EMS and first responder agencies, health care facilities, and to aid their own friends and family. This course will help prepare students for future healthcare studies and careers. Students planning on working or volunteering with an EMS agency will be capable of performing the job expectations of an entry level EMT safely and effectively on completion of this course.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

HC 405(1 - 3) **Course ID:013165** **2022-04-08**
Experiential Learning in Health Care
This is as an independent study course under the mentorship of a member of the Lewis School of Health Sciences faculty. This is a variable credit course (1-3cr) where 50hrs is equal to 1 credit hour. The student is required to complete at least 50 hours of work in a health profession setting. The work must include some form of interaction with health professionals and with patients or analogous health-service recipients. Examples include healthcare internships or volunteer positions at a hospital or clinic, completions of HS 210 Health Coaches II, serving as an EMT, or emergency first-responder. Conducting research with medical applications that does not involve working with patients/ health-service recipients will not meet the requirements for this course. Upon completing each 50hr experience, the student will prepare a short (around 3 page) self-reflective essay on what the student did and learned during the experience, and how the experience has affected the student’s professional goals and preparation. In the essay(s), specific
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 600(3) **Course ID:012426** **2018-08-09**
Introduction to Health Systems
[Formerly HCM 500] This course examines the determinants of health, illness, and medical care utilization, institutional arrangements and settings for the delivery of acute and chronic care, the doctor-patient relationship, resource allocation and financing, and measuring and evaluating system performance.
Components: Lecture
Course Equivalents: HC 630
Attributes: Offered Fall Term
Req. Designation: Technology

HC 601(3) **Course ID:012433** **2017-10-02**
Swiss Healthcare Study Tour
[Formerly HCM 601] This Study tour will give Healthcare MBA students a better understanding of the healthcare delivery system in Switzerland. Students will have an opportunity to visit research hospitals, R&D centers, and pharmaceutical companies and learn firsthand about the unique characteristics of the system. We will also have seminars where experts in the field will discuss current issues in terms of healthcare delivery.
Components: Lecture
Req. Designation: Technology

Business - CRC Healthcare Data Analytics - Subject: Health Management

HC 602(3) **Course ID:012539** **2017-09-29**
Advanced Statistics and Data Visualization
[Formerly MBA 606] This is an applied course on advanced statistical techniques that are commonly used in health care and business settings. The course will be based on case studies that incorporate typical challenges of a real-life application: Large data sets with mixed types of variables (e.g., qualitative and quantitative), missing data, lurking variables, correlated variables and uncontrolled variation. The course objective is to enable students to become effective users of advanced statistical techniques in support of business decision making. The topics covered will include logistic regression, multivariate analysis (principal components, clustering, discriminant analysis), partitioning analysis, and time series modeling. Students will learn to identify high impact application opportunities for each technique, plan and execute their own data-based investigations, apply the appropriate statistical modeling technique, and report their findings and recommendations. The role of effective data visualization as a key element in modern data
Components: Lecture
Attributes: Offered Winter Term
Requirement Group: Prerequisites: IS647
Req. Designation: Technology

HC 603(3) **Course ID:012540** **2017-09-29**
Data Architecture
[Formerly MBA 607] Database management systems are standard tools that enable the storage and retrieval of data within modern information systems. Database concepts are now an accepted part of most computer science courses. These introductory units tend to concentrate on the use of relational database systems. This advanced module, in contrast, deals with implementation aspects of relational systems and provides students with the knowledge of the current enhancements to relational database systems, distributed database systems (e.g. Hadoop) object oriented database and XML database systems. The course will also include an introduction into SQL to query relational databases.
Components: Lecture
Attributes: Offered Winter Term
Requirement Group: Prerequisites: HC468 or IS606
Req. Designation: Technology

HC 604(3) **Course ID:012434** **2017-09-29**
Hospital Analytics
[Formerly HCM 604] An application of principles of analytics to hospital settings, problems, and strategic issues. Students will learn the array of alternative platforms hospitals use for collecting, storing, and distributing data within the hospital-health system setting, including data displays, analytical modules, and user interfaces. Students will also work with hospital data to answer clinical and strategic questions that senior leaders pose, and understand the promise and limitations of the data. Finally, students will be exposed to issues related to data communication and sharing among internal constituencies including owned physician practices and subsidiaries, related parties (e.g., PHO’s and voluntary physicians), and Health Information Exchanges through RHIO’s.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: HC602, HC603, and HC642
Req. Designation: Technology

HC 605(3) **Course ID:012428** **2022-01-26**
Health Operations
[Formerly HCM 505] This course instructs the students in quantitative methods useful for analysis, improvement, and design of efficient and effective organizational processes within a health-care organization. Operations management (OM) is concerned with evaluating the performance of operating units, understanding why they perform as they do, designing new or improved operating procedures and systems for competitive advantage, making short-run and long-run decisions that affect operations, and managing the work force. Health systems OM is the analysis, design, planning, and control of all steps necessary to provide a service for a client. The course will involve readings from a selected text, review of published studies, exercises in internal and external benchmarking, and exploration of the tools and methods promoted at the national level.
Components: Lecture
Attributes: Offered Fall and Spring
Req. Designation: Technology

Business - CRC Healthcare Data Analytics - Subject: Health Management

HC 606(3) **Course ID:012435** **2017-09-29**
Payer Analytics
[Formerly HCM 606] Health insurers and healthcare providers share a common mission of improving health however their means to achievingtheir mission vary materially. This course will focus on the analytics health insurers utilize to facilitate affordable, quality healthcare. We will discuss and analyze the approaches health insurers take to discover and communicate meaningful patterns in data from historical information reporting to future predictive modeling. Upon completion of this course, the student ill have been exposed to key payer analytic frameworks and tool sets used to drive success within a health insurer.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: HC602, HC603, and HC642
Req. Designation: Technology

HC 607(3) **Course ID:012436** **2017-09-29**
Healthcare Operations Research
[Formerly HCM 607] Health Care Operations Research examines several of the Operations Research models most widely used in the Health Care industry. The primary goal is to enable students to become productive consumers of Operations Research for the support of Health Care Management decision making. Students will learn to recognize opportunities for Operations Resarch analyses, perform basic analyses, report their findings in non-technical terms, and direct or interact with more complex analyses. Operations Research methodologies covered will include Linear Programming, Queuing Theory, Simulation, and Decision Analysis. Applications to staffing, scheduling, capacity planning, facility layout, facility location, and inventory management will be covered.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IS502
Req. Designation: Technology

HC 609(3) **Course ID:012437** **2017-09-29**
Healthcare CRM
[Formerly HCM 609] This course provides a practical overview of how to design and implement modern digital customer relationship marketing. Topics to include: customer insight mining, social media and search analyses, segmentation, customer database design, promotional media selection, campaign operations, sales force automation, digital engagement analytics, and ROI measurement. Textbook and other readings will be supplemented by a small-group case study project that students develop throughout the term.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: (IS647 or HC647), and (HC648 or IS606)
Req. Designation: Technology

Business - CRC Business - Subject: Health Management

HC 610(3) **Course ID:012430** **2016-07-25**
Healthcare Accounting and Finance
[Formerly HCM 510] The course covers use of financial statements and financial management in a regulated environment for taxable and tax exempt healthcare entities. Topics covered include: reading, interpreting and analyzing healthcare entity financial statements, time value analysis, valuing healthcare entities and assets, financial decision making and capital budgeting.

Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 617(3) **Course ID:012438** **2017-10-02**
Healthcare Finance
[Formerly HCM 617] This course covers financial management in a regulated healthcare environment. Topics include cost-finding and third-party reimbursement, contemporary issues in healthcare financing, sources of capital, capital budgeting, financial planning and analysis, cost accounting, and managed care issues.
Components: Lecture
Attributes: Offered Winter and Spring
Requirement Group: Prerequisites: AC604
Req. Designation: Technology

HC 620(3) **Course ID:012439** **2022-01-26**
Health Economics
[Formerly HCM 620] This course is intended for students entering the health field and investigates economic approaches to problems and solutions. Students obtain an understanding of how economics contributes to public and private decision-making in healthcare, and learn to properly interpret economic research results and apply them to work performed by health planners and administrators.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: HC600 and IS647
Req. Designation: Technology

HC 626(3) **Course ID:012431** **2022-01-26**
Health Systems Marketing
[Formerly HCM 526] This course introduces students to the principles of marketing and their application to healthcare settings. At the end of this course, students should a.) Understand what marketing can do for the healthcare organization in terms of contribution to strategic planning, building business, strengthening relationships between the organization and its constituents, and achieving competitive advantage. b.) Clearly understand how to use health data in marketing planning and implementation. c.) Appreciate the challenges of evaluating the effectiveness of marketing communications investments made by healthcare organizations. d.) Understand the relationship between patient/customer satisfaction and service quality in health organizations. e.) Understand how to judge marketing communications quality, both qualitatively and quantitatively. f.) Demonstrate effective communications skills through in-class participation, writing assignments, and class presentations. g.) Analyze marketing problems and select effective strategies for
Components: Lecture
Attributes: Offered Winter and Spring
Req. Designation: Technology

Business - CRC Business - Subject: Health Management

HC 630(3) **Course ID:012506** **2016-07-01**
LIM Introduction to Health Systems
[Formerly LIM 500] This course examines the determinants of health, illness, and medical care utilization, institutional arrangements and settings for the delivery of acute and chronic care, the doctor-patient relationship, resource allocation and financing, and measuring and evaluating system performance.
Components: Lecture
Course Equivalents: HC 600
Attributes: Offered Fall Term
Requirement Group: Restriction: Open to LIM students only
Req. Designation: Technology

HC 633(3) **Course ID:012508** **2016-07-02**
LIM Healthcare Leadership
[Formerly LIM 503] This course examines managerial roles and processes within health service organizations - organization design, managerial epidemiology, governance, total quality management, human resource management, labor relations and ethics.
Components: Lecture
Attributes: Offered Winter Term
Requirement Group: Restriction: Open to LIM Students only Prerequisites: HC630
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 634(3) **Course ID:012509** **2018-04-23**
LIM Health and Human Values
[Formerly LIM 544] An intensive 8 day introduction to current topics in clinical ethics and bioethics, taught seminar style, with a clinical visit to Mount Sinai School of Medicine in New York City. This overview of current issues in bioethics humanities involves four special pro-seminars, case conferences and ethics rounds. There will also be training in the computer skills (demonstrations, workshops) essential to mastering distance learning.

Components: Seminar
Attributes: Offered Summer Term
Requirement Group: Restriction: Open to LIM students only
Req. Designation: Technology

Business - CRC Business - Subject: Health Management

HC 635(3) **Course ID:012511** **2016-07-19**
LIM Health Economics
[Formerly LIM 553] This course is intended for LIM students entering the medical profession and investigates economic approaches to problems and solutions. Students obtain an understanding of how economics contributes to public and private decision-making in healthcare, and learn to properly interpret economic research results and apply them to work performed by Physicians, health planners and administrators.

Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: Open to LIM students only
Req. Designation: Technology

School of Arts and Sciences - CRC Business - Subject: Health Management

HC 637(3) **Course ID:012512** **2016-07-25**
LIM Clinical Leadership Practicum
[Formerly LIM 571] Students will work in the field with a preceptor in a clinical leadership role. Students may be placed in a variety of healthcare settings including: hospitals, physician offices, health maintenance organizations, etc. Classes meet every other week to discuss students' field experiences and selected readings.

Components: Practicum
Attributes: Offered Spring Term
Requirement Group: Restriction: Open to LIM students only
Req. Designation: Technology

Business - CRC Healthcare Data Analytics - Subject: Health Management

HC 642(3) **Course ID:012440** **2019-10-30**
Data Analytics and Business Intelligence
[Formerly HCM 642] This course provide an introduction to Data Analytics and examines a set of information systems, which specifically support managerial decision makers: Decision Support Systems, Group Decision Support Systems, Executive Information Systems, Data Warehouses, Expert Systems, and Neural Networks. The focus in this course is on data and text mining, using an appropriate software application for the organization, retrieval, and modeling of large structured and unstructured data sets.

Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: HC602 and HC603
Req. Designation: Technology

School of Arts and Sciences - CRC Healthcare Data Analytics - Subject: Health Management

HC 643(3) **Course ID:012781** **2017-10-02**
Advanced Applications in Data Analytics
The objective of this course is to introduce students to advanced data analytics applications, using a set of structured and unstructured data (historical and real-time) from various business sectors. The course will build upon concepts and methodologies, which students have learned from previous classes in the data analytics program, but extend the scope and complexity by using a combination of analytic tools (e.g. R, SPSS, RapidMiner, Tableau, and SQL). While some of the 3 day course involves lecturing and hearing guest sessions, students will spend most of their time working in a team to analyze data and prepare presentations to visualize and communicate the insights obtained from the data. This course will be focused on key-concepts in data analytics and provide students with a better understanding of how to analyze and communicate 'big data' and will provide the students in the MS Healthcare Data Analytics program a "capstone" style experience.

Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: HC602, HC603, HC642, HC647, HC648
Req. Designation: Technology

Business - CRC Healthcare Data Analytics - Subject: Health Management

HC 647(3) **Course ID:012443** **2022-05-04**
Statistical Foundations of Data Analytics
[Formerly HCM 647] [Cross Listed with IS647] This course covers fundamental methods in statistical analysis and data visualization as applied in healthcare. A holistic problem-solving approach is taken covering problem formulation, data acquisition and preparation, selection of appropriate statistical methods, and effective communication of analytic results. Topics covered include data visualization, data description methods, statistical inference, and model building. Examples are drawn from a variety of healthcare applications. Data visualization and analysis will be performed using statistical software.

Components: Lecture
Course Equivalents: IS 647, IS 647
Attributes: Offered Winter and Summer
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 648(3) **Course ID:012444** **2022-01-26**
Health Informatics
This course will introduce students to the concepts and practices of health informatics. Topics include: a) an introduction to information systems and specifically to the health informatics field; b) major applications and commercial vendors; c) decision support methods and technologies; d) system analysis, design, implementation, and evaluation of healthcare information systems; and e) new opportunities and emerging trends.
Components: Lecture
Attributes: Offered Fall and Summer
Req. Designation: Technology

HC 650(3) **Course ID:012445** **2022-05-04**
Health Policy Dynamics
Through the application of public policymaking process and organization theory, this course examines topics associated with health policymaking process and external competitiveness of modern health care organizations. Course topics include policy formulation, agenda-setting, policy implementation, policy modification, organizational design & structure, organizational environment, strategic planning, and managerial ethics. The course covers theoretical, conceptual, and practical foundations of the macro aspects of health policymaking process and healthcare management.
Components: Lecture
Attributes: Offered Winter Term
Requirement Group: Prerequisites: HC600
Req. Designation: Technology

Business - CRC Business - Subject: Health Management

HC 651(3) **Course ID:012427** **2016-07-02**
Health Systems Management
[Formerly HCM 501] This course examines the various aspects of managing in the modern health care environment. A variety of methods including lectures, case studies, in-class exercises, and student presentations will be used. Topics covered include quality improvement, ethical management, managing diversity, communications, leadership, motivation, team building, and conflict resolution.

Components: Lecture
Attributes: Offered Fall and Winter
Requirement Group: Prerequisites: HC600
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 656(3) **Course ID:012446** **2017-10-02**
Group Practice Administration
The objective of this course is to introduce students to the organization and management of private group practice through seminar and practical experience. It is intended that this course will prepare students for employment in private group practices and/or other ambulatory care organizations.
Components: Lecture
Attributes: Offered Winter and Summer
Requirement Group: Prerequisites: HC600 and HC651
Req. Designation: Technology

HC 657(3) **Course ID:012429** **2017-10-02**
Healthcare Leadership Proseminar
[Formerly HCM 507] This Proseminar will provide students with an introduction to the role of management and leadership in healthcare. It includes a preliminary overview of the U.S. health system and changes occurring in the healthcare environment, as well as an introduction to ethical reasoning and ethics as they apply to the healthcare industry. Students will also learn communications concepts and skills required of leaders. The course will involve an intensive three-day on-campus residency, in which students will receive classroom lectures, participate in exercises, hear guest speakers from healthcare organizations, and complete projects as assigned. After completing the 3-day on-campus residency, students will continue the course independently and online, completing an assignment by the end of the Fall term. The Proseminar is designed to provide students with a framework with which they can interpret material to be covered in successive courses. In addition, they will have a unique opportunity to meet and network with healthcare leaders, faculty members,
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

HC 674(3) **Course ID:012158** **2017-10-02**
Legal Aspects of Healthcare
[Formerly HCM 674] This course is designed to familiarize students with basic legal issues involved in managing healthcare systems. Antitrust, consent, labor law, malpractice, professional rights and other problems are explored using actual and hypothetical case studies.
Components: Lecture
Attributes: Offered Spring and Summer
Req. Designation: Technology

HC 680(3) **Course ID:012448** **2021-04-23**
Managerial Epidemiology
[Cross listed with BIE577] [Formerly HCM 680] This 10-week course focuses on applying basic epidemiological methodologies in healthcare management. Epidemiological problems are formulated and described in terms of person, place, and time. Health care planning relies on needs assessments to allocate resources to epidemiological and population health issues. A variety of study designs are used to generate data to analyze causes or patterns of disease frequency. Epidemiological methods employed in infectious disease and disaster are examined. Data collection systems specific to public health applications are reviewed. The ethical principles applied in public and population health settings are covered.
Components: Lecture
Course Equivalents: BIE 577
Attributes: Offered Spring Term
Requirement Group: Prerequisites: HC 600. For students in the LIM program, HC 630, and HC 633.
Req. Designation: Technology

HC 681(3) **Course ID:012449** **2022-05-04**
Strategic Issues for Healthcare Organizations (Health Capstone)
[Formerly HCM 681] This course is designed to integrate the concepts and skills associated with managerial problem-solving learned throughout the MBA in Healthcare Management program. Students analyze case studies addressing the strategic realignment of health service organizations in today’s healthcare environment. A variety of expert practitioners present their views on this topic. This course begins with a 3-day in-person session that takes place during the first week of the Spring Quarter, beginning Friday at 8:00 am and ending Sunday at 12:00 pm. The remaining coursework is completed working independently in student teams on consulting projects for healthcare organizations under the supervision of faculty mentors.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: HC600, HC605, HC651, and HC657.
Req. Designation: Technology

Business - CRC Business - Subject: Health Management

HC 683(0) **Course ID:012450** **2016-07-01**
MBA Internship
[Formerly HCM 683] An Internship for the MBA or Healthcare MBA program. Provides practical, hands-on experience that focuses on an area directly related to the student's field of study.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

HC 684(3) **Course ID:012451** **2022-01-26**
LIM Strategic Issues in Healthcare (Capstone)
[Formerly HCM 684] A capstone course designed to integrate the concepts and skills associated with healthcare research-based managerial problem solving learned throughout the LIM program in Healthcare Management. The objective of this course is to assist students with a level of professional maturity, confidence and strategic thinking to become a successful physician leader.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Restriction: Open to LIM students only
Req. Designation: Technology

Business - CRC Healthcare Management - Subject: Health Management

HC 999(0 - 10) **Course ID:012921** **2009-01-01**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 1(2 - 4) **Course ID:008511** **2015-01-19**
History Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

HIST 2(2 - 4) **Course ID:008512** **2015-01-19**
History Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: History

HIST 100(3) **Course ID:011438** **2015-01-19**
European History Survey
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP European History Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate European History Higher-Level Examination, or 3) satisfactory completion of a college-level European History survey course.
Components: Independent Study
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Transfer Credit Only
Req. Designation: Technology

HIST 101(3) **Course ID:011439** **2015-01-19**
World History Survey
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP World History Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate History Higher-Level Examination, or 3) satisfactory completion of a college-level World History survey course.
Components: Independent Study
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Transfer Credit Only
Req. Designation: Technology

HIST 102(3) **Course ID:011440** **2015-01-19**
History of the Americas Survey
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate History of the Americas Higher-Level Examination or 2) satisfactory completion of a college-level History of the Americas survey course.
Components: Independent Study
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Transfer Credit Only
Req. Designation: Technology

HIST 103(3) **Course ID:011441** **2015-01-19**
Islamic History Survey
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate Islamic History Higher-Level Examination or 2) satisfactory completion of a college-level Islamic History survey course.
Components: Independent Study
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 210(3) **Course ID:010880** **2022-02-11**
The Ancient World
This course traces the birth and development of civilization in the ancient world from the 3rd millennium BC in Mesopotamia to the height of the Roman Empire in the 3rd century AD. Students will study the cultural values, economic organization and political systems of Mesopotamia, Egypt, Greece and Rome. Students will also consider the processes of social, cultural and geopolitical change in the ancient world and critically evaluate primary sources from each area in terms of their original function, and what types of information we can glean from them.
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

HIST 220(3) **Course ID:008519** **2015-01-23**
America: 1776 - 1877
[Formerly LC250] This course will survey developments in American history from the American Revolution to post-Civil War Reconstruction. Topics for special consideration will include: the American Revolution and its aftermath, the economic and political 'revolutions' of the first half of the 19th century, immigration and the opening of the West to settlement, the critical decade of the 1850's, and the Civil War and its aftermath. The focus of the course will be on the larger political and economic trends of this transformative period, but some attention will be paid to the social and intellectual developments as well. The course will alternate between lecture and discussion. A comprehensive text may be used but discussion will center on interpretive texts and primary documents. This is an entry-level course for people who want to prepare for more advanced work in American history at the upper division level.
Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

HIST 221(3) **Course ID:008520** **2022-02-11**
America: 1877 - Present
[Formerly LC251] A social, political, cultural and economic survey of the United States from Reconstruction through the present.
Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Offered Even Falls
Req. Designation: Technology

HIST 230(3) **Course ID:010739** **2019-03-04**
Science and Society
This course will acquaint students with the multifaceted ways in which science and society interface in the modern world. It will discuss important developments in the history of modern science (17th century-present). But examining the conceptual development of scientific theories is only part of the story. The course will also explore the broader institutional, cultural and political contexts of the theories in questions. It will analyze how science influenced the societies which nurtured it as well as how societal values impact the nature and practice of science. Relationships between religion and science, science and political authority as well as the social and ethical responsibility of the scientist will be explored. Students will understand science, not as a collection of disembodied ideas about the natural world, but as a historically and socially situated activity best understood in relation to the historical contexts in which it occurs.
Components: Lecture
Attributes: One communication unit, Science, Technology and Society
Req. Designation: Technology

HIST 240(3) **Course ID:010804** **2015-01-23**
War and Society
[Formerly LP398] War is as old as society, and from earliest times, changes in warfare have reflected changes in society. Through primary source material (eyewitness accounts and descriptions) and selected historical writings, we will study the battle experience of soldiers and civilians, and the shifting relationship between the military and society. The course will concentrate on four stages of military/ cultural experience: 'the army of heroes' in which the warrior fights for personal honor; 'the professional army' in which training comes to the fore; 'the gentleman's war', in which the professional soldier follows a strict code of moral behavior; and 'the modern war', in which technology changes conventional warfare with dire consequences to the military and society.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 241(3) **Course ID:008594** **2020-02-19**
War Stories I
[Formely LF392] [Cross-listed with LIT241] The oldest and most enduring stories describe war and its consequences. Reading these stories helps us see how different societies valued leadership, honor, loyalty, courage, and death on the battlefield. Not all war literature, however, glorifies heroic warriors and their exploits. Some war stories, even in the distant past, question martial codes imposed on men. Others examine what is worth dying or killing for, and still others lament the inevitable wastage and brutality of war, of the costs to individuals, civilizations, and the environment. Most of them are ambivalent. Text will range from the ancient world to the Renaissance and from Asia to Europe.
Components: Lecture
Course Equivalents: LIT 241
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 245(3) **Course ID:012977** **2019-10-21**
Introduction to Environmental History
In this class, students will be introduced to the major problems, current trends, and ""classic"" issues in the study of North American environmental history. Topics may include: climate changes and society, environments and technologies, parks and conservation, the history of environmental racism, gender and the environment, indigenous environmental knowledge, animals, pests, and animal control, water studies, and the history of Arctic environments. By the end of the course, students will have a basic understanding of what environmental history is and how it is conducted, and will be encouraged to think like historians in their everyday lives.
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

HIST 253(3) **Course ID:012985** **2019-10-21**
Greek Mythology
[Cross-listed with LIT253] This course will explore the beginnings of Greek culture through its myths, recorded primarily in Homer, Hesiod, the Greek dramatists of the 5th century BCE, and by later writers of the classical period, such as Apollonius of Rhodes, the Roman poet Ovid, and mythographers such as Apollodorous. As important as this rich textual record is the physical evidence of ancient Greek society. Since the late nineteenth century, archaeological excavations of sites associated with the ancient myths have steadily increased our understanding of their meaning and significance, as well as their relationship to ancient Greek religion and ritual. Finally, visual representations of the figures from myth and legend, found in vase paintings and sculptures, are essential to our full comprehension of the role of myth in the lived lives of Greeks.
Components: Lecture
Course Equivalents: LIT 253
Attributes: Two communication units, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 255(3) **Course ID:011485** **2022-02-11**
Introduction to Global History
Introduction to Global History is a course that looks at global patterns through time, and attempts to see history as an integrated whole. Topics are studied in a general chronological order, but each is examined through a thematic lens, showing how people and societies experience exchanges, integration and differences. The course consists of lectures that allow exploration of these issues at either introductory levels or at a more advanced level.
Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

HIST 260(3) **Course ID:012883** **2018-09-17**
The Soviet Union at War
The Soviet Union engaged in war throughout its 74-year history. This course will address the experience of World War One as a contributing factor to the Russian Revolution, the Russian Civil War (1918-1921), the Russo-Polish War (1919-21), intervention in the Spanish Civil War (1936-9), the Winter War (1939-40), the Great Patriotic War (1941-45), the Cold War including proxy wars and Soviet interventions during the period, the Soviet-Afghan War (1979-89) and the Gulf War (1990-91). Aspects to be considered include the conduct of and experience of war, development of Soviet defense capabilities, the diplomacy of war and peacemaking, the impact of war on Soviet society, and the international reactions to the Soviet Union.
Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

HIST 270(3) **Course ID:011756** **2022-02-11**
Introduction to Society, Culture & Biology
This course welcomes students into the interdisciplinary world of the human and biological sciences. In this class we will encounter the myriad ways in which the human and biological sciences were constituted, defined, and intertwined in the nineteenth and twentieth century. Students will learn to place ideas and controversies within a broad historical and cultural context. They will gain experience evaluating and interpreting historical texts. They will evaluate scientific theories, controversies, and ethical failures.
Components: Lecture
Attributes: Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

HIST 280(3) **Course ID:012084** **2022-02-11**
The Renaissance
This course surveys the age of European Renaissance from the late fourteenth century to the age of Galileo, including the cultural exchange between Europe and the Near East. Studying the process of rapid religious and geopolitical change provides the historical context for analyzing the works of the master painters, sculptors, and architects of the Renaissance.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 290(3) **Course ID:013163** **2022-03-21**
Intro. to Africana Studies
This introduction to Africana Studies offers critical inquiry into the discipline of Pan-African (African and African American) Studies. It considers the historical and intellectual life of Africans and members of the African Diaspora from an “Afrocentric” perspective. Africana Studies offers an interrogation of: social and political systems, resistance and anti-colonial movements, and paradigms for cultural reclamation, transformation, and liberation. Students will be introduced to Africology and to Kawaida methodology.
Components: Lecture
Attributes: One Design Credit, Contemporary and Global Issues, Cultures and Societies, University Course, Offered Every Other Term
Req. Designation: Technology

HIST 310(3) **Course ID:013138** **2022-02-11**
Indigenous People's History of New York State
A historical look into the Indigenous People's history within and with what is today called New York State. This course will focus on the specific interactions between Indigenous and non-indigenous peoples and their reflective influences on the history of the State, Federal and International Levels. Providing additional views on
the Indigenous historical narrative as it relates to the more common New York State history.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Cultures and Societies, University Course, Offered Even Springs
Req. Designation: Technology

HIST 321(3) **Course ID:012027** **2020-02-26**
History of Public Health in America
This course surveys the history of public health in the United States from the colonial period to the late twentieth century, with the aim of providing students with an understanding of how history may inform twenty-first century challenges regarding the health of populations. We will explore public health responses to diseases such as smallpox, tuberculosis, typhoid, syphilis, and HIV/AIDS and examine the ways in which those responses actually framed the conceptions of disease. Some of the questions we will address include: Who is responsible for the public’s health? To what extent has the responsibility for the public’s health changed over time? What rights should individuals have if they endanger the health of others? How have class, race, ethnicity, gender, and sexuality shaped public responses to and understandings of disease?
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 322(3) **Course ID:012976** **2019-10-21**
Indigenous North America Post-Contact
This course studies the history of North America—what some Indigenous peoples call “Turtle Island”— from contact to present. This course will introduce students to the historical processes that shaped Indigenous and settler history in North America. Throughout this course, students will analyse Indigenous history through a variety of historical lenses, including those of ethnohistory, environmental history, political history, and legal history.
This course will cover a variety of themes including the nature of contact between Indigenous peoples and settlers, treaties, land claims, and education.
The course explores a variety of sources for studying and engages with Indigenous-centered perspectives that challenge conventional histories of colonialism, focusing on human migrations, economic expansions, and cultural developments.
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

HIST 327(3) **Course ID:008527** **2022-02-11**
History of Women and Gender in America
This course focuses on the historical experiences of American women from the seventeenth-century era of colonization to the modern era (with an emphasis on the nineteenth and twentieth centuries), and it explores the role gender plays in shaping and defining American history. A separate investigation of women's experiences provides an understanding of 1) the distinct contributions of women to the American heritage, and 2) the ways in which gender intersects with race, ethnicity, class, sexuality, region, and religion in explaining social, cultural, and political developments in the United States.
Components: Lecture
Course Equivalents: HIST 527
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: History

HIST 328(3) **Course ID:011383** **2022-02-11**
History of Gender and Sexuality in the Transatlantic World
This is a historical look at the constructions of gender and sexuality throughout the Transatlantic world. Chronologically, it will focus on the period of 1492-1999. Topics to be covered include the constructions of genders in Europe, the Americas and Africa. The course will progress chronologically, however it will cover certain topics in depth and other topics as part of a broad overview. Students will come to understand how cultures and societies shape and are shaped by gender constructions. In addition, students will come to appreciate the historical individual's negotiation of gender within a social grouping.

Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 329(3) **Course ID:010454** **2022-02-11**
History of the American Family
What is a family? How have social, political, and economic forces shaped American families? How has the family changed throughout history? Did the end of the twentieth century see the demise of the American family, as some social critics have claimed? Focusing on the United States, this course will examine the history of marriage, divorce, childrearing, sexuality, families of different races, ethnicities, religions, classes, and regions, and the portrayal of the family in the media, as well as controversial issues concerning the American family today.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Cultures and Societies, University Course, Offered Odd Springs
Req. Designation: Technology

HIST 331(3) **Course ID:010453** **2022-02-11**
Ancient Medicine and Magic
[Formerly LC331] In a seemingly hostile world controlled by unseen forces, ancient man fought to gain the upperhand in a daily struggle against illness and death. Using magic and medicine (both thought to be equally valid) he sought to understand his body and maintain his health. Primary written sources and information gleaned from skeletal and mummified human remains allow us to trace the development of medicine from its earliest appearance in Mesopotamia and Egypt to its more advanced form in Greece and Rome. Topics will include: disease, wounds, cures, surgery, the interplay between the supernatural and the mundane, physiology, life expectancy, nutrition, gynecology, and hygiene.
Components: Lecture
Attributes: Science, Technology and Society, Offered Odd Falls
Req. Designation: Technology

HIST 332(4) **Course ID:011594** **2022-02-11**
Documenting Social Activism
The course explores social movements in Untied States after World War II and allows students to describe and interpret the complex nature of cultures and societies in historical context. The movements will focus on issues of racial civil rights, workers' rights, the women's movement, the gay rights movement, the American Indian Movement and the Students' Movements. Ranging from 1945 until the present day the course illustrates the process of social, cultural, and geopolitical change over time. This is a team taught course in which students will be required to create a documentary film. Therefore students will split their time between history lectures, seminar style discussion and documentary film production. The course has 3 hours of class and 3 hours of lab per week, and students should expect to do extensive out-of-class work. Limit of 20 students. Permission of one of the instructors required.
Components: Laboratory, Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 333(3) **Course ID:010808** **2016-09-12**
Science, Technology, and Society in the Renaissance
[Formerly LC395] Guns and printing were among the many revolutionary technological developments in Renaissance Europe. With the increased scale of war, feudal structures gradually dissolved and nationalism began to emerge. At the same time, religious reformation, with its theses disseminated through the printed page, helped shift the balance of power among states and individuals. Meanwhile, banking, commerce, and colonization, fueled by advances in navigation, promoted the beginning of capitalism. The theories of Copernicus, Kepler, and Galileo irreversibly changed ideas about man's place in the universe. Beginning with mathematical perspective and ending with the new scientific method, this courses will chart the extraordinary technological and scientific advances and profound economic and social changes that together mark the birth of the modern world.
Components: Lecture
Attributes: Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

HIST 335(3) **Course ID:011511** **2022-02-11**
History of Medicine in Europe and North America
History of medicine is important even to those who think of themselves primarily as scientists or historians of science. Much of what we might initially see as biology, chemistry or physics was done within medicine, and even today a great deal of science either goes on in hospitals and the associated laboratories, or is at least nominally directed towards medical ends.
Components: Lecture
Attributes: Contemporary and Global Issues, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 337(3) **Course ID:012036** **2015-03-05**
Medicine in Europe and America
From a distance, the study of medical history might appear little more than an idle pursuit - perhaps only a study of great men and their discoveries. However, even slight reflection on the social, institutional, and cultural features of medicine will lead us to reconsider much about medicine that we might before have taken for granted. Enrollment is limited to students participating in the Trudeau Semester.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Requirement Group: Enrollment is limited to students participating in the Trudeau Semester.
Req. Designation: Technology

HIST 338(3) **Course ID:011954** **2022-02-11**
Women, Gender and Science in American History
Why have science, medicine, and technology traditionally been the domains of men? What are the consequences of that? What has motivated women to become scientists, health care practitioners, and engineers? Has their growing participation changed the cultures of science, medicine, and technology? Focusing on the United States, this course examines (1) how preconceived notions about women, men, gender, and sexuality have shaped scientific ideas, and (2) the history of women as actual participants in science, medicine, and technology. We will use a historical perspective to shed light on current discussions about the gender dimensions of science.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Science, Technology and Society, University Course, Offered Even Springs
Req. Designation: Technology

HIST 339(3) **Course ID:013029** **2020-02-18**
Engineering and the Environment in the Ancient World
Since earliest times humans have attempted to improve their lives by controlling their environments, often with unintended consequences. This course explores the impact of engineering on the environment in ancient Mesopotamia, Egypt, Greece and Rome. Students will consider such topics as irrigation and agricultural practices, exploitation of natural resource, water supply and management, fortifications, communication pathways (roads and shipping), sewage systems, and mining. We will also learn about the effects of climate change on human populations and productivity.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Science, Technology and Society, University Course, Offered Even Falls
Req. Designation: Technology

HIST 340(3) **Course ID:011219** **2022-02-11**
Warfare in Ancient Greece
Study the major conflicts and conquests from the late Bronze Age to the founding of the Roman Empire. Topics include: weaponry and technological advances; reconstructions and battle-plans of specific engagements; combatants, non-combatants, and leaders; motivations, causes, and consequences; empire-building.
Components: Lecture
Attributes: Cultures and Societies, Offered Odd Springs
Req. Designation: Technology

HIST 341(3) **Course ID:011000** **2022-02-11**
War in Ancient Rome
The Romans developed the most successful military organization of the ancient world, but it took a great deal of painful experience, political maneuvering, and reform to move from volunteer citizen-soldiers to the highly trained professional legionaries of the Empire. This course traces the history of the Roman military from the inception of the Republic to the height of the Empire. Using primary and secondary sources, we will study the major wars of the Republic and early Empire: the Punic Wars, Caesar s Gallic Wars, the Civil Wars, and the wars of Imperial expansion. Specific topics will include weapons and armor, tactics, strategy, fortifications, artillery, leadership, and the campaign experience of legionaries. We will also consider the social, political, and economic consequences of warfare, and the impact of the Roman army on non-Roman cultures.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 343(3) **Course ID:010806** **2015-01-23**
War in the Middle Ages
[Formerly LC392] One popular image from the Middle Ages is the brightly armored knight, charging into battle on his steed and performing brave deeds of arms. While war was a defining force in the medieval era, the picture is somewhat more complex. This course will consider European warfare from the Carolingian period to the dawn of the Renaissance, including the origins of feudalism, the Crusades, and the Hundred Years War. Using primary and secondary sources, we will look at developments in arms, armor, training, strategy, tactics, logistics, and battlefield experience. Our problem will be to determine the relationship between warfare and the economic, social, religious, and political culture of medieval Europe.
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

HIST 347(3) **Course ID:008530** **2020-09-21**
World War I
This course offers an in-depth examination of the World War I of 1914-18, its causes, campaigns, and consequences. Taking into account long-term and short-term factors, the war is considered as the first truly ‘modern’ war with new technologies playing in a role in a conflict of truly catastrophic scale. While many of the histories of World War I focus on Western Europe, this course will consider the war in global context, provide an insight into how great power politics was changed by it, an examination of strategy and campaigns, and a consideration of scientific and technological development. Students will engage with both primary and secondary sources relating to the war including government documents, diaries, letters, artistic and literary depictions, film, as well as considering how the war has been and can be represented in various ways.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 348(3) **Course ID:011218** **2022-02-11**
World War II
World War II was one of the pivotal events of the twentieth century, and it's legacies remain important to this day. The course will address the origins, outbreak, course, impact, and resolutions of the war. Taking a global perspective, the course goes beyond simply a study of battles and addresses all aspects of the war, from great civilian and military leaders to the common soldiers, along with social, cultural, and economic changes on the various home fronts. Students will engage with a range of primary and secondary material relating to World War II, including texts, film, novels, and material artifacts.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

HIST 349(3) **Course ID:008529** **2016-09-08**
The Cold War Era: War and Society in the Era of the American-Soviet Rivalry, 1945-1991
This course is intended to provide a general history of the Cold War, 1945-1991. We will discuss not only the evolution of the Soviet-American rivalry, but also the many smaller wars which emerged out of this larger conflict. Special attention will be paid throughout to the social, political, and cultural aspects of the Cold War. We will consider how the conflict was driven by social and political currents within the contending parties, and how the war shaped and transformed the societies that were a part of it.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Offered Spring Term
Req. Designation: Technology

HIST 362(3) **Course ID:013139** **2022-02-11**
Public History
This course provides students with knowledge of best practices in the presentation of public history while providing students with the skills and aptitudes for the preservation of African American, Indigenous American, and Ethnic Group History. Public history students learn basic archival theory and methodology and how documents and artifacts are preserved. The course teaches students to analyze, interpret, and evaluate historical evidence, to apply historical perspectives to contemporary issues, and include diverse cultural values. Students explore issues of ethics and politics, interpretation and access. The course provides students with an introduction to fields of inquiry which support preservation and historic interpretation including: museum studies, special collections, historic preservation, oral history and historic archeology. Students of public history gain historical and specialized knowledge and skills through site work and participation in inter-active events with the goal that they will be able to convey historical understanding
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 363(3) **Course ID:013140** **2021-11-10**
Africana Biography
This course examines the lives of African Americans in various modes of work and being. Students will study the life of an African American scientist, journalist, concert singer-humanist, and civil rights leader among others. Each of the biographies selected represent individuals who command respect within their political, scientific, spiritual, or artistic realm. This course allows for exploration of nuances in the Ethos of the people of the African Diaspora. Students will have the opportunity to understand the challenges of being an Africana/ African American Intellectual in the Americas.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

HIST 365(3) **Course ID:012984** **2019-10-21**
Technology and the Modern State
In this course, students will explore how technologies of various types have been used in service of, or against, the modern state in the 19th-21st centuries. Topics may include: mega-projects and national identity, military technology, narratives of ""invention"" and ""firsts,"" gender, race, and technology, technological modernity, technological discourses, and bodily experiences of everyday technology. At the end of the semester, students will create a public-facing project using primary and secondary historical sources.
Components: Lecture
Attributes: Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

HIST 370(3) **Course ID:013090** **2022-02-11**
Extreme Science: Marginal Environments in the History of Science
In this class, students will learn about the history of how science has been practiced in ""extreme"" environments at the limits of the geographic and environmental imagination since the seventeenth century. Topics may include: the microscopic world and the development of scientific instruments; empire, colonialism, and the sciences of oceanic and terrestrial exploration; geopolitics and international scientific cooperation; the ""space race"" and the ""races"" for the North and South Poles; and ""extreme environments"" in culture, art, and literature. By the end of the course, students will have a basic understanding of the connections between science, the environment, and the larger socio-cultural imagination, and will be encouraged to think like historians in their everyday lives.
Components: Lecture
Attributes: Cultures and Societies, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

HIST 394(3) **Course ID:010878** **2016-10-04**
Special Topic: History of Social Activism after WWII
The course explores social movements in United States after World War II. The movements will focus on issues of race and ethnicity, poverty, civil rights, civil liberties and gender discrimination. The social movements explored will cover the main organizations and key individuals. Special attention will be paid to the religious liberal tradition and grass roots activism.
Components: Lecture
Attributes: Liberal Arts-Soc Foundation Curriculum Course, Cultures and Societies, Given When Needed

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HIST 459(3) **Course ID:011214** **2022-02-11**
Neuroscience and Society
[Cross-listed with PY 459] The word 'neuroscience' is of recent origin. Yet we can trace neuroscientific ideas back to Rene Descartes. Since Descartes, social understanding of madness, the relationship between mind and brain, and the nature of sensation and perception has changed frequently. Beginning in the Age of Mechanical Man and ending in the Age of Prozac, our course focuses mainly on ways contemporary society has influenced neuroscientific thought and, in turn, the ways neuroscience has influenced society.
Components: Lecture
Course Equivalents: PY 459
Attributes: One communication unit, Science, Technology and Society, Given When Needed

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School of Arts and Sciences - Humanities & Social Sciences - Subject: History

HIST 490(1 - 10) **Course ID:008550** **2015-02-03** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in history for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term

HIST 498(1 - 3) **Course ID:008557** **2015-01-23**
Undergraduate TA
A student assists a faculty member in teaching a course. The student engages in substantial pedagogical work beyond mastery of the course material. Such activities may include mentoring students in course work, leading class discussions, designing and presenting course modules, etc. The primary objective is for the students to work with a faculty member to learn and practice pedagogical approaches in the discipline.
Components: Independent Study
Attributes: Given When Needed

HIST 499(0) **Course ID:008558** **2015-02-09**
Minor Portfolio
In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Credit Basis.
Components: Independent Study
Attributes: Offered Each Term

HIST 527(3) **Course ID:012953** **2019-09-02**
History of Women and Gender in America
This course will cover the same subject area and topics as HIST 327. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Course Equivalents: HIST 327
Attributes: Cultures and Societies, Individual and Group Behavior, Given When Needed

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Other - Honors Program - Subject: Honors Program

HP 100(3) **Course ID:008386** **2022-01-26**
Interdisciplinary Approaches to Systems Thinking
Nature, society, and individuals are complex systems. Problems require a variety of perspectives to understand and propose solutions. This course will expose students to disciplinary, interdisciplinary, and systems thinking, including conceptual and problem solving models, to facilitate the dissection of, understanding of, and problem solving of complex issues in their personal, academic, societal, and professional lives. In addition to learning and discussing interdisciplinary and system thinking topics, students will write a series of papers exploring the same issue from different disciplines and then write a final paper that integrates these perspectives. Course sections will vary thematically and use of conceptual and problems solving models, but will emphasize small group and whole class discussion, critical reading, writing, and analysis, extensive written and oral communication, and collaborative work.
Components: Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 101(3) **Course ID:008387** **2022-05-19**
Introduction to Professional and Research Ethics
This course aims to introduce Honors Program students to various ways of thinking about the ethical issues and moral dilemmas that they will encounter in their future careers, and to organize their thinking about what they should value and what principles they should act upon in order to act ethically. The first section of the course will focus on foundational issues in philosophical ethics, and the second section will focus on applications of these ethical theories to real-world professional and research settings.
Components: Discussion, Lecture
Attributes: One communication unit, Individual and Group Behavior, Science, Technology and Society, University Course, Offered Spring Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 102(1) **Course ID:011194** **2015-02-19**
Introduction to Programming I
This lab section will teach the computer competencies necessary for work at Clarkson and eventual research at the University.
Components: Laboratory
Attributes: Offered Fall Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 103(1) **Course ID:011210** **2014-11-20**
Introduction to Programming II
[Cross-listed with ES 100] This lab section will teach the computer competencies necessary for work at Clarkson and eventual research at the University.
Components: Laboratory
Course Equivalents: ES 100
Attributes: Offered Spring Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 200(3) **Course ID:008389** **2022-06-10**
Introduction to Community Engagement
This course will employ methodologies from multiple fields and from diverse perspectives to help students develop and understanding of the social impacts of engagement through community-based service partnerships.
Components: Seminar
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Offered Fall Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 201(3) **Course ID:008390** **2022-06-10**
A Matter of Perspective: Reframing, Retelling, and Revision
In this course, we'll first explore how narratives represent points of view. We will situate the narratives we've received within their particular social and historical contexts. Then, we'll examine the ways in which writers, directors, historians, or political scientists reconfigure, revise, and reimagine narratives in order to shift dominant ways of knowing.
Components: Seminar
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Spring Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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Other - Honors Program - Subject: Honors Program

HP 280(1 - 10) **Course ID:008396** **2015-02-09**
Honors Independent Study
Designed for Honors Program sophomores who wish to pursue special interests that are consistent with the goals of the Honors Program. This series allows students to design and conduct independent study projects under faculty guidance.
Prerequisites: Consent of the Honors Director is required.
Components: Independent Study
Attributes: Offered Each Term

HP 300(3) **Course ID:008397** **2022-06-10**
Philosophy and Epistemology of Science and Technology
This course will explore the theory and practice of doing science through theoretical summaries and discussions and practical and technical workshops. Topics will include how scientific knowledge is created, what is the nature of scientific knowledge, how does bias affect our access to scientific knowledge, and is scientific knowledge limited. We will explore practical aspects of doing science through readings, case study discussions, and role playing on responsible conduct of research.
Components: Seminar
Attributes: One communication unit, Science, Technology and Society, Offered Fall Term

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HP 380(1 - 10) **Course ID:008400** **2015-02-09**
Honors Independent Study
Designed for Honors Program juniors who wish to pursue special interests that are consistent with the goals of the Honors Program. This series allows students to design and conduct independent study projects under faculty guidance. Permission of the Honors Director is required.
Components: Independent Study
Attributes: Offered Each Term

HP 390(3 - 10) **Course ID:008401** **2022-01-26**
Honors Capstone Proposal Seminar
The main goal of this course is to guide honors program students through the capstone project proposal process leading to an approved capstone project proposal. Students will be exposed to the expected components of a capstone project through workshops on the elements of a capstone project proposal introduction, literature review, methodology/approach, expected results, and logistics sections. After each workshop, students draft these individual sections and garner feedback from the course instructor. After revising each section, students then will integrate individual sections into a full draft of their proposal which will be reviewed for feedback by their capstone project advisors, peer-reviewed by their classmates, and reviewed by the course instructor. This will result in a final draft of their capstone project proposal which will be sent out for independent evaluation, a required component, for feedback, with the ultimate goal of having an approved capstone project proposal. Other activities in the course include workshops on formal and informal
Components: Research
Attributes: Offered Each Term

HP 391(1 - 0) **Course ID:009667** **2022-05-06**
Honors Undergraduate Thesis
Components: Research
Attributes: Offered Each Term

HP 400(3) **Course ID:008402** **2022-06-10**
Solving for System Failures
This course explores failures in order to demonstrate analytical and practical skills in systems thinking. The first unit will explore how we define failure. The second unit will explore what we can learn from examining major system failures. Students will use transdisciplinary case studies to investigate how and why notable contemporary or historical failures occurred. The final unit will use a design approach and employ our own disciplinary and transdisciplinary expertise to propose possible solutions.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Offered Spring Term
Requirement Group: Prerequisite: HP 100 and Honors Program students only

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HP 480(1 - 10) **Course ID:008404** **2022-01-20**
Honors Independent Study
Designed for Honors Program seniors who wish to pursue special interests that are consistent with the goals of the Honors Program. This series allows students to design and conduct independent study projects under faculty guidance. Permission of the Honors Director is required.
Components: Independent Study
Attributes: Offered Each Term

Other - Honors Program - Subject: Honors Program

HP 490(3 - 10) **Course ID:008405** **2022-01-26**
Honors Capstone Report Seminar
This course will guide honors program students through the first draft of their capstone project final report; in most cases, this first draft will be revised and approved as a capstone project final report in the following spring semester. However, students graduating a semester early may finalize their document during the course. In this course, students will be exposed to the overall organization of an expected capstone project final report through a variety of workshops and will use their capstone project proposal to update their introduction, literature review, and methodology/approaches sections. Students then will write up the additional expected sections of results/outcomes and implications and conclusion or equivalent sections depending on the type of project they are pursuing. This first draft of their capstone project report is based on capstone project progress at that time of the course and will garner input from the student's capstone project advisor, peers, and course instructor. Other activities in the course may include
Components: Research
Attributes: Offered Each Term

HP 491(1 - 0) **Course ID:009668** **2017-01-13**
Honors Undergraduate Thesis
Components: Research

School of Arts and Sciences - Lewis School - Subject: Health Sciences

HS 1(1 - 4) **Course ID:011631** **2022-03-18**
Health Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

HS 200(2) **Course ID:012089** **2022-03-18** **Instructor Consent Required**
Health Coaches I: Introduction to Community Healthcare
In a new collaboration with Canton-Potsdam Hospital, HS 200 is the first in a 2-semester sequence that trains students to become Health Coaches in the Potsdam community. Students will attend a weekly 2-hour seminar class in which they learn about key issues in current healthcare policy, management, and delivery. Each week, different healthcare practitioners will discuss a variety of topics, including healthcare delivery challenges in the community, ethical concerns regarding insurance, and heart disease. The end of the course focuses on patient care and skill building. The course will culminate in a group presentation of a case study. By the conclusion of this course, students will be equipped to begin health coaching with continued guidance. Application required. Contact the instructor for more information.
Components: Lecture
Attributes: Offered Fall Term

HS 210(2) **Course ID:012768** **2022-03-18** **Instructor Consent Required**
Health Coaches II: Community Healthcare Practicum
HS210 is the second in a 2-semester sequence that trains students to become Community Health Coaches in the Potsdam area. This course is offered in collaboration with the Canton Potsdam Hospital, part of the St. Lawrence Health System. During this practicum, each student will be assigned a patient to work with and will visit the patient in their home and maintain phone contact. The Health Coach will help the patient manage their health and navigate the healthcare system. The Health Coach will also meet regularly with a Canton-Potsdam Hospital healthcare team to discuss their coaching approach and gain knowledge on how to best manage the particular situation of their patient. All HS210 students must have access to personal transportation.
Components: Practicum
Attributes: Given When Needed
Requirement Group: Prerequisites: HS200 and approval of instructor(s). Requirement: Access to transportation

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HS 220(1) **Course ID:012905** **2022-03-18**
Medicine & Healthcare Profession Seminar
Organized by the Career Center with assistance of the Pre-Health Advising Coordinator and in consultation with the Clarkson Health Professions Committee Chair, this course meets semi-weekly, and uses the seminar format to bring in human health professionals from a diversity of fields to discuss their professions, including what their professions encompass, the academic and experiential track they followed to become medical professionals, their perspective on the future directions of their fields, and opportunities for Clarkson students to pursue these fields. It will also bring representatives of different professional schools to discuss admission, expenses, and career opportunities.
Components: Seminar
Attributes: Offered Spring Term

HS 405(1) **Course ID:012904** **2022-03-18**
Experiential Learning in Medicine & Healthcare
This is as an independent study course under the mentorship of a member of the Health Professions committee. The student is required to complete at least 50 hours of work in a health profession setting. The work must include some form of interaction with health professionals and with patients or analogous health-service recipients. Examples include healthcare internships or volunteer positions at a hospital or clinic, completions of HS 210 Health Coaches II, serving as an EMT or emergency first-responder, serving as an athletic trainer. Conducting research with medical applications that does not involve working with patients/ health-service recipients will not meet the requirements for this course. Upon completing the experience, the student will prepare a short (around 3 page) self-reflective essay on what the student did and learned during the experience, and how the experience has affected the student’s professional goals and preparation.
Components: Independent Study
Attributes: Offered Fall and Spring

School of Arts and Sciences - Humanities & Social Sciences - Subject: Humanities & Social Sciences

HSS 120(1) **Course ID:010998** **2020-06-05**
Introducing the Liberal Arts
This course welcomes new Liberal Arts majors to Clarkson with a combination of activities designed to orient them to the disciplines represented in the department (Literature, Philosophy, Film, History, Political Science, Anthropology, Sociology and American Studies), with a particular emphasis on their differing perspectives and ways of thinking critically and solving problems. Students will gain hands-on experience in research methods, and the course will also explore the wide variety of career options open to those who graduate with a Liberal Arts degree. Finally, students will have the opportunity to get to know Clarkson, the North Country, the Liberal Arts faculty and each other better during the course of the semester.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Freshman or Sophomore standing in a Humanities and Social Science major

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HSS 210(3) **Course ID:012990** **2019-10-29**
Professional and Technical Writing
HSS 210 is an introduction to technical and professional writing. This course provides students with practical information about communicating in different kinds of workplace environments and professional/technical discourse communities. Throughout the semester students will produce and analyze common technical writing genres, including emails, letters, resumes, memos, reports, proposals, technical descriptions, technical definitions, technical manuals, and proposals. Students will work toward understanding how to analyze and react to rhetorical situations each genre and writing situation presents, including issues of audience, organization, visual design, style, and the material production of documents.
Components: Lecture
Attributes: Two communication units, Given When Needed

HSS 220(3) **Course ID:013041** **2020-04-28**
Writing Across the Disciplines
The overall goal of this online course is to enable students to be successful writers and scholars in the academy and to help students produce genres of writing used in their professions. Students will learn how to research and analyze in their chosen academic disciplines and how to use writing as a tool for discovery, thinking, and problem-solving. They will identify the conventions of their discourse communities and use these conventions in their own writing. While we will address the differences and similarities between writing in varying academic disciplines, most of the work in this course will be devoted to the study of students' own disciplinary groups and chosen fields. Where possible, students will work in smaller disciplinary cohorts to foster collaborative research and writing skills. Through flexible and rigorous research, students will be able to locate and define various genres of writing in their disciplines and gain the skills to become confident and competent writers.
Components: Lecture
Attributes: Two communication units, Given When Needed

HSS 310(1 - 6) **Course ID:012828** **2017-08-15** **Instructor Consent Required**
Undergraduate Research
This is an opportunity to work one-on-one with a faculty member on an area of shared interest. It provides a chance to be involved in cutting-edge original research, practice research methods central to the relevant discipline, and become part of the research community in that field. The student will undertake research directed by the faculty member and related to the faculty member's research agenda, and will document the research through a formal research paper. Undergraduate research may lead to a presentation at Clarkson's RAPS conference, other academic conferences, and/or joint publication.

Requirement: Permission of the instructor
Components: Research
Attributes: Given When Needed

Liberal Arts - Humanities & Social Sciences - Subject: Humanities & Social Sciences

HSS 410(2 - 12) **Course ID:011353** **2015-02-09** **Department Consent Required**
Humanities/Social Science Internship
Students gain experience in applying humanities and social science concepts and methods to issues, problems, or projects in professional contexts that are external to the Department of Humanities and Social Sciences. Internships typically occur during the fall or spring semester, but summer employment and co-op positions also can provide students with an internship experience depending on the type of work done. Students will work closely with a Faculty Supervisor to develop the academic component of the internship, which may take the form of outside readings, journal-writing as well as a major paper, project or exhibit related to or stemming from the work being done in the internship itself.

Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisite: Consent of the Internship Director in the Department of Humanities and Social Sciences.

School of Arts and Sciences - Humanities & Social Sciences - Subject: Humanities & Social Sciences

HSS 480(3) **Course ID:010961** **2015-03-03** **Instructor Consent Required**
Major Research Seminar
This senior seminar is the capstone course for all students majoring in Humanities and Social Sciences. Taught every semester by a different member of the HSS faculty, the seminar focuses on broad-based interdisciplinary themes, including, for example, war and peace, poverty and social justice, cross-cultural issues, and the environment. Students will engage in readings and class discussions in preparation for writing their senior research papers. Significant portions of the seminar will be devoted to producing these research papers.

Components: Seminar
Attributes: Two communication units, Offered Each Term
Requirement Group: Prerequisites: Must be in History, Humanities, Interdisciplinary Social Sciences, Political Science or

Institute for STEM Education - CRC Education Program - Subject: History

HST 575(3) **Course ID:012907** **2022-04-08**
Interdisciplinary Connections of History and Multicultural Literature
Framed around universal concepts of humanity (change, diversity, intolerance, ethics, creativity, freedom, and legacy), this course is designed to illustrate the interdisciplinary connections between secondary social studies and English language arts. Recognition that these key concepts span time and place, and are applicable to every period in history, will help to develop a broad understanding of the human experience, and the unity of humanity, through the study of history and multicultural literature. In addition to the historic and literature specific content of the course, other goals include development of empathy and a respect for diversity, as well as learning how to guide discussions that value different points of view.
Components: Seminar
Course Equivalents: EGL 575
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

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HST 580(3) **Course ID:012477** **2021-10-08**
MAT Project in History (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

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HST 587(3) **Course ID:012881** **2018-08-02**
Reel History
Reel History is an examination of themes and concepts related to the study of history. A range of historical topics across the New York state ?7?-12 social studies curriculum will be examined. Students will view and research films to analyze and evaluate the historical accuracy portrayed in film. Emphasis will be placed on determining the degree to which film can be used as a source for understanding history. Student research, presentations, and the development of curricular materials related to the use of film as a documentary evidence will be the basis of course assessments.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

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HST 988(3) **Course ID:012496** **2017-07-01**
Independent Study in History
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

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HST 989(3) **Course ID:012497** **2017-07-01**
Independent Study in History
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

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School of Arts and Sciences - Humanities & Social Sciences - Subject: Humanities

HUM 1(2 - 4) **Course ID:010950** **2015-01-19**
Humanities Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

HUM 490(1 - 10) **Course ID:011225** **2015-02-09** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in Humanities for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term

Graduate Interdisciplinary - Data Science - Subject: Interdisciplinary Analytics

IA 501(2) **Course ID:012103** **2018-01-16**
Calculus
This course serves as a prerequisite course for MS Data Analytics students who do not have calculus background. Functions and graphs; derivative concept and formulas, including chain rule and implicit differentiation; integral concept; the Fundamental Theorem of Calculus; properties and applications of the derivative, including max-min problems and graph sketching; exponential, logarithmic, and inverse trigonometric functions.
Components: Lecture
Attributes: Given When Needed

IA 502(2) **Course ID:012104** **2018-01-16**
Probability and Statistics
Prerequisite course for MS Data Analytics students who do not have calculus-based statistics and probability background. A calculus based introduction to topics in probability and statistics. Probability content includes events and sample spaces, the basic axioms of probability, discrete and continuous random variables (definitions and basic characterizations such as the means and variances) including binomial, Poisson, normal, exponential, student-t, and uniform distributions. Topics in statistics include the central limit theorem, statistical inference including confidence intervals and hypothesis testing for one and two sample data, and linear regression. Students will use statistical software to read data and interpret software generated output.
Components: Lecture
Attributes: Given When Needed

IA 503(2) **Course ID:012105** **2022-01-11**
Introduction to Programming
Prerequisite course for MS Data Analytics students who do not programming background. This course introduces students to programming fundamentals and standard components, features and practices. Main programming concepts are introduced in an applied context. Practical emphasis is on sound programming practices and development methods.
Components: Lecture
Same As Offering: IA 503
Attributes: Given When Needed

IA 503(2) **Course ID:012105** **2022-01-11**
Introduction to Programming
Prerequisite course for MS Data Analytics students who do not programming background. This course introduces students to programming fundamentals and standard components, features and practices. Main programming concepts are introduced in an applied context. Practical emphasis is on sound programming practices and development methods.
Components: Lecture
Same As Offering: IA 503
Attributes: Given When Needed

IA 507(1) **Course ID:012773** **2017-01-24**
Spreadsheet Analytics
The main purpose of this course is to enable students to acquire understanding and applicable knowledge of conducting exploratory analysis across different disciplinary fields using modern spreadsheet based tools and techniques. This course focuses on critical skills and tools for using the spreadsheet software packages for the purpose of conducting a variety of analytics tasks and operations to improve gathering, generation and presentation of organizational intelligence.
Components: Lecture
Attributes: Offered Spring Term

IA 510(3) **Course ID:011987** **2022-01-21**
Database Modeling, Design & Implementation
This course is focused on key concepts of database modeling, design, and management, utilizing a variety of relational database management systems. Students will acquire understanding of proper data modeling approaches, grounded in underlying rationale for creating well-designed and efficient data repositories. They will be introduced to the variety of modeling and implementation approaches, and will gain understanding of unique advantages leading to the prevalence of the relational database model in today's systems. Students will learn to properly utilize basic methods and techniques for conceptually envisioning as well as designing databases which include Entity-Relationship (ER) modeling, relational modeling, normalization, and Structured Query Language (SQL).
Components: Lecture
Same As Offering: IA 510
Attributes: Offered Winter Term

Graduate Interdisciplinary - Data Science - Subject: Interdisciplinary Analytics

IA 510(3) **Course ID:011987** **2022-01-21**
Database Modeling, Design & Implementation
This course is focused on key concepts of database modeling, design, and management, utilizing a variety of relational database management systems. Students will acquire understanding of proper data modeling approaches, grounded in underlying rationale for creating well-designed and efficient data repositories. They will be introduced to the variety of modeling and implementation approaches, and will gain understanding of unique advantages leading to the prevalence of the relational database model in today's systems. Students will learn to properly utilize basic methods and techniques for conceptually envisioning as well as designing databases which include Entity-Relationship (ER) modeling, relational modeling, normalization, and Structured Query Language (SQL).
Components: Lecture
Same As Offering: IA 510
Attributes: Offered Winter Term

IA 520(3) **Course ID:011989** **2017-01-24**
Optimization Methods for Analytics
Optimization is a structured approach to determining the best values for a set of decision possibilities given constraints and an objective expressed as a function of these decision variables. This course focuses on the design, development, and analysis of optimization models while using canned software to solve them. The students will solve a wide variety of optimization problems applicable to a wide variety of industries: manufacturing, distribution, health care, finance, marketing, etc. Students will develop optimization models using Microsoft Excel.
Prerequisites: An undergraduate course in probability and statistics, and an undergraduate course in introductory computer science or programming.
Components: Lecture
Attributes: Offered Fall Term

IA 530(3) **Course ID:011990** **2019-11-05**
Probability & Statistics for Analytics
Probability theory is presented as a mathematical foundation for statistical inference. Axiomatic probability is introduced; standard discrete and continuous probability distributions are presented. Joint distributions and transformations are discussed. Probabilistic convergence concepts are introduced. The key objectives of this course are to formulate statistical models and find optimal solutions for statistical problems in economics, business, engineering, and science, have a global overview of the interplay between probability and statistics as well as master the art of writing statistical proofs well, consistent with the written tradition of the discipline, and have the skills to communicate statistical ideas effectively.
Components: Lecture
Same As Offering: IA 530
Attributes: Offered Winter Term

IA 530(3) **Course ID:011990** **2019-11-05**
Probability & Statistics for Analytics
Probability theory is presented as a mathematical foundation for statistical inference. Axiomatic probability is introduced; standard discrete and continuous probability distributions are presented. Joint distributions and transformations are discussed. Probabilistic convergence concepts are introduced. The key objectives of this course are to formulate statistical models and find optimal solutions for statistical problems in economics, business, engineering, and science, have a global overview of the interplay between probability and statistics as well as master the art of writing statistical proofs well, consistent with the written tradition of the discipline, and have the skills to communicate statistical ideas effectively.
Components: Lecture
Same As Offering: IA 530
Attributes: Offered Winter Term

IA 605(3) **Course ID:011991** **2017-01-24**
Data Warehousing
This course examines how data warehouses are used to successfully gather, structure, analyze, understand, and act on information. The components and design issues related to data warehouses and business intelligence techniques for extracting meaningful information from data warehouses are emphasized. The emphasis is on proper modeling techniques as well as the techniques for Extraction, Transformation and Loading (ETL) process. Various software tools will be used to demonstrate design, implementation, and utilization of data warehouses.
Components: Lecture
Attributes: Offered Fall Term

Graduate Interdisciplinary - Data Science - Subject: Interdisciplinary Analytics

IA 626(3) **Course ID:012107** **2018-04-04**
Big Data Processing and Cloud Services
This course will enable students to gain understanding of critical components and the processes of Big Data architecture. The course will take a hands on approach, enabling students to develop critical skills by creating data processing pipelines and procedures to transform and integrate structured, semi-structured and unstructured data . The course will provide students with understanding of web service based systems architecture and best practices for deployment of scalable applications for data analytics.
This class will also teach students practical fundamentals of Cloud Computing and how it relates to Big Data. The class will cover both Apache Hadoop implementation as well as usage of leading industry solutions such as Elastic MapReduce. Throughout the class students will be taught how to recognize opportunities in big data analytics and how to match those opportunities with the most appropriate big data software.
Students will learn the various data formats and be taught when to utilize each one. The course will take an
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: IA 503, or IS 237, or CS 141, or equivalent

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IA 628(3) **Course ID:012130** **2017-01-24**
Introduction to Big Data Architecture and Applications
The objective for this course is to provide an in-depth discussion of the big data architecture and its applications. The following topics will be covered: big data architecture from a data pipeline perspective; distributed file systems; massively scalable processing of big data, using the map and reduce model; access to big data via SQL-like interface; running search engines over big data; scripting over big data; and real-time access to big data. The course will be taught using the Hadoop ecosystem as a reference platform. The course will use a projects-driven approach where students will have ample opportunities to practice essential skills needed by a big data analyst, from cluster planning, through the development of data analytics, to the designing and building of big data applications.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: IA 503, IA 510, and IA 626 (or equivalent)

IA 630(3) **Course ID:011992** **2017-01-24**
Modeling for Insight
Although mathematical models have a long and compelling history of application in science and engineering, they are becoming increasingly important in the world of business. Some problems are well described by statistical (curve fitting models), but analyzing a business problem generates significant complexities that are often not well described by simply analyzing the historical data. In particular, to be able to answer questions of 'what if...?' often requires an understanding of system behaviors when we specifically to to depart from previous (historical) practices. The critical contribution of these models is that they may allow the analyst to arrive at compelling insights to contribute to development of a reasoned action plan. This class will enable students to develop familiarity and facility in generating insightful models via modeling in realistic situations. Key skills to be developed include recognizing the key problem, developing a model structure for an unstructured problem, and intelligent analysis and interpretation of model results.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IA 505, IA 510, IA 520, and IA 530 (or equivalents)

IA 640(3) **Course ID:011993** **2019-08-05**
Information Visualization
The science of Information Visualization (InfoVis) seeks to understand the best way to achieve synergistic interaction of the human visual perception system and data. Data visualizations focus on two general application areas: (1) Enhancing the ability of the visual system to discover structure in the data leading to new insight and knowledge, and (2) Taking advantage of the visual display to support rapid diffusion of complex information throughout the organization achievable by the visualization applications. This class will study the techniques, systems, software, algorithms, and design principles that allow for maximal information transmission and knowledge discovery when working with complex data sets. Students will learn the key principles involved in information visualization through a project driven course, with students gaining background skills in design and application of innovative visualizations.
Components: Lecture
Same As Offering: IA 640
Attributes: Offered Spring Term

Graduate Interdisciplinary - Data Science - Subject: Interdisciplinary Analytics

IA 640(3) **Course ID:011993** **2019-08-05**
Information Visualization
The science of Information Visualization (InfoVis) seeks to understand the best way to achieve synergistic interaction of the human visual perception system and data. Data visualizations focus on two general application areas: (1) Enhancing the ability of the visual system to discover structure in the data leading to new insight and knowledge, and (2) Taking advantage of the visual display to support rapid diffusion of complex information throughout the organization achievable by the visualization applications. This class will study the techniques, systems, software, algorithms, and design principles that allow for maximal information transmission and knowledge discovery when working with complex data sets. Students will learn the key principles involved in information visualization through a project driven course, with students gaining background skills in design and application of innovative visualizations.
Components: Lecture
Same As Offering: IA 640
Attributes: Offered Spring Term

IA 650(3) **Course ID:011988** **2017-01-24**
Data Mining
Recent advances in information technology, together with the growth of the Internet have resulted in an explosion of data collected, stored, and disseminated. Because of its massive size, it is difficult for analysts to sift through the data even though it may contain useful information. Data mining holds great promise to address this problem by providing efficient techniques to uncover useful information hidden in large data repositories. Awareness of the importance of data mining is becoming widespread. Industry is creating more job opportunities for people who have interdisciplinary data analytic skills. They key objectives of this course are to teach the fundamental concepts of data mining and provide extensive hands-on experience in apply the concepts to real-world applications.

Students will have opportunities to learn both domain and technical knowledge to face the big data challenges
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisite: IA 530 or equivalent

IA 651(3) **Course ID:012851** **2020-04-23**
Applied Machine Learning
The objective of this course is to provide in-depth coverage of major supervised machine learning algorithms from an applied perspective, using a case studies approach. The following topics will be covered: machine learning paradigms; process and measurement of supervised learning; support vector machines; neural networks; other selected machine learning algorithms; feature engineering; case studies selected from different domains, such as text and natural language processing, electrical engineering, business, and vision and image processing. The course will be taught using an industry accepted language, such as Python or R, and associated machine learning packages. The course will use a projects-driven approach where students will have ample opportunities to practice essential skills needed by a machine learning practitioner, from the preparation and planning of data for training and testing, through feature selection, to the deployment of machine learning based applications.
Components: Lecture
Same As Offering: IA 651
Attributes: Offered Spring Term
Requirement Group: Prerequisite: IA 530

IA 651(3) **Course ID:012851** **2020-04-23**
Applied Machine Learning
The objective of this course is to provide in-depth coverage of major supervised machine learning algorithms from an applied perspective, using a case studies approach. The following topics will be covered: machine learning paradigms; process and measurement of supervised learning; support vector machines; neural networks; other selected machine learning algorithms; feature engineering; case studies selected from different domains, such as text and natural language processing, electrical engineering, business, and vision and image processing. The course will be taught using an industry accepted language, such as Python or R, and associated machine learning packages. The course will use a projects-driven approach where students will have ample opportunities to practice essential skills needed by a machine learning practitioner, from the preparation and planning of data for training and testing, through feature selection, to the deployment of machine learning based applications.
Components: Lecture
Same As Offering: IA 651
Attributes: Offered Spring Term

Graduate Interdisciplinary - Data Science - Subject: Interdisciplinary Analytics

IA 690(6) **Course ID:011995** **2017-01-24** **Instructor Consent Required**
Analytics Capstone Project
This course is based on a semester-long sponsored project that utilizes a variety of expertise areas, methods, and skills in data analytics. Students participating in this course will be divided into inter-disciplinary teams charged with planning, designing, and implementing an analytics solution for the organization that sponsors the project. In addition to the continuous interaction with the sponsoring organization representatives, students will be required to report and consult with the faculty project supervisor on a regular basis. Depending on the nature of the capstone and its sponsorship, projects could be on-site fieldwork intensive. Final deliverables include written reports and oral presentations.
Components: Independent Study
Attributes: Offered Summer Term

School of Arts and Sciences - Communication, Media & Design - Subject: Ignite

IGN 120(1) **Course ID:013078** **2021-10-15**
Making and Communicating Innovation
[Cross Listed with COMM120] This course will provide a high level overview of prototyping digital and physical innovations and will provide instruction on communicating innovations. Making topics covered include but are not limited to 3D modeling/printing, audio and video principles/recording/editing, basic video shooting/editing. Communication topics include but are not limited to context, audience, and purpose analysis, genres in business and technical communication, pitching, writing style, and writing and revision processes. This is a hybrid course that will include in person and virtual sessions
Components: Lecture
Course Equivalents: COMM 120
Attributes: Given When Needed

Business - School of Business - Subject: Information Systems

IS 1(2 - 4) **Course ID:008422** **2015-06-30**
Information Systems Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

IS 2(2 - 4) **Course ID:008423** **2015-06-30**
Information System Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only

IS 110(3) **Course ID:008425** **2022-02-10**
Introduction to Business Intelligence and Data Analytics
This course is an introduction to the underlying technology components of modern information systems used in businesses. It is important for organizations to utilize technology to collect data and use modern analysis tools and techniques to transform that data into tactical and strategic information. Emphasis is on introducing students to the main building blocks of information systems in organizations, and how such systems can be used to support individual and organizational decision making. Students will gain hands on experience in using data gathering and analysis tools such as Microsoft Excel and Enterprise Resource Planning software. Offered Fall and Spring semesters.
Components: Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: Freshman or Sophomore standing.
Req. Designation: Technology

IS 200(1) **Course ID:008424** **2015-06-30**
ERP Fundamentals
The course serves as an introduction to enterprise resource planning (ERP) concepts and navigation using SAS R/3 software. This course is a co-requisite for non-CUSB or iE&M students taking MK320, OM331, or OS352 who have not taken IS211.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Restriction: Students may not receive credit for IS200 as well as IS211.
Req. Designation: Technology

IS 237(3) **Course ID:011760** **2016-04-06**
Introduction to Application Development
This course will enable students to gain the knowledge and necessary skills required to develop standard software applications. Students will learn object oriented application development and programming principles and how they are applied through all the stages of software development, from requirements to testing and deployment. Students will learn programming syntax and best programming practices including documenting, testing, and error correction. Offered Spring semesters.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

IS 301(3) **Course ID:008427** **2022-02-10**
Applied Data Analytics
[Cross listed with EM301] Proper utilization of modern analytical tools is a critical component of effective and timely creation and use of organizational intelligence in a variety of fields of human endeavor: management, social science, health care, engineering etc. This course focuses on critical skills for using software tools such as Excel, SQL, and Tableau (or their equivalents) for the purpose of conducting a variety of analytics tasks and operations to improve gathering, generation and presentation of organizational intelligence. Focus is on proper data gathering and preparation, followed by the use of key analysis grouping and summation tools as well as data presentation and visualization.
Components: Lecture
Course Equivalents: EM 301
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: IS110. Students may not receive credit for IS200 as well as IS211.
Req. Designation: Technology

Business - School of Business - Subject: Information Systems

IS 314(3) **Course ID:008438** **2015-06-30**
Database Design & Management
[Cross-listed with EM 314] This course provides the student with in-depth knowledge of database analysis, design, and implementation principles. Students who successfully complete this course will be able to use the entity-relationship data model to represent business data requirements, to translate that model into a relational schema, to normalize this schema and to build and use a relational database that implements the schema, using the Standard Query Language (SQL).
Components: Lecture
Course Equivalents: EM 314
Req. Designation: Technology

IS 400(3) **Course ID:008436** **2017-07-06**
Process and System Analysis and Modeling
Students are expected to master the fundamentals of business process analysis and application design using the traditional and agile analysis and modeling approaches. Students will learn methodologies and project management skills by completing an array of individual assignments that involve planning, design and prototyping of business application systems. A mock prototype software application based on the analysis will be developed throughout the course. Offered Fall semesters.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: IS237 or CS141 or EE261
Req. Designation: Technology

IS 415(3) **Course ID:008439** **2016-11-08**
Data Warehousing for Analytics
[Cross-listed with EM 415] This course covers the fundamental concepts, design, management and application of data warehouses and business/enterprise intelligence systems. Specific topics covered include the logical design of a data warehouse, the data staging area and extraction-transformation-loading process, the design, implementation and utilization of multi-dimensional data analysis systems, as well as key business/enterprise intelligence concepts, processes and techniques including knowledge discovery and exploratory analysis. Offered Fall semesters.
Components: Lecture
Course Equivalents: EM 415
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IS314 or CS460/EE468
Req. Designation: Technology

IS 426(3) **Course ID:011274** **2019-10-22**
Big Data Architecture
This course will enable students to gain understanding of critical components and the processes of big data architecture. The course will take a hands-on approach, enabling students to develop skills for creating data processing pipelines and procedures to transform and integrate structured, semi-structured and unstructured data. The course will provide students with an understanding of web service based systems architecture and best practices for deployment of scalable applications for data analytics. Offered Fall semesters.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: IS211, & IS314, & IS237, CS141 or EE261, or IS110
Req. Designation: Technology

IS 428(3) **Course ID:008441** **2016-11-08**
Information Systems for Supply Chain Management
This course will be focused on information systems that enable supply chain integration. Redesign of core intra and inter-enterprise business processes will be discussed in detail. Students will be introduced to and will get hands-on experience with latest technologies such as Extended Enterprise Systems. The trend of outsourcing of business and supply chain processes to distant geographical locations and its impact on business practices and strategies will be discussed in detail. Course material will be comprises of book chapters, cases, labs, and project work to apply concepts learned in the course, and to include hands-on experience with business process driven enterprise software (e.g. SAP Advanced Planner & Optimizer).
Components: Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: OM331.
Req. Designation: Technology

Business - School of Business - Subject: Information Systems

IS 437(3) **Course ID:008442** **2017-07-06**
Data Analytics Project: Planning, Development, and Data Analysis
This course highlights the development of business intelligence applications which use remote data and web services for the purpose of presentation to organizational decision makers. As an experiential course, students will be required to engage in all stages of planning, analyzing and building a complete connected software application stack for data analytics. Students will use the stack to analyze a real-life data set, delivering insight and recommendations based on the analysis. Offered Spring semesters.
Prerequisites: IS314 and, IS237 or CS141 or EE261
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IS314 and, IS237 or CS141 or EE261
Req. Designation: Technology

IS 487(1 - 3) **Course ID:008445** **2017-01-13**
Special Project in Information Systems
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member. Permission of the instructor required.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

Business - CRC Business - Subject: Information Systems

IS 501(0) **Course ID:012515** **2017-06-21**
Mathematics of Management
[Formerly MBA 1] This course focuses on mathematics useful in modeling management processes. Fundamental concepts of differential and integral calculus and their applications to management are addressed.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

IS 502(0) **Course ID:012516** **2017-06-21**
Introduction to Probability
[Formerly MBA 2] This course covers marginal, joint and conditional probability; random variables, expected value and variance; selected probability distributions and their uses in management; and sampling distributions and the Central Limit Theorem.
Components: Lecture
Req. Designation: Technology

Business - School of Business - Subject: Information Systems

IS 605(2) **Course ID:008454** **2015-06-30**
Information Systems (MBA Module)
[Cross-listed with IS 606] In this course the role of information systems and information technology in managing modern information age enterprises is explored. The focus of the course is on (a) establishing the basic knowledge of information systems (b) strategic significance of information systems to various businesses and industries (c) role of information systems as a strategic weapon to compete in the global marketplace and (d) role of information systems in transforming modern business organizations. Advanced topics of enterprise resources planning and emergent visions and practices such as electronic commerce, web-based information systems, and corporate intranets and extranets are reviewed in a framework of strategic information planning. Real life cases of information systems are analyzed and discussed to reinforce the understanding of concepts introduced in the course.
Prerequisites: completion of all CUSB MBA foundation requirements admission to the MBA program.
Components: Lecture
Course Equivalents: IS 606, IS 606
Req. Designation: Technology

Business - CRC Business - Subject: Information Systems

IS 606(3) **Course ID:008455** **2020-01-05**
Business Information Systems
[Cross-listed with IS 605] This course explores the role of information technology and systems (IT/IS) in today's organizations. The focus of this course is on the fundamentals of information systems and investigating the strategic importance of information systems to various businesses and industries as well as the role of information systems in transforming modern business organizations. Topics will include: Planning an IT application portfolio, system implementation, IT driven process redesign, IT governance and IT/IS as a source of competitive advantage. We will examine specific information technologies and applications such as: enterprise systems, cloud computing, social media, and business intelligence. The structure of the course will include readings, group work / discussions and case studies highlighting the IT/IS related issues faced by organizations.
Components: Lecture
Same As Offering: IS 606
Course Equivalents: IS 605
Attributes: Offered Winter Term
Req. Designation: Technology

IS 606(3) **Course ID:008455** **2020-01-05**
Business Information Systems
[Cross-listed with IS 605] This course explores the role of information technology and systems (IT/IS) in today's organizations. The focus of this course is on the fundamentals of information systems and investigating the strategic importance of information systems to various businesses and industries as well as the role of information systems in transforming modern business organizations. Topics will include: Planning an IT application portfolio, system implementation, IT driven process redesign, IT governance and IT/IS as a source of competitive advantage. We will examine specific information technologies and applications such as: enterprise systems, cloud computing, social media, and business intelligence. The structure of the course will include readings, group work / discussions and case studies highlighting the IT/IS related issues faced by organizations.
Components: Lecture
Same As Offering: IS 606
Course Equivalents: IS 605
Attributes: Offered Winter Term
Req. Designation: Technology

IS 642(3) **Course ID:013079** **2021-04-21**
Applications in Business Analytics
This course provides an introduction to Big Data and Analytics and examines a set of systems and applications, which specifically are supporting the Big Data World. Students will learn the basic concepts behind data retrieval and analytics, explore and discuss the development of these systems. Data analytics applications will be applied to current business problems, to illustrate how organizations can gain a competitive advantage with the implementation and usage of such applications. Students will gain the conceptual knowledge for business analytics concepts as well as practical experience with the structural dimension for data analytics. The main focus of this course will be to collect, preprocess, analyze and present structured and unstructured data, using advanced Data Analytics software.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

IS 647(3) **Course ID:012524** **2018-09-17**
Statistical Methods for Data Analytics
[Formerly MBA 506] [Cross Listed with HC647] This course covers the analytic process that supports data-driven decision-making in business. Emphasis is placed on problem formulation, data acquisition, selection of appropriate statistical approaches, and effective communication of analytic results. Topics covered include data visualization, data description methods, statistical inference, and model building. Examples are drawn from quality management, finance, operations, supply chain management, marketing and healthcare. Data visualization and analysis will be performed using statistical software.
Components: Lecture
Same As Offering: IS 647
Course Equivalents: HC 647
Req. Designation: Technology

Business - School of Business - Subject: Information Systems

IS 647(3) **Course ID:012524** **2018-09-17**
Statistical Methods for Data Analytics
[Formerly MBA 506] [Cross Listed with HC647] This course covers the analytic process that supports data-driven decision-making in business. Emphasis is placed on problem formulation, data acquisition, selection of appropriate statistical approaches, and effective communication of analytic results. Topics covered include data visualization, data description methods, statistical inference, and model building. Examples are drawn from quality management, finance, operations, supply chain management, marketing and healthcare. Data visualization and analysis will be performed using statistical software.
Components: Lecture
Same As Offering: IS 647
Course Equivalents: HC 647
Req. Designation: Technology

IS 687(1 - 3) **Course ID:008470** **2022-06-13**
Independent Project in Information Systems
Practical application of information systems concepts in an independent research or development project conducted under the guidance of a CUSB faculty member.
Components: Independent Study
Same As Offering: IS 687
Attributes: Offered Each Term
Req. Designation: Technology

IS 687(1 - 3) **Course ID:008470** **2022-06-13**
Independent Project in Information Systems
Practical application of information systems concepts in an independent research or development project conducted under the guidance of a CUSB faculty member.
Components: Independent Study
Same As Offering: IS 687
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - School of Business - Subject: Information Systems

IS 999(1 - 10) **Course ID:012738** **2016-08-29**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Science - Provost - Subject: Information Technology

IT 2(2 - 4) **Course ID:011468** **2015-01-19**
Information Technology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Technology Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Graduate Interdisciplinary - Computer Science - Subject: Information Technology

IT 501(3) **Course ID:008481** **2018-10-22**
Software Systems
This course is an introduction to software design and implementation. After a review of basic programming concepts, students will be introduced to procedural and data abstraction, object-oriented design, recursion and dynamic data structures. Abstract data types such as lists, stacks, queues, and trees will be studied. Algorithms for searching and sorting will be explored along with methods for comparative analysis. Programming concepts will be demonstrated in a language like C++. The course will also include an introduction to the Unix operating system.
Prerequisite: programming experience.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

Graduate Interdisciplinary - - Subject: Information Technology

IT 521(1 - 10) **Course ID:010326** **2017-01-12**
Information Technology Independent Project
Independent project under the direction of a Clarkson professor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Graduate Interdisciplinary - Computer Science - Subject: Information Technology

IT 522(1 - 4) **Course ID:010996** **2017-01-12**
Information Technology Independent Project
Independent project under the direction of a Clarkson professor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

IT 620(1 - 9) **Course ID:008484** **2021-12-14**
Information Technology Project
Independent project work in IT under the supervision of a Clarkson professor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

IT 621(1 - 9) **Course ID:008485** **2021-12-14**
Information Technology Project
Independent project work in IT under the supervision of a Clarkson professor.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - - Subject: Information Technology

IT 999(1 - 10) **Course ID:011099** **2017-01-12**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Language

LANG 1(2 - 4) **Course ID:008487** **2015-01-19**
Language Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 2(2 - 4) **Course ID:008488** **2015-01-19**
Language Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 10(2 - 0) **Course ID:011912** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 12(2 - 0) **Course ID:011913** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 14(2 - 0) **Course ID:011914** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 16(2 - 0) **Course ID:011915** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 18(2 - 0) **Course ID:011916** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 20(2 - 0) **Course ID:011917** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 22(2 - 0) **Course ID:011918** **2015-01-19**
LANG Elective
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Language

LANG 100(3) **Course ID:011442** **2015-01-19**
Introductory French Language
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate French B Higher-Level Examination or 2) satisfactory completion of a college-level Introductory French course.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 101(3) **Course ID:011443** **2015-01-19**
Introductory German Language
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate German B Higher-Level Examination or 2) satisfactory completion of a college-level Introductory German course.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 102(3) **Course ID:011444** **2015-01-19**
Introductory Italian Language
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate Italian B Higher-Level Examination or 2) satisfactory completion of a college-level Introductory Italian course.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 103(3) **Course ID:011445** **2021-06-01**
Introductory Spanish Language
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate Spanish B Higher-Lever Examination or 2) satisfactory completion of a college-level Introductory Spanish course.
Components: Independent Study
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Language

LANG 104(3) **Course ID:012123** **2015-08-23**
Introductory English Language
Credit for this course is awarded only in the following case: Receipt of a score of 5 through 7 on the International Baccalaureate English B Higher-Level Examination.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LANG 110(3) **Course ID:011446** **2020-07-15**
Chinese Language and Culture
An Introductory Language course that covers both Chinese language and culture. No previous knowledge of Chinese language is required. Not open to native speakers of Chinese.
Components: Lecture
Attributes: Cultures and Societies
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Language

LANG 111(3) **Course ID:011447** **2015-01-19**
Japanese Language and Culture
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 or 6 on the AP Japanese Language & Culture Examination or 2) satisfactory completion of a comparable college-level course that covers both Japanese language and culture.
Components: Independent Study
Attributes: Cultures and Societies, Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Language

LANG 112(3) **Course ID:012128** **2015-10-27**
Spanish Language and Culture
An Introductory Language course that covers both Spanish language and culture. No previous knowledge of Spanish language is required. Not open to native speakers of Spanish.
Components: Lecture
Attributes: Cultures and Societies, Given When Needed
Req. Designation: Technology

LANG 113(3) **Course ID:013160** **2022-03-18**
French Language and Culture
An Introductory Language course that covers both French language and culture. No previous knowledge of French language is required. Not open to native speakers of French.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Language

LANG 150(3) **Course ID:011448** **2015-01-19**
Intermediate French Language
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP French Language Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate French A1 or A2 Higher-Level Examination, or 3) satisfactory completion of a college-level Intermediate French course.
Components: Independent Study
Attributes: Cultures and Societies, Transfer Credit Only
Req. Designation: Technology

LANG 151(3) **Course ID:011449** **2015-01-19**
Intermediate German Language
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP German Language Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate German A1 or A2 Higher-Level Examination, or 3) satisfactory completion of a college-level Intermediate German course.
Components: Independent Study
Attributes: Cultures and Societies, Transfer Credit Only
Req. Designation: Technology

LANG 152(3) **Course ID:011450** **2015-01-19**
Intermediate Italian Language
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP Italian Language & Culture Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate Italian A1 or A2 Higher-Lever Examination, or 3) satisfactory completion of a college-level Intermediate Italian course.
Components: Independent Study
Attributes: Cultures and Societies, Transfer Credit Only
Req. Designation: Technology

LANG 153(3) **Course ID:011451** **2015-01-19**
Intermediate Spanish Language
Credit for this course is awarded only in the following cases: 1) receipt of a 4 or 5 on the AP Spanish Language Exam, 2) receipt of a score of 5 through 7 on the International Baccalaureate Spanish A1 or A2 Higher-Level Examination, or 3) satisfactory completion of a college-level Intermediate Spanish course.
Components: Independent Study
Attributes: Cultures and Societies, Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Latin Language

LAT 580(3) **Course ID:012500** **2021-10-08**
MAT Project in Latin (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

LAT 988(3) **Course ID:012504** **2017-07-01**
Independent Study in Latin
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

LAT 989(3) **Course ID:012505** **2017-07-01**
Independent Study in Latin
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Other - Provost - Subject: Library Services

LIB 201(3) **Course ID:012988** **2019-10-23**
Digital Citizenship & Information as Power
How has our access to and consumption of information changed over time? How will it change in the future? How can we be responsible citizens and media consumers in today's information landscape? This discussion-based course will consider the history and analysis of information creation and use, with an emphasis on the news media and scholarly publishing. Students will learn to analyze the source, purpose, and quality of information and consider the ethical implications of information collection and use. Topics will include the history of the news media and propaganda, information production and ethics, evaluation of information, the movement toward a participatory culture, social media and the news, fake news and ""alternative facts,"" media consumption, and the 1st Amendment and media regulation. Students will also be given an in-depth introduction to the college level research process, focused on a topic of their own choosing. Students will leave the course comfortable with using library resources and able to excel at
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

LIB 202(3) **Course ID:013102** **2021-04-13**
Digital Citizenship & Information as Power: True Crime
Do you find yourself drawn to the latest true crime documentary, book, or podcast? Are you intrigued by stories of infamous bad acts and their impact on society? Throughout history people have been captivated by stories of true crime in all formats. This discussion-based course will consider the history and analysis of information creation and use with an emphasis on true crime media and scholarly publishing in all aspects of criminology. Topics will include a history of true crime media, information production and ethics, evaluation of true crime information resources, the 1st Amendment and media regulation, and the movement toward a participatory culture (web sleuthing, etc.). Students will be given and in-depth introduction to the college level research process, focused on a true crime aspect of their choosing. Students will leave the course comfortable with using library resources and able to excel at college level research. All majors are encouraged to enroll, and there are no prerequisites.
Components: Lecture
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 1(2 - 4) **Course ID:008559** **2015-01-19**
LIT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LIT 2(2 - 4) **Course ID:008560** **2015-01-19**
LIT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LIT 101(3) **Course ID:011181** **2015-01-19**
Literature & Writing
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP English Literature & Composition Exam; 2) receipt of a score of 5 through 7 on a designated International Baccalaureate Higher Level Examination; or 3) satisfactory completion of an approved college-level course. The University Registrar in Student Administrative Services maintains the current lists of the designated IB Exams and approved college-level courses.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Transfer Credit Only
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Literature

LIT 102(3) **Course ID:011452** **2015-01-19**
French Literature
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP French Literature Examination or 2) satisfactory completion of a third-year college French Literature course.
Components: Independent Study
Attributes: Cultures and Societies, Imaginative Arts, University Course, Transfer Credit Only
Req. Designation: Technology

LIT 103(3) **Course ID:011453** **2015-01-19**
The Works of Vergil
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP Latin: Vergil Examination or 2) satisfactory completion of a third-year college Latin Literature course that focuses on the works of Vergil.
Components: Independent Study
Attributes: Cultures and Societies, Imaginative Arts, University Course, Transfer Credit Only
Req. Designation: Technology

LIT 104(3) **Course ID:011454** **2015-01-19**
Latin Literature
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP Latin: Literature Examination or 2) satisfactory completion of a third-year college Latin Literature course.
Components: Independent Study
Attributes: Cultures and Societies, Imaginative Arts, University Course, Transfer Credit Only
Req. Designation: Technology

LIT 105(3) **Course ID:011455** **2015-01-19**
Spanish Literature
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP Spanish Literature Examination or 2) satisfactory completion of a third-year college Spanish Literature course.
Components: Independent Study
Attributes: Cultures and Societies, Imaginative Arts, University Course, Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 106(3) **Course ID:012124** **2015-08-23**
Chinese Literature
Credit for this course is awarded only in the following case -- Receipt of a score of 5 through 7 on the International Baccalaureate Chinese A: Literature Higher-Level Examination
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

LIT 220(3) **Course ID:008566** **2022-02-11**
American Gods
This course focuses on the gods of American literature: Emerson, Hawthorne, Douglass, Melville, Whitman, Dickinson, Twain, and Poe. These authors and the themes they wrote about run so deep in the American psyche that they seem immortal. Foremost among those themes are spirituality and American individualism, the intertwined themes of Transcendentalist literature and its legacy. We will focus primarily on the mid-nineteenth century period of the American Renaissance, the efflorescence of American literature that produced the greatest number of authors in the American pantheon.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Fall Term
Req. Designation: Technology

LIT 221(3) **Course ID:008567** **2022-02-11**
Great American Authors
[Formerly LF231] This course surveys great American authors of the “long” twentieth-century. Readings include such writers as Crane, London, Pound, Fitzgerald, Hemingway, Faulkner, Ellison, and Cisneros.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Offered Odd Springs
Req. Designation: Technology

LIT 222(3) **Course ID:012120** **2022-02-11**
Philosophy for Life
[Cross-Listed as PHIL 222] In this course, we will learn to think philosophically (which is to say: critically, rigorously, and reflectively) about complex and difficult questions. We will study practical life philosophies from both the Eastern and Western traditions, from the Tao Te Ching to Marcus Aurelius, and from Plato to the Dalai Lama. We will reflect on the ontological, epistemological, rhetorical, and ethical perspectives of each of these philosophers and schools of thought. We will note striking similarities and important distinctions between them. Ultimately, we will reflect on our own life philosophies as well—each of us refining our personal life philosophy through reading, reflection, and discussion of these classic texts from the wisdom literature tradition.
Components: Lecture
Course Equivalents: PHIL 222
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Offered Even Springs
Req. Designation: Technology

LIT 225(3) **Course ID:008578** **2022-02-11**
American Short Story
[Formerly LF351] Seeing short fiction as a distinct art form, this course will introduce students to selected masters of the short story. It will include works of short fiction by established authors as well as contemporary ones, and it will include stories by ethnic and racial minorities. It will introduce students to the key elements of fiction, such as character, theme, point of view, and symbolism, as a way to help students evaluate and interpret literature. Occasionally, filmed versions of short stories will be used for comparison.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Odd Springs
Req. Designation: Technology

LIT 226(3) **Course ID:008579** **2022-02-11**
Modern Fiction
This course focuses on fiction of the 20th and 21st centuries. We will explore literary challenges to previous ways of writing and understanding the world. Typical topics include modernism and postmodernism, science fiction, magic realism, and the graphic novel.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 227(3) **Course ID:012894** **2022-02-11**
Tales from the Tropics
This course will examine short stories from Southeast Asian. Students will read and engage with texts by writers from Burma, Cambodia, Indonesia, Laos, Malaysia, Negara Brunei Darussalam, Singapore, Thailand, the Philippines, and Vietnam. We will explore topics such as race, family, tradition, modernity, marginality, displacement, intergenerational conflict, religion, and resistance. We will also pay close attention to the intended audience, implied author, and historical and cultural contexts of the texts.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Odd Springs
Req. Designation: Technology

LIT 229(3) **Course ID:011863** **2015-01-23**
American Weird Fiction
This course will introduce students to that curious type of fiction known as ""weird fiction"" (also sometimes called slipstream fiction), which overlaps with a number of other genres such as science-fiction, fantasy, and horror. Weird stories often lack an explanation for the strange events they depict, and so the genre offers writers and readers a new perspective on the sometimes odd world in which we find ourselves. The course will introduce students to the most important American authors of weird fiction from the 20th and 21st Centuries, included H.P. Lovecraft, Joyce Carol Oates, Caitlin R. Kiernan, Thomas Ligotti, and Laird Barron.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Given When Needed
Req. Designation: Technology

LIT 230(3) **Course ID:011932** **2015-03-03**
Monsters in the House
To label something monstrous may be to identify a primal source of fear or to construct a social barrier, deliberately marginalizing people who do not fit into the mainstream. This course explores portrayals of the monstrous across centuries, considering how they reflect and shape social norms. Texts may include, for example, fairy tales, Disney movies, horror films, and dystopian novels.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Even Springs
Req. Designation: Technology

LIT 235(3) **Course ID:012013** **2022-02-11**
Science Fiction
Introduction to the genre of science fiction and, more broadly, speculative fiction as well as a survey of representative literary texts, including readings from such writers as Philip K. Dick, Margaret Atwood, Octavia Butler, and Orson Scott Card. Works of speculative fiction often serve as an allegory for, or social commentary of, existing cultural views and social structures. The genre’s focus on imagining other worlds and alternative realities make it particularly well-suited for viewing our own biases, prejudices, and social assumptions through the mirror of alien cultures.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Even Springs
Req. Designation: Technology

LIT 240(3) **Course ID:012072** **2015-03-27**
Gender and Popular Culture
This interdisciplinary multi-media course explores the ways conceptions of gender are constructed and challenged by popular culture, including literature, film, TV, and advertising. It considers the complex ways in which social perceptions of gender intersect with constructions of race, class, and sexuality to affect relations of power. It looks at pop culture not simply as entertainment but as something that contributes to collective identities and influences our ways of seeing ourselves and others, often unconsciously. And it explores means of 'talking back,' challenging dominant portrayals of gender to open up more liberating possibilities for imagining selves.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 241(3) **Course ID:013024** **2020-02-19**
War Stories I
[Cross-listed with HIST241] The oldest and most enduring stories describe war and its consequences. Reading these stories helps us see how different societies valued leadership, honor, loyalty, courage, and death on the battlefield. Not all war literature, however, glorifies heroic warriors and their exploits. Some war stories, even in the distant past, question martial codes imposed on men. Others examine what is worth dying or killing for, and still others lament the inevitable wastage and brutality of war, of the costs to individuals, civilizations, and the environment. Most of them are ambivalent. Text will range from the ancient world to the Renaissance and from Asia to Europe.
Components: Lecture
Course Equivalents: HIST 241
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

LIT 248(3) **Course ID:013084** **2022-02-11**
Nobel Prize Winners in Literature
""Nobel Prize Winners in Literature"" course offers a grand tour of world literature through the writings of Nobel Prize winners. It features different authors from a range of countries, languages, and traditions, and includes works of prose, poetry, and drama. Students will also study literary techniques and the cultural background and significance of each work. Possible authors include Alice Munro, Orhan Pamuk, Dario Fo, Seamus Heaney, Toni Morison, Derek Walcott, WB. Yeats, and Rabindranath Tagore.
This is a Clarkson Common Experience University (UNIV) course. This course fulfills the learning outcomes of both the Imaginative Arts (IA) and Cultures and Societies (CSO) Knowledge Areas. This course also fulfills the requirements for a one-unit communication-intensive (C1) credit and will require at least 10—20 pages of graded writing.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Odd Falls
Req. Designation: Technology

LIT 250(3) **Course ID:011486** **2022-02-11**
World Literature
An introduction to representative works of world literature, other than British and American, including fiction, poetry, drama and film.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Even Falls
Req. Designation: Technology

LIT 252(3) **Course ID:011487** **2022-02-11**
African Literature
A study of African literary works from the 19th century, to the present. In this course, students will read memoirs, songs, stories, novels, poems, and plays written by authors from the continent of Africa, considering thematic and stylistic trends and transformations over time.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

LIT 253(3) **Course ID:008570** **2019-10-21**
Greek Mythology
[Cross-listed with HIST253] This course will explore the beginnings of Greek culture through its myths, recorded primarily in Homer, Hesiod, the Greek dramatists of the 5th century BCE, and by later writers of the classical period, such as Apollonius of Rhodes, the Roman poet Ovid, and mythographers such as Apollodorous. As important as this rich textual record is the physical evidence of ancient Greek society. Since the late nineteenth century, archaeological excavations of sites associated with the ancient myths have steadily increased our understanding of their meaning and significance, as well as their relationship to ancient Greek religion and ritual. Finally, visual representations of the figures from myth and legend, found in vase paintings and sculptures, are essential to our full comprehension of the role of myth in the lived lives of Greeks.
Components: Lecture
Course Equivalents: HIST 253
Attributes: Two communication units, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 255(3) **Course ID:011779** **2022-02-11**
Close Encounters of the X Kind
This course will examine Anglophone plays and other plays in English translation. The selected texts revolve around close' encounters with
the unknown or the foreign, and the impacts of such encounters on all parties involved. The course will expose students to different cultures
and theatrical traditions, with playwrights hailing from, among others, Kenya, South Africa, Indonesia, India, the Caribbean, and Irlandia.
Possible readings might include Wole Soyinka' s Death and the King' s Horseman, Athol Fugard' s Boesman and Lena, Arifin C. Noer'
s Moths, Girish Karnad' s Tughlaq, Derek Walcott' s Dream on Monkey Mountain, and Brian Friel' s Translations.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Even Springs
Req. Designation: Technology

LIT 262(3) **Course ID:012895** **2022-02-11**
Women Acting Out
This course will examine dramatic texts by women playwrights. The selected texts revolve around issues pertinent to gender and women’s issues such as family, love, employment, empowerment, and abuse/violence. Students will read and engage with plays from different cultures and theatrical traditions, and with playwrights hailing from Argentina, England, India, Indonesia, and the United States. Possible readings include Caryl Churchill’s Top Girls, Griselda Gambaro’s Antigona Furiosa, Maria Irene Fornes’ Conduct of Life, Mahasweta Devi’s Bayen, Ntozake Shange’s for colored girls, Sarah Daniels’s The Gut Girls, Susan Glaspell’s Trifles, Spiderwoman Theater’s Sun, Moon, and Feather, and Tsitsi Dangarembga’s She No Longer Weeps.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Even Falls
Req. Designation: Technology

LIT 265(3) **Course ID:008583** **2022-02-11**
Creative Writing
[Formerly LF365] This course is designed to introduce students to the main genres of imaginative writing and the basic techniques of those genres. Students will work primarily within the genres of fiction and poetry, though the course will also include brief sections on drama and memoir. Coursework will consist of reading examples and producing exercise in fiction, poetry, and (optionally), drama or memoir. The goal of the course is to make students familiar with the techniques of literary practice and to provide hands-on experience using those techniques.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Offered Even Springs
Req. Designation: Technology

LIT 270(3) **Course ID:012933** **2022-02-11**
Comics of Conscience
Comics of Conscience will examine graphic novels or book-length comics which raise important social and political issues. It will explore how graphic novels are built and told—we will learn to use a conceptual vocabulary so we can discuss how the graphic novel achieves its objective of obtaining the reader’s attention and engagement. We will learn how to read them, how to talk about how they get made and how they work, how to understand—and how to enjoy— some of the kinds of comics and graphic novels. Emphasis in our studies will examine the co-mixing of genres within telling a visual story: we will look at journalism comics, memoir comics, realistic fiction comics, and fantasy comics. The overall objective is to learn how to read graphic novels—e.g., how to understand the way the verbal and the non-verbal/graphic work together—and how to write about them.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 275(3) **Course ID:012979** **2022-02-11**
Demons and Witches
“Demons and Witches among Us” will help you to develop skills in reading and analyzing fiction, as well as introduce you to the fascinating world of horror fiction. We will explore the genre of ghost story or horror literature in contemporary Asian literature, including short stories, novels, and comic books. How do Asian writers utilize elements of conventional horror, and to what effect? Can horror literature be used to address important issues such as abuse of power by authoritarian regimes, conflicts between the traditional and the modern, gender discrimination, urban alienation, and environmental destruction? We will examine supernatural motifs, including ghosts, zombies, witches, demons, and psychopaths, in fiction by writers from India, China, Japan, Cambodia, Malaysia, Singapore, and Indonesia. We will investigate how horror holds power over us the reader and what is the place of horror in society. We will also discuss the various elements of fiction: character analysis, plot, use of symbols, theme, tone, and style.
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Even Springs
Req. Designation: Technology

LIT 280(3) **Course ID:013064** **2021-01-14**
Disaster Lit
Disaster Lit forces us to confront our own mortality and to ask ourselves how we would respond if facing a similar crisis, threat, or catastrophe. The genre also offers social commentary by extrapolating current trends to disastrous conclusions, and showing how our political and social institutions might respond—or fail to respond—during extraordinary situations. We will consider both fiction and nonfiction depictions of catastrophes and disasters, and natural as well as political or socioeconomic disasters. Possible readings include: Albert Camus’s The Plague, Robert Harris’s historical thriller Dictator, Walter Miller’s post-apocalyptic novel A Canticle for Leibowitz, and H.G. Wells’s alien invasion novel War of the Worlds.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Given When Needed
Req. Designation: Technology

LIT 328(3) **Course ID:008573** **2015-01-29**
African-American Literature
[Formerly LF335] This course will survey African-American novelists, dramatists, and poets of the twentieth century in their social and political context and in their own sense of their literary tradition. It will begin, however, by looking back, (to the slave narrative of Frederick Douglass for instance), before moving into the four stages, broadly speaking, of African-American literature: The Harlem Renaissance: 1915-1935 (e.g., Zora Neale Hurston, Langston Hughes, Alain Locke); The Age of Protest: 1935-1955 (e.g., Richard Wright, James Baldwin, Gwendolyn Brooks); African-American Militant Literature: 1955-1970 (e.g., Amiri Baraka, Ishmael Reed, Nikki Giovanni); and Literature by African-American Women: 1970-1991 (e.g, Alice Walker, Toni Morrison, Toni Cade Bambara, Maya Angelou). Because in the 1950s and 1960s there is a 'rediscovery' of Africa, the survey will also include such influential African writers as Chinua Achebe. The course will be conducted as an exploration, mainly in class discussions, but also in formal written analysis,
Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Odd Falls
Req. Designation: Technology

LIT 335(3) **Course ID:011933** **2022-02-11**
Violence and Reconciliation
[Cross-listed with POL 335] While scholars have labeled the 20th century 'the century of genocide,' the past two decades have catalyzed global changes in the ways we think about peace-building and reconciliation. But reconciliation after mass conflict remains a difficult process. Can you forgive someone who has done irreparable harm to you or your loved ones? Can you reconcile -literally, return to a previous state of harmony- with someone if you never shared a harmonious relationship with that person? Is reconciling with a whole community the same as reconciling with an individual? This course examines the challenges to reconciliation after political trauma and assesses the strengths and weaknesses of major reconciliation mechanisms. Through the lens of two case studies, South Africa and Northern Ireland, and the disciplines of film, fiction, and political theory, students will compare the consequences of criminal trials, truth commissions, and informal efforts at communal healing. As a final project, the class will participate in a
Components: Lecture
Course Equivalents: POL 335
Attributes: One communication unit, Contemporary and Global Issues, Imaginative Arts, University Course, Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Literature

LIT 355(3) **Course ID:012891** **2022-02-11**
Power, Exploitation, and Freedom: Postcolonial Literature
Colonialism is the process of one country taking political, economic, and cultural control of another country. From the 15th-20th centuries, European countries colonized swathes of Asia, Africa, and South and Central America. They exploited the economic resources of those countries, subjugated their populations, and labeled indigenous cultures "inferior." In the mid-20th century, independence movements led to the decolonization of many countries and gave rise to an important body of literature. Postcolonial literature explores the effects of colonialism and challenges the misrepresentation of colonized countries by colonizing powers. It helps readers understand the cultures of colonized countries, their fight for independence, and their evolution after decolonization. This course examines postcolonial literature from a wide range of countries and cultures, including India, Nigeria, South Africa, and the Caribbean.
Components: Lecture
Attributes: One communication unit, Imaginative Arts, Offered Odd Falls
Req. Designation: Technology

LIT 380(3) **Course ID:008603** **2022-02-11**
Shakespeare's Game of Thrones: Blood, Lust, and Power
[Formerly LF480] While Shakespeare's plays are unquestionably part of our literary heritage, there were also written by a practical man of the theater who was fully engaged in the changing culture of late Elizabethan and early Jacobean England. During the semester, students will read Shakespeare's plays for their literary values and their theatrical values, while placing them specifically in their historical context. Class discussion will involve literary analysis, questions or effective staging and stage history, and the most pressing social and political issues of Renaissance England. Students will read, see, and hear a representative selection of plays.
Components: Lecture
Attributes: Two communication units, Imaginative Arts, Offered Spring Term
Req. Designation: Technology

LIT 490(1 - 10) **Course ID:008604** **2015-02-09** **Department Consent Required**
Independent Study
[Formerly LF490] Designed primarily for an advanced student who wishes to pursue special interests in literature for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

LIT 499(0) **Course ID:008613** **2015-02-09**
Minor Portfolio
[Formerly LF499] In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Credit basis.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

Business - School of Business - Subject: Law

LW 1(2 - 4) **Course ID:008716** **2015-07-06**
Law Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Discussion
Attributes: Transfer Credit Only
Req. Designation: Technology

LW 2(2 - 4) **Course ID:008717** **2015-07-06**
Law Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Business Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

LW 270(3) **Course ID:008718** **2015-07-06**
Law and Society I
A course designed to provide a basic understanding of (1) the nature, functions and limitations of law and legal systems; (2) the basic relationship among justice, ethics, legal systems and social structure; and (3) the relationship among society, law and business activity. Further, it is designed to enlighten with respect to rules, principles, standards and doctrines of law fundamental to a free enterprise system. The course covers the substantive areas of constitutional law, torts, contracts, and property and estate law.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisite: at least sophomore standing.
Req. Designation: Technology

School of Arts and Sciences - School of Business - Subject: Law

LW 352(3) **Course ID:012825** **2022-02-10**
Reading for the Law: Legal Issues Through Non-Fiction Literature
Understanding ""black letter law"" is but one window in to legal understanding. In order to contextualize the law, we must understand the social and political issues which have given rise to, and are affected by, the statutes and judicial decisions that shape our legal system.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Requirement Group: Prerequisites: LW270
Req. Designation: Technology

Business - School of Business - Subject: Law

LW 466(3) **Course ID:008719** **2015-07-06**
The Law of the Workplace
This course is designed to review areas of law affecting the workplace both from the perspective of the employer as well as the employee. The students will study the environment of the workplace from a legal perspective. Topics will include the National Labor Relations Act and the jurisdiction of the National Labor Relations Board, the rights and obligations of management and labor under the Act. The course will also review the law which governs the public employer in the form of federal, state and local governments. Finally, the course will review other areas of law which affect the workplace such as the doctrine of 'employment at will,' Worker's Compensation and Disability Law, Social Security Law, the law governing discriminatory practices, the Americans with Disabilities Act, the law of the Occupational Safety and Health Agency and developing topics such as drug testing in the workplace and pay equity issues.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: LW270 or consent of the instructor.
Req. Designation: Technology

LW 471(3) **Course ID:008720** **2022-02-10**
Law and Society II
A continuation of LW 270, including the substantive areas of agency law, business organizations (including the law of partnerships, corporations and the limited liability company), negotiable instruments, sales and secured transactions.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: LW270.
Req. Designation: Technology

LW 487(1 - 3) **Course ID:012149** **2016-04-05** **Instructor Consent Required**
Special Project in Law
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisistes: Permission from the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

LW 490(1 - 3) **Course ID:008721** **2016-04-05** **Instructor Consent Required**
Internship
An unpaid internship that is related to the student’s professional goals.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

LW 499(0) **Course ID:011209** **2015-07-08**
Law Studies Minor Portfolio
A student completing the Law Studies Minor will compile a portfolio that manifests his or her learning experience in the minor. In this course, students complete their Law Studies Minor portfolio under the direction of their minor advisor. The course is graded on a Pass-No Credit basis.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 1(2 - 4) **Course ID:008723** **2017-09-28**
Mathematics Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may not be used to satisfy the requirements of the Mathematics or Applied Mathematics and Statistics major. Check with major department to determine whether credits count toward graduation.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

MA 2(2 - 4) **Course ID:008724** **2017-09-28**
Mathematics Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy the requirements of the Mathematics or Applied Mathematics and Statistics major.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

MA 30(3) **Course ID:011281** **2015-01-21** **Instructor Consent Required**
Introductory Mathematics Summer Program
This course is intended primarily as a preparation for students who will be starting their Clarkson careers in MA 180, Introduction to College Mathematics. Course topics include: a brief review of elementary algebra, linear, quadratic, exponential, logarithmic, and trigonometric functions. The course emphasizes an applied approach to all topics through real-life examples. You should check with your major department to determine whether this course can be used to satisfy your degree requirements in specific majors.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

MA 31(2.5) **Course ID:008725** **2020-05-17** **Instructor Consent Required**
Pre-Calculus Mathematics
This course is a comprehensive review of the high school level mathematics whose mastery is necessary for success in calculus. Topics include: Elementary algebra, geometry and trigonometry; coordinate geometry; linear, quadratic, trigonometric, exponential and logarithmic functions. Check with major department to determine whether credits count toward graduation.
Components: Lecture
Attributes: Offered Fall and Summer
Req. Designation: Technology

MA 41(2) **Course ID:008726** **2015-09-15**
Co-Calculus Mathematics
This course provides support for students in Calculus I by reviewing topics from algebra, functions, geometry and trigonometry as they are being used in calculus. Enrollment is by invitation of the Mathematics Department. Check with major department to determine whether credits count toward graduation.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisite: MA 131
Req. Designation: Technology

MA 42(0) **Course ID:010149** **2015-12-15**
Co-Calculus II
This course provides help sessions for students in Calculus II by reviewing carefully selected examples as the corresponding topics are being studied in calculus. Review of background topics from Calculus I will also be included as needed. Enrollment is by invitation of the Mathematics Department. Given Pass/No Credit only.
Components: Discussion
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 120(4) **Course ID:012091** **2021-09-22**
Introduction to STEM Mathematics
Prepares students for Calculus and higher mathematics in the science, technology, and engineering majors. Topics include algebraic concepts, lines and quadratic equations; functions; exponential and logarithmic functions and equations, trigonometry and trigonometric functions, identities and equations; systems of equations and inequalities. This course will focus on illustrating these mathematical topics from pre-calculus within the context of applications taken from the sciences and engineering.

Grading for this course is done using Mastery Based Assessment.

This course is normally taken for 4 credits. However, students joining after normal add period may be directed by the Math Department Chair to take this course for fewer than 4 credits. Under these conditions
Components: Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Restriction: This course is not available for students who already have credit for any one of the foll

Req. Designation: Technology

MA 131(3) **Course ID:008732** **2015-09-15**
Calculus I
Functions and graphs; derivative concept and formulas, including chain rule and implicit differentiation; integral concept; the Fundamental Theorem of Calculus; properties and applications of the derivative, including max-min problems and graph sketching; exponential, logarithmic, and inverse trigonometric functions.
Prerequisites: high school algebra and trigonometry.
Components: Discussion, Lecture
Attributes: Offered Each Term
Requirement Group: Corequisite: MA 41
Req. Designation: Technology

MA 132(3) **Course ID:008733** **2015-02-12**
Calculus II
A continuation of MA 131. Properties and applications of the integral, including areas, volumes, arc length and differential equations; integration techniques, including parts, partial fractions, trigonometric substitution, and numerical integration; indeterminate forms; improper integrals; infinite series and Taylor series; introduction to polar coordinates, complex numbers, and parametric equations.
Components: Discussion, Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisite: MA131
Req. Designation: Technology

MA 180(4) **Course ID:010506** **2016-11-04**
Introductory College Mathematics
Review of basic algebra and functions, differences, an introduction to discrete calculus, rates of growth, introduction to the derivative. This course is not available for students who already have credit for any one of MA131, MA132, or MA181.
Components: Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Restriction: Not open to students who have taken, or are taking MA120, MA181, MA131, or MA132
Req. Designation: Technology

MA 181(3) **Course ID:010507** **2022-02-11**
Basic Calculus
The fundamentals of differential calculus with applications to business, life and social sciences, optimization, the fundamental theorem of calculus, introduction to the concept of the integral.
Components: Discussion, Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: MA180 or MA120
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 200(3) **Course ID:011229** **2015-01-20**
Introduction to Mathematical Modeling and Software
Introduction to the use of mathematics in solving real-life problems. Basics of using mathematical software (such as MATLAB and Maple) to apply calculus and other methods. Group projects. Communication skills including ethical considerations, presentation and mathematical exposition. Introduction to mathematical professions.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: MA131.
Req. Designation: Technology

MA 211(3) **Course ID:008740** **2018-10-18**
Discrete Mathematics and Proof
A transitional course between the technique-oriented lower-level courses and the concept-oriented upper-level courses in both mathematics and computer science. Topics include logic, quantifiers, proof techniques (including mathematical induction), integers, sets, functions, equivalence relations, and basic combinatorics. A major emphasis of the course is learning to write mathematical proofs. This course is intended for students majoring in Mathematics, Computer Science, and related fields.
Components: Lecture
Attributes: Two communication units, Offered Each Term
Requirement Group: Prerequisites: MA132
Req. Designation: Technology

Science - Mathematics - Subject: Mathematics

MA 222(3) **Course ID:008741** **2022-06-02**
Differential Equations without Linear Algebra
A college level Ordinary Differential Equation course for which there is no comparable Clarkson course. Solutions and applications of first-order differential equations and linear differential equations with constant coefficients. Laplace transform methods, systems of differential equations. Other topics may include modeling, engineering applications or numerical methods.

Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 230(3) **Course ID:010518** **2016-10-18**
3-D Space and Projective Geometry
An introduction to the mathematics of 3 dimensional space, including vector functions, elementary vector calculus and partial derivatives, introductory projective geometry especially as applied to projections of 3-D images on two dimensional media, translations, rotations and an introduction to their matrix representations. A student may not receive credit for both MA230 and MA231. MA231 satisfies any requirement for MA230.
Components: Discussion, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: MA131
Req. Designation: Technology

MA 231(3) **Course ID:008742** **2015-02-12**
Calculus III
Vectors and vector-valued functions; functions of several variables; partial differentiation, including the chain rule, gradients, and maxima and minima; multiple integration, including polar, cylindrical, and spherical coordinates; vector calculus, including Green's, Divergence, and Stokes's Theorems. A student may not receive credit for both MA230 and MA231. MA231 satisfies any requirement for MA230.
Components: Discussion, Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA132
Req. Designation: Technology

MA 232(3) **Course ID:008743** **2015-02-12**
Elementary Differential Equations
Solutions and applications of first-order differential equations and linear differential equations with constant coefficients. Laplace transform methods. Introduction to matrix algebra, systems of algebraic equations, eigenvalues and eigenvectors, with application to systems of differential equations. Other topics may include modeling, engineering applications or numerical methods.
Components: Discussion, Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA132
Req. Designation: Technology

MA 239(3) **Course ID:010191** **2017-01-17**
Elementary Linear Algebra
Introduction to matrices and matrix operations, Linear systems of equations, Elementary treatment of eigenvalues, parameter estimation by least squares, Introduction to linear programming, MATLAB will be used throughout (Instruction in MATLAB is included.)
Components: Lecture
Requirement Group: Prerequisites: MA 131 or MA181 Not open to Mathematics or Applied Math and Stats majors; not open to s

Req. Designation: Technology

MA 277(3) **Course ID:012864** **2018-02-26**
Elementary Numerical Methods
An introductory course on numerical methods as applied in scientific computing. Topics include application of Taylor polynomials and representations of functions, numerical calculus, solving linear systems, and interpolation. Optional topics may include numerical solution of differential and difference equations and solutions to nonlinear equations. This course is intended for students outside of engineering/math/physics that seek to expand their skill set in applying computational tools. Students may not receive credit for both MA277 and MA377.
Components: Lecture
Attributes: Offered Even Falls
Requirement Group: Prerequisites: MA239, and MA230 or permission of the instructor Not open to students who have credit f

Req. Designation: Technology

MA 300(1) **Course ID:008748** **2016-12-06** **Instructor Consent Required**
Seminar in Actuarial Mathematics
Seminar for students with interest in an actuarial career. Especially recommended for those preparing for the actuarial exams.
Requisite: Permission of the Instructor
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 301(3 - 4) **Course ID:008749** **2017-09-28**
Mathematics Elective
An upper-division mathematics course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy the requirements of the Mathematics or Applied Mathematics and Statistics major or the Mathematics minor.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

MA 311(3) **Course ID:008755** **2015-01-29**
Abstract Algebra
A study of mathematical systems, including an introduction to the theory of groups, rings, ideals and fields. Polynomials over a field; matrix polynomials.
Components: Lecture
Attributes: One communication unit, Offered Odd Falls
Requirement Group: Prerequisites: MA211
Req. Designation: Technology

MA 313(3) **Course ID:008757** **2015-03-03**
Abstract Linear Algebra
A proof-oriented introduction to linear algebra. Vector spaces, linear transformations, determinants, eigenvalues, canonical forms and inner-product spaces.
Components: Lecture
Attributes: One communication unit, Offered Even Falls
Requirement Group: Prerequisites: MA211 and MA339.
Req. Designation: Technology

MA 314(3) **Course ID:008758** **2015-03-05**
Number Theory and Its Applications
Divisibility; the fundamental theorem of arithmetic; linear diophantine equations; fundamentals of congruences; prime numbers and factoring; the theorems of Fermat and Wilson; quadratic residues. Additional topics may include arithmetic functions, the Mobius inversion formula; geometric number theory; partitions; continued fractions; primality testing and factoring; applications to crystallography and cryptography.
Components: Lecture
Attributes: One communication unit, Offered Odd Springs
Requirement Group: Prerequisites: MA211
Req. Designation: Technology

MA 315(3) **Course ID:013154** **2022-03-17**
Introduction to Complex Networks
This course will introduce the student to the new, burgeoning field of Complex Networks, their analysis and applications to everyday-life. Elementary concepts from Graph Theory, Statistical Physics and Discrete Math techniques will be taught as demanded by the material. Covered topics will include: Basic concepts from Graph Theory, Global vs. local algorithms of analysis, Erdos-Renyi Random Graph, Small-World model of Watts & Strogatz, Scale-free networks, Barabasi-Albert and Krapivsky-Redner models, Recursive scale-free models and their applications; The percolation problem and its applications to epidemic spreading, vaccination strategies, etc. and Kleinberg navigation.
Components: Lecture
Course Equivalents: PH 315
Attributes: Offered Fall Term
Requirement Group: Prerequisite: MA132
Req. Designation: Technology

MA 321(3) **Course ID:008760** **2015-02-19**
Advanced Calculus I
A rigorous course in analysis on the real line and calculus of functions of one variable.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: MA231 and MA211
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 322(3) **Course ID:008761** **2015-03-03**
Advanced Calculus II
Continuation of MA321 and extension to functions of several variables.
Components: Lecture
Attributes: One communication unit, Offered Even Springs
Requirement Group: Prerequisites: MA321
Req. Designation: Technology

MA 330(3) **Course ID:008762** **2017-01-17**
Advanced Engineering Mathematics
Introduction to linear algebra. Review of ordinary differential equations and Laplace transforms; ordinary boundary value problems. Fourier analysis; overview of partial differential equations. Introduction to probability and statistics. Modeling and applications to engineering problems will be emphasized throughout. This course is intended principally for Mechanical and Aeronautical Engineering majors; not open to Mathematics majors.
Components: Discussion, Lecture
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: MA231 and MA232
Req. Designation: Technology

MA 331(3) **Course ID:008763** **2015-01-20**
Fourier Series and Boundary Value Problems
Review of ordinary boundary value problems. Fourier series and integral. Derivation of heat, wave and potential equations with boundary and initial conditions. Solution by separation of variables. Additional topics may include multidimensional problems, Bessel functions, Laplace transforms, numerical methods.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MA231 and MA232
Req. Designation: Technology

MA 332(3) **Course ID:008764** **2014-12-05**
Intermediate Differential Equations
Theory of linear differential equations; oscillation and boundedness. Nonlinear differential equations: stability, phase-plane analysis, exact solutions. Additional topics may include control theory, theory of first-order equations, singularities.
Components: Lecture
Requirement Group: Prerequisites: MA231 and MA232
Req. Designation: Technology

MA 339(3) **Course ID:008768** **2015-02-12**
Applied Linear Algebra
This course is an introduction to matrices and linear algebra with applications in engineering and science. Algebra of matrices and systems of linear algebraic equations. Rank, inverse, eigenvalues, eigenvectors, vector spaces, subspaces, basis, independence, orthogonal projection, determinant. Other topics may include: systems of differential equations, numerical methods, linear programming.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA132; MA230/231 recommended but not required
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Mathematics

MA 345(3) **Course ID:011628** **2019-04-03**
Automata Theory and Formal Languages
[Cross-listed with CS 345] This course gives an introduction to formal languages and their relation to automata. Topics include deterministic and non-deterministic finite automata, regular expressions and languages, closure properties and decision procedures for context-free languages, recursive and recursively enumerable sets, Turing machines, and decidability. Some aspects of computational complexity may also be explored.

Components: Lecture
Course Equivalents: CS 345, CS 541
Requirement Group: Prerequisites: CS 142, EE262, or EE361, and MA211
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 362(3) **Course ID:008774** **2014-12-05**
Complex Analysis with Applications
Complex numbers and functions, conformal mapping and applications, derivative, Cauchy-Riemann equations, real and complex line integrals, Fundamental Theorem, Cauchy and Poisson formulas, Taylor series, analytic continuation, special functions, Laurent series, residues. Applications to partial differential equations.
Components: Lecture
Requirement Group: Prerequisites: MA231
Req. Designation: Technology

MA 363(3) **Course ID:008775** **2015-08-14**
Mathematical Modeling
Introduction to the use of mathematics in solving real-life problems. Topics include: formulation and refinement of models, different types of models, application of results to prediction and design. Mathematical methods beyond the prerequisite courses will be presented as needed.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: MA231, MA232 and PH132 Corequisites: MA330, or MA381, or S
Req. Designation: Technology

MA 368(1) **Course ID:011578** **2021-04-12** **Instructor Consent Required**
Mathematical Biology Seminar
[Cross-listed with BY 368] The objective of this course is to present recent advances in research that combines biological and mathematical analysis, and to describe opportunities for interdisciplinary summer research in biology and mathematics. Students will receive one credit for attending seminars (6 per semester), reading a journal article prior to each presentation, writing a short review of each seminar, and participating in discussions. This course can be taken for credit more than once.
Components: Seminar
Course Equivalents: BY 368
Req. Designation: Technology

MA 377(3) **Course ID:008776** **2015-02-19**
Numerical Methods
Floating-point numbers and sources of error, direct solution of linear systems, nonlinear equations, interpolation, numerical integration and numerical solution of initial value problems in ordinary differential equations.
Components: Laboratory, Lecture
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: MA230 or MA231
Req. Designation: Technology

MA 381(3) **Course ID:008777** **2016-08-15**
Probability
[Cross-listed with STAT 381] Sample spaces; axioms of probability; basic theorems; random variables (discrete and continuous); combinatorial methods; Bayes' Theorem and conditional probability; expected values and variances; distribution functions, including: binomial and multinomial, Poisson, normal and bivariate normal distributions, and others such as geometric, hypergeometric, negative binomial, exponential, gamma and beta; joint distributions; covariance and correlation; central limit theorem; geometric probability; method of transformations; introduction to stochastic processes.
Components: Lecture
Course Equivalents: MA 581, STAT 381, STAT 581
Requirement Group: Prerequisite: MA231 or MA230 (MA211 Recommended)
Req. Designation: Technology

MA 400(1 - 6) **Course ID:008781** **2015-01-28**
Undergraduate Seminar
This seminar will emphasize recreational mathematics and problem solving on the advanced undergraduate level. It is particularly recommended for those who are interested in preparing for the Putnam Undergraduate Mathematics Competition or the Mathematical Contest in Modeling.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 401(1 - 10) **Course ID:008782** **2017-01-13**
Directed Study in Mathematics
Prerequisite: consent of the instructor.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MA 405(1 - 10) **Course ID:008786** **2017-01-13**
Directed Study in Applied Mathematics
Prerequisite: consent of the instructor.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MA 407(1 - 10) **Course ID:008788** **2015-01-28** **Instructor Consent Required**
Directed Study in Numerical Analysis
A directed study in Numerical Analysis, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Req. Designation: Technology

MA 409(1 - 10) **Course ID:008790** **2014-12-04**
Directed Study in Probability and Statistics
[Cross-listed with STAT 409] A directed study in Probability and Statistics, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Course Equivalents: STAT 409
Req. Designation: Technology

MA 431(1 - 3) **Course ID:008804** **2015-02-19**
Mathematics Course Assistance
Assisting a faculty member in a mathematics course or project. Credit can be used as free electives to meet baccalaureate degree requirements, up to a maximum of 6 hours for MA431. This course is offered on a Pass/No-Credit basis only. (May be taken more than once for credit.)
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

MA 442(3) **Course ID:011629** **2019-04-24**
Computational Complexity
The complexity of a computational problem is the amount of computer resources it requires. Computational complexity theory studies the complexity of computational problems as well as relationships between different types of resources. This course will cover both classical and research-related topics in computational complexity, such as: complexity measures and complexity classes for sequential machines and Boolean circuits, reductions and completeness, hierarchy theorems, relativization, circuit complexity, and proof complexity.
Components: Lecture
Course Equivalents: CS 442
Attributes: Given When Needed
Requirement Group: Prerequisites: CS345 or equivalent MA345.
Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Mathematics

MA 447(3) **Course ID:008809** **2019-04-03**
Computer Algorithms
[Cross-listed with CS 447] This course will study and contrast a variety of computational algorithms and develop tools for algorithm analysis. Methods and topics such as dynamic programming, greedy algorithms, graph algorithms, circuits, parallel algorithms, matrix and polynomial algorithms, string matching, and geometrical algorithms will be explored. The theory of NP-completeness and methods of managing NP-complete problems will also be covered.
Components: Lecture
Course Equivalents: CS 447
Requirement Group: Prerequisites: CS344 and MA211
Req. Designation: Technology

MA 449(3) **Course ID:011626** **2015-08-15**
Computational Learning
[Cross-listed as CS 449] Computational learning studies algorithmic problems for inferring patterns and relations from data. This course describes the mathematical foundations of learning and explores the important connections and applications to areas such as artificial intelligence, cryptography, statistics, and bioinformatics. A list of relevant topics may include perceptron and online learning, graphical models and probabilistic inference, decision tree induction and boosting, analysis of Boolean functions, sample complexity bounds, cryptographic and complexity hardness, and reinforcement learning. Basic ideas from computer science and mathematics are employed to describe the main ideas and major developments in computational learning.
Components: Lecture
Course Equivalents: CS 449
Attributes: Given When Needed
Requirement Group: Prerequisites: CS344 and CS345, or consent of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 451(2) **Course ID:011187** **2017-01-17**
Introduction to Mathematical Research
Introduction to the methods and tools needed to prepare mathematical research papers and presentations. Course instruction includes an introduction to research journals, including databases and search tools; mathematical writing; mathematical authoring and presentation software; professionalism, diversity, and ethics in the mathematical professions. Elements of the student grade will be drawn from performance in this class, from peer-evaluations and from self-assessment through surveys.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Only open to Math or Applied Math and Statistics majors with at least junior standing, or by permissio

Req. Designation: Technology

MA 453(1 - 3) **Course ID:011186** **2018-01-17**
Introduction to Mathematical Instruction
Introduction to mathematical pedagogy. Students majoring in Math or Applied Math and Statistics register for 2 credits, consisting of: classroom presentation techniques; preparation of handouts; evaluation techniques; mathematical authoring and presentation software; professionalism, diversity, and ethics in the mathematical professions. Elements of the student grade will be drawn from performance in this class, from peer-evaluations and from self-assessment. Students are required to complete a semester-long non-paid teaching experience in conjunction with this course (for example, serving as a teaching assistant or a group tutor). Students enrolled in the pre-teaching minor register for one additional credit and complete additional assignments covering a broader range of topics in education; this additional credit may be taken in the same semester or in a later semester.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: Only open to Math or Applied Math and Statistics majors with at least junior standing or

Req. Designation: Technology

School of Arts and Sciences - Computer Science - Subject: Mathematics

MA 456(3) **Course ID:008814** **2021-11-30**
Cryptography
[Cross-listed with CS 456] Cryptography is the discipline which studies the making of 'secret' codes. This course will examine some of the methods of cryptography together with many surprising applications. The language of modern cryptography is primarily number theory, and various tools of number theory will be developed as needed. No background in number theory or cryptography will be necessary, but some mathematical sophistication and familiarity with proofs will be assumed. Topics will include: one-way functions, public-key cryptosystems, digital signatures, probabilistic encryption, primality testing, interactive proof systems, and methods of secret sharing.

Components: Lecture
Course Equivalents: CS 456
Attributes: Given When Needed
Requirement Group: Prerequisites: CS142, EE262, or EE361, and MA211. (CS344 Recommended)
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 497(1 - 3) **Course ID:008822** **2017-01-13** **Instructor Consent Required**
Undergraduate Research
Students engage in mathematical research with a faculty member. The topic will be determined by student interest and faculty research programs. This course may be repeated for credit.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MA 499(0) **Course ID:008824** **2015-02-09**
Professional Experience
This course records success in completing the requirements other than conventional course work for all mathematics majors. The student must present evidence demonstrating skill in communications and understanding the profession. The requirement can be satisfied in a number of ways including internships or co-ops with appropriate professional content, participation in REU programs, a mathematical honors thesis, teaching assistance in mathematics, active participation in professional societies including attendance at regional or national conferences and presentation of work at such. Directed study or research courses that lead to such presentations would also satisfy the requirement. Check with the Math department for specific requirements.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

MA 513(3) **Course ID:011423** **2014-08-01**
Abstract Linear Algebra
A proof-oriented introduction to linear algebra. Vector spaces, linear transformations, determinants, eigenvalues, canonical forms, and inner-product spaces. Notions of null spaces, spectral decomposition theorem, positive definiteness, and also Penrose pseudo-inverse and singular value decomposition will be included. Students will be expected to independently investigate some aspects of the course material.
Prerequisite: Linear Algebra
Components: Lecture
Req. Designation: Technology

MA 514(3) **Course ID:008829** **2015-01-28**
Sets and Topology
Sets and set operations. Construction of the number system. Axiom of choice and its equivalents. Transfinite numbers. Topological spaces. Separation and connectedness. Product and quotients. Compactness. Topological groups.
Prerequisite: linear algebra.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 521(3) **Course ID:008830** **2015-01-28**
Classical Complex Analysis
Complex series and power series. Analytic functions and basic mapping properties. Cauchy's theorem and its consequences. Residue theorem and applications.
Prerequisite: advanced calculus.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 522(3) **Course ID:008831** **2015-01-28**
Classical Real Analysis
Metric spaces and metric topology. Continuity, connectedness and compactness. Contraction mapping theorem and applications. Lebesgue measure and integral on euclidean spaces. Fourier series.
Prerequisite: advanced calculus.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 525(3) **Course ID:011265** **2015-01-28**
Functional Analysis
This course introduces the students to the fundamental aspects of applied functional analysis. This field builds upon the concepts of real and complex analysis, developing the general theories of Banach spaces, bounded linear operators, and linear functionals. The primary focus of the course will be applications of functional analysis to other fields of mathematics, including such topics as dual spaces, weak topologies and weak convergence, approximation theory, and the applications of operator theory to the solutions of partial differential equations. Recommended prerequisites: courses in Real Analysis and Complex Analysis or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 526(3) **Course ID:008832** **2015-01-28**
Convex Optimization and Analysis
Convex sets, functions, and optimization problems. Basics of convex analysis. Least-squares, linear and quadratic programs, semidefinite programming, minimax and extremal volume problems. Optimality conditions, Lagrange multipliers and KKT conditions, duality theory, primal and dual decomposition theorems of alternative interior point methods. Possible applications to come from signal processing, physics, control theory, mechanical engineering, image processing, manifold learning. Other topics may include epigraphs, subdifferentials and cone convexity, and multiobjective optimization.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: MA578; MA513 or MA573; and MA522
Req. Designation: Technology

MA 531(3) **Course ID:008833** **2015-01-28**
Initial and Boundary Value Problems and Partial Differential Equations
Solution techniques for ordinary differential equations. Series solutions. Boundary value problems and special functions. Classification of partial differential equations. Linear problems shall include heat equation, wave equation, and Laplace's equation. Separation of variables and boundary value problems will be presented. Nonlinear equations shall be discussed, including reaction diffusion and reaction diffusion advection. Method of characteristics will be presented and shocks and singularities shall be included, and so will Burger's equation be included.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 533(3) **Course ID:011581** **2011-01-27**
Ordinary Differential Equations
Please check with the math department for a course description
Components: Lecture
Req. Designation: Technology

MA 550(3) **Course ID:011943** **2015-01-28**
Nonlinear Partial Differential Equations
This course introduces the analysis of Partial Differential Equations, (PDE's). Topics include linear PDE's such as transport, Laplace, heat and wave equations. Necessary functional analysis such as L^p spaces, Hilbert spaces, linear operator theory, dual spaces and weak convergence and the theory of Sobolev spaces will be included. Methods will include classical maximum principles, Galerkin truncation methods for global existence of weak solutions, and finite time blow up. The application of Sobolev spaces for existence theory of elliptic and parabolic PDE, and certain nonlinear reaction diffusion equations, such as models for population dynamics may be covered as time allows.
Prerequisites: Basic PDE, Advanced Calculus. Real and/or functional analysis is recommended but not required.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 562(3) **Course ID:008840** **2015-01-28**
Complex Analysis with Applications
Complex numbers and functions, conformal mapping and applications, derivative, Cauchy-Riemann equations, real and complex line integrals, Fundamental Theorem, Cauchy and Poisson formulas, Taylor series, analytic continuation, special functions, Laurent series, residues. Applications to partial differential equations. Prerequisite: MA231.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 563(3) **Course ID:010538** **2015-01-28**
Applied Dynamical Systems
This course will emphasize applied dynamical systems, nonlinear science, and chaos theory. The dynamical systems approach emphasizes the study of long-term evolution through geometrical and topological considerations. We will emphasize applications from mechanics, engineering, physics, biology, medicine and chemistry.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 571(3) **Course ID:008842** **2015-01-28**
Numerical Solution of Differential Equations
Numerical solution of initial and boundary value problems in ordinary differential equations, finite difference methods for elliptic, parabolic, and hyperbolic partial differential equations. Additional topics may include introduction to finite element and spectral methods.
Prerequisites: MA377 or consent of the instructor and the ability to program.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 572(3) **Course ID:008843** **2014-12-04**
Finite-Element Methods
[Cross-listed with CE 538, ME 515] This course is an introduction to the finite element method, from a mathematical as well as a modeling and applications point of view. The basic theory and implementation will be discussed in the context of continuum problems in linear elasticity, potential flow and plate modeling. If time permits, additional applications such as structures, electromagnetics, fluid mechanics, ground water and geotechnics will also be discussed. Topics include: weak formulations and the principle of virtual work, discretization and interpolation-function selection, assembly and solution of the system equations, error estimates and accuracy assessment. When taught in conjunction with CE 438/ME 453 the course requires additional independent work for those registered for the graduate course.
Prerequisites: MA232, MA339 or MA330, ES222, ES330, and the ability to program. Consent of the instructor may be used to replace some prerequisites.
Components: Lecture
Course Equivalents: CE 538, ME 515
Req. Designation: Technology

MA 573(3) **Course ID:008844** **2015-01-28**
Matrix Theory and Computations
This course presents topics in matrix theory that are useful in applications to engineering, science and other branches of mathematics. Review of linear algebra, including vector and matrix norms and canonical forms, numerical methods for linear systems (direct and iterative methods), eigenvalue problems, singular value decomposition, orthogonal projections, matrix decompositions, generalized inverses. Additional topics may include applications to least squares and optimization.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 578(3) **Course ID:008846** **2015-01-28**
Numerical Analysis
Review of linear algebra and systems, solution of nonlinear equations and systems, interpolation, approximation of functions, orthogonal polynomials, numerical differentiation and integration. Additional topics may include eigenvalue problems, iterative methods for linear systems and topics from optimization.
Prerequisites: linear algebra.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 579(3) **Course ID:010460** **2015-01-28**
Introduction to Applied Optimization
The motivation for this course is that optimization problems arise routinely in most applications -- from designing an airline schedule to minimize cost to designing a remediation strategy for a contaminated ground water site. In this course we will focus on numerical techniques to solve applied optimization problems of various formulations. Topics will include solutions to linear and nonlinear equations, nonlinear programming, unconstrained and constrained optimization, black-box formulations and a glance at sampling methods, an dif time allows, extra topics may include multi-objective optimization, mixed integer programming methods, and evolutionary algorithms. This course will include a computing component with MATLAB and possibly some off-the-shelf optimization packages. The objectives are (a) to become familiar with a range of optimal design formulations and techniques appropriate for those formulations, (b) to motivate the need for efficient numerical methods for optimization problems, (c) to study these methods through implementation and analysis,
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

MA 581(3) **Course ID:008847** **2016-08-15**
Probability
[Cross-listed with STAT 581] Sample spaces; axioms of probability; basic theorems; random variables (discrete and continuous); combinatorial methods; Bayes' Theorem and conditional probability; expected values and variances; distribution functions, including: binomial and multinomial, Poisson, normal and bivariate normal distributions, and others such as geometric, hypergeometric, negative binomial, exponential, gamma and beta; joint distributions; covariance and correlation; central limit theorem; geometric probability; method of transformations; introduction to stochastic processes.
Components: Lecture
Course Equivalents: MA 381, STAT 381, STAT 581
Req. Designation: Technology

MA 585(3) **Course ID:008850** **2022-05-05**
Bayesian Data Analysis
[Cross-Listed STAT585] This course will introduce both the principles and practice of Bayesian methods for data analysis. This is a hands-on course that will use MATLAB, R or other suitable software at instructor discretion. Students will learn to write their own Bayesian computer programs to solve problems relevant to engineering, biology, chemistry, physics, earth science, ecology, economics, signal processing and machine learning. Topics that will be included are parameter estimation, model selection, time series and error analysis. Prerequisites: MA383 or equivalent and familiarity with matrices; or consent of the instructor.
Components: Lecture
Course Equivalents: STAT 585
Attributes: Given When Needed
Req. Designation: Technology

MA 601(1 - 10) **Course ID:008851** **2015-01-28**
Topics in Mathematics
Prerequisites: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

MA 701(1 - 10) **Course ID:008883** **2015-01-28**
Directed Study in Mathematics
Prerequisites: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

MA 705(1 - 10) **Course ID:008887** **2015-01-28** **Instructor Consent Required**
Directed Study in Applied Mathematics
Directed Study in Applied Mathematics
Components: Independent Study
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Mathematics

MA 707(1 - 10) **Course ID:008889** **2015-01-28** **Instructor Consent Required**
Directed Study in Numerical Analysis
A directed study in Numerical Analysis, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

MA 710(0) **Course ID:013039** **2020-04-07**
Department of Mathematics Colloquium
The colloquium is the sequence of talks given to the Department of Mathematics by local and visiting researchers in mathematics, statistics, and other fields of interest. This course serves to expose graduate students in mathematics to a broader range of research topics. All graduate students are expected to attend the colloquium as a part of the education toward their degree. The course does not carry a credit load, but serves to document grad student participation and avoid scheduling overlap.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

MA 719(1 - 10) **Course ID:008894** **2015-01-28** **Instructor Consent Required**
Directed Study in Nonlinear Processes
A directed study in Nonlinear Processes, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

MA 725(1 - 10) **Course ID:008898** **2015-01-28**
Seminar in Applied Mathematics
Prerequisites: consent of the instructor.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

MA 739(1 - 10) **Course ID:008904** **2017-01-23**
Seminar in Nonlinear Processes
[Cross-Listed with EE739]Prerequisites: consent of the instructor.
Components: Seminar
Course Equivalents: EE 739
Attributes: Given When Needed
Req. Designation: Technology

MA 810(1 - 0) **Course ID:008905** **2017-01-12**
Thesis Dissertation or Special Projects
Components: Thesis Research
Attributes: Given When Needed
Req. Designation: Technology

MA 999(1 - 10) **Course ID:011100** **2015-01-19**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 1(2 - 4) **Course ID:008906** **2015-01-19**
Mechanical & Aeronautical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

ME 2(2 - 4) **Course ID:008907** **2015-01-19**
Mechanical & Aeronautical Engineering Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used as a Professional Elective.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

ME 201(1) **Course ID:010194** **2022-03-18**
Measurement & Instrumentation
[Cross-listed with AE 201] This course provides an introduction to measurement and instrumentation in mechanical and aerospace engineering. Fundamental components of mechanical measurement systems are studied through laboratory experiments. Tests include electromechanical instruments, circuits, actuators, controls, and data acquisition systems. First order uncertainty analysis is performed and empirical results are compared with engineering principles from material science, statics, strength of materials, rigid body dynamics and electrical science.
Components: Lecture
Course Equivalents: AE 201
Attributes: Two communication units, Offered Spring Term
Requirement Group: Corequisites: ES220, ES222, ES223
Req. Designation: Technology

ME 212(3) **Course ID:008908** **2020-06-12**
Introduction to Engineering Design
This course lays the foundation for the design curriculum of the MAE Department. Students are introduced to how to solve complex, open-ended engineering problems. Core topics covered are: the design process; engineering ethics and professional responsibilities; design for safety; mathematical and computer modeling; and written, oral and graphical communication. These topics are presented within the framework of at least two open-ended design projects which students must propose and accomplish through the completion of the preliminary design phase including a design report and presentation slides for each project.
Components: Lecture
Course Equivalents: AE 212, CE 212
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES100 or equivalent, PH131, or permission of the instructor.
Req. Designation: Technology

ME 301(1) **Course ID:010196** **2022-04-13**
Experimental Methods
This is a hands-on experimental methods course with applications in mechanical engineering. Mechanical measurement techniques focus on temperature, strain, force, pressure, fluid flow, friction and vibration. Course topics include workplace safety, test procedures, calibration, measurement uncertainty, error propagation, design of experiments, data acquisition, sampling, data analysis, and technical report writing.
Components: Lecture
Course Equivalents: AE 301
Attributes: Two communication units, Offered Fall Term
Requirement Group: Prerequisites: ME201 or AE201
Req. Designation: Technology

ME 310(3) **Course ID:008911** **2016-11-02**
Thermodynamic System Engineering
The preliminary design of thermodynamic systems made up of components such as turbines, pumps, compressors, boilers, evaporators, and condensers will be investigated. The major emphasis will be on the design of systems operating at steady-state, but start-up and transient operation will also be studied. Design work will consider actual, rather than ideal, thermodynamic systems, and account for the applicable combustion and psychrometric aspects of the system. Both individual and team work may be required. Open-ended problems on topics discussed will be assigned. Oral and written reports will be required. Some laboratory work may be required.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES340 or CH260
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 324(3) **Course ID:008912** **2016-06-01**
Dynamical Systems
[Cross-listed with EE 324] Dynamic systems classification, mathematical modeling of mechanical, electrical and mixed dynamic systems, state space representation, equilibrium points and linearization, solution of linear input/output and state equations, Laplace transforms, transfer functions and block diagrams, first and second order systems, stability, frequency response and simulation techniques.
Components: Lecture
Course Equivalents: EE 324
Attributes: Offered Each Term
Requirement Group: Prerequisites: MA232.
Req. Designation: Technology

ME 326(3) **Course ID:008913** **2022-03-18**
Intermediate Fluid Mechanics
A continuation of ES 330. Topics include: deformation and stress in fluids; basic conservation laws; kinematics of fluid flow; theory of potential flow; introduction to compressible flows; isentropic flows and shock waves; compressible flows with friction and heat transfer; Navier-Stokes equation and theory of viscous flow; low Reynolds number flows with applications to hydrodynamic lubrication; laminar boundary layer theory and von Karman momentum integral method; introduction to computational fluid dynamics; applications of fluid mechanics to engineering problems including turbomachinery. Introduction to design concepts.
Components: Laboratory, Lecture
Course Equivalents: AE 425
Attributes: Offered Each Term
Requirement Group: Prerequisites: ES330 and MA 232, and either ES340 or CH271
Req. Designation: Technology

ME 341(3) **Course ID:008914** **2015-02-12**
Mechanics of Machine Elements
The course reviews and extends the study of strength of materials and engineering materials behavior concepts with applications to mechanical design/behavior of classical machine elements. Additional coverage of multi-axial static failure theories, fatigue of materials and components and fracture mechanics is also provided. A self-directed study of a machine component is undertaken.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: ES222.
Req. Designation: Technology

ME 342(3) **Course ID:012852** **2018-04-04**
Introduction to Numerical Methods with Application
The goal of this course is to introduce the techniques needed for the numerical solution of ordinary and partial differential equations. These techniques will include the formulation of physical problems for numerical simulations, discretization and solution methods, and use of commercial software for solving engineering problems governed by differential equations. Specific topics covered are numberical differentiation, integration, interpolation, and associated errors, the solution of systems of non-linear algebraic equations, and the solution of initial and boundary value problems using finite difference and finite element methods.
Components: Laboratory, Lecture
Course Equivalents: AE 342
Attributes: Offered Each Term
Requirement Group: Prerequisites: ES 100, or HP102 and HP103, or EM120 and EM121, or CS141, and MA 232 Corequisites: ES 2

Req. Designation: Technology

ME 365(3) **Course ID:008918** **2015-02-09** **Instructor Consent Required**
Independent Projects I
[Cross-listed with AE 365] An opportunity for the student to become involved singly, or with a group, working on a special project under the guidance of a faculty member. Topics are often suggested by the faculty but suggestions from the students are encouraged. By permission of advisor only.
Components: Independent Study
Course Equivalents: AE 365
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 366(3) **Course ID:008919** **2014-11-18** **Instructor Consent Required**
Independent Projects II
[Cross-listed with AE 366] Continuation of ME 365.
Components: Independent Study
Course Equivalents: AE 366
Req. Designation: Technology

ME 380(3) **Course ID:010270** **2014-11-19**
Special Topic: Biomechanics
[Cross-listed with ES 380] This course will examine the application of engineering principles to biologic systems. The structure and function of biologic tissue will be examined in the context of engineering mechanics. Emphasis will be placed on the biomechanics of human movement, including the basic principles of orthopedic biomechanics. Students will develop the skills necessary to explore biomechanics in the contemporary scientific literature and will write a term paper on a biomechanics topic of their choice.
Components: Discussion, Lecture
Course Equivalents: ES 380
Requirement Group: Prerequisites: PH131 and MA132
Req. Designation: Technology

ME 385(3) **Course ID:011148** **2022-04-05**
Design of Electromechanical Systems
This course will cover analog electronic design for purposes of controlling electromechanical systems, including electromechanical sensors and actuators, analog electronic design of filters, state space and classical controllers, and transistor-based servoamplifiers and high voltage amplifiers. The course has a significant laboratory component in which students are expected to design and fabricate circuits to control electromechanical systems. Implementation of digital controllers is also covered. Text Description: The Art of Electronics, Horowitz and Hill, Cambridge University Press, Second Edition, Mechatronics; An Integrated Approach, Clarence de Silva, CRC Press.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES250, MA232, and ES223
Req. Designation: Technology

ME 390(3) **Course ID:008922** **2022-03-23**
Advanced Manufacturing Processes
Brief introduction to the traditional manufacturing processes such as bulk deformation, extrusion, forging/forming, cold & hot working, and joining/welding. Emphasis will be on advanced near net shape forming/processes of engineering materials known as Additive Manufacturing/3D Materials Processing, including 3D processing for Polymers as well as metals.
Components: Lecture
Course Equivalents: ME 503
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES260
Req. Designation: Technology

ME 401(1) **Course ID:010198** **2014-11-20**
Advanced Experimental Methods in Mechanical and Aeronautical Engineering
[Cross-listed with AE 401] This course covers advanced experimental methods including Fourier analysis filtering, computer data acquisition. Experiments demonstrate principles of heat transfer, fluid mechanics, gas dynamics and aerodynamics. Experiments are documented using written memoranda and worksheets.
Components: Lecture
Course Equivalents: AE 401
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ME/AE 201 or ME/AE301 Corequisites: ME411 or ME326
Req. Designation: Technology

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ME 405(3) **Course ID:013162** **2022-03-23**
Geometric Dimensioning and Tolerancing
During this course, the students will be introduced to the foundational concepts of Geometric Dimensioning and Tolerancing. It will briefly review traditional coordinate dimensioning practices and then continue with the key concepts of GD&T that address the known limitations and shortcomings of coordinate dimensioning. This course will prepare students to begin thinking of design approach with regard to defining and documenting machine component's function in addition to its size and shape. This course is instructor led with many class participation examples and hands-on student exercises. After final review and student assessments, students will be exposed to 2D and 3D CAD tools and shown how to apply the lessons learned from this course, to CAD drawings.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: ME 212
Req. Designation: Technology

ME 411(3) **Course ID:008925** **2015-02-12**
Introduction to Heat Transfer
Introductory treatment of steady and transient conduction, natural and forced convection and radiation heat transfer with applications to basic heat exchanger design and other multimode problems. Students will complete at least one design project. Laboratory work may be required.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: ES330 or CH301, ES340 or CH271, and MA232 or equivalent.
Req. Designation: Technology

ME 424(3) **Course ID:012986** **2019-10-23**
Advanced Biomechanics
[Cross-listed with ME524] Solid biomechanics including structure, function, and mechanical properties of biological tissues. Emphasis will be placed on cell mechanics and signalling, mechanobiology, and remodeling. Current literature topics will be covered.
Components: Lecture
Course Equivalents: ME 524
Attributes: Offered Spring Term
Requirement Group: ME424 Prerequisites: MA232 and ES222.
Req. Designation: Technology

ME 443(3) **Course ID:008935** **2014-11-18**
Optimal Engineering
[Cross-listed with AE 443] An introduction to the optimal design of mechanical systems. This course involves the application of mathematical optimization techniques, including linear and nonlinear methods, to the design of devices and systems of interest to mechanical engineers. Emphasis is placed on the formulation of problems which can be solved by these techniques. Use is made of currently available optimal design computer programs.
Components: Lecture
Course Equivalents: AE 443
Requirement Group: Prerequisites: AE/ME350 or ME341.
Req. Designation: Technology

ME 444(3) **Course ID:008936** **2015-02-09**
Computer Aided Engineering
An introduction to computer-aided design of mechanical and structural systems. The course deals with the use of commercially available computer-aided design software and hardware for the design of mechanical and structural assemblies. The production of engineering drawings using a CAD system will also be discussed. Hands-on experience is emphasized. Students entering the course are assumed to have a basic understanding of general computer usage and computer graphics in particular.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: ES100 or EM121 and MA231
Req. Designation: Technology

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ME 445(3) **Course ID:008937** **2021-11-04**
Integrated Design I
This course provides a review and extension of the basic methodology and decisions surrounding design leading to the conceptual and preliminary design of mechanical systems. Topics covered included preliminary sizing, mathematical modeling, experimental evaluation, requirements and constraints, layout, fluid mechanics and thermal sciences issues, structural issues, economics, trade studies, and ethical implications of the design and decision process.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: AE/CE/ME212, ES330, and ES340 or CH271 Corequisites: ME341
Req. Designation: Technology

ME 446(3) **Course ID:008938** **2021-11-04**
Integrated Design II
Continuation of concepts introduced in the Integrated Design I on the basic methodology and decisions surrounding mechanical systems design including what is necessary for final detail design. The course is supplemented by lectures on various topics including conceptual design issues, detailed system considerations, trade studies, integration, structural issues, computational mechanics, testing considerations, cost, and manufacturing.
Components: Lecture
Attributes: One communication unit, Offered Each Term
Requirement Group: Prerequisites: ME445
Req. Designation: Technology

ME 450(3) **Course ID:008940** **2014-11-19**
Control Systems
[Cross-listed with EE 450] Introduction to the analysis and design of continuous-time feedback control systems. Topics include: mathematical representation of physical systems with linear differential equations, Laplace transforms, transfer functions, block diagrams and signal flow graphs, feedback, sensitivity, transient specifications, steady-state tracking errors, stability, root locus plots, compensator design, simulation.
Components: Lecture
Course Equivalents: EE 450
Requirement Group: Prerequisites: AE/EE/ME324 or Corequisite: EE321.
Req. Designation: Technology

ME 452(3) **Course ID:008942** **2021-03-03**
Advanced Strength of Materials
A study of properties of materials, general stress-strain relationships, modern strength theories, unsymmetrical bending, curved beams, beams on elastic foundations, the equations of elasticity and plasticity (1 credit of design)
Components: Lecture
Course Equivalents: CE 452
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES222
Req. Designation: Technology

ME 455(3) **Course ID:008944** **2014-11-18**
Mechanical Vibrations and Control
[Cross-listed with AE 455] Fundamentals, free vibration, harmonically excited vibration, transient vibration, multi-degree freedom systems, vibration measurements, introduction to control theory, linear feedback control, vibration control, adaptive and optimal control, numerical methods.
Components: Lecture
Course Equivalents: AE 455
Requirement Group: Prerequisites: ES223
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Mechanical Engineering

ME 457(3) **Course ID:008945** **2014-11-20**
Composite Mechanics and Design
[Cross-listed with AE 457, ME 457] Nature of composite materials. Classification and characteristics of composite materials, mechanical behavior of composite materials. Macromechanical and micromechanical elastic behavior of unidirectional lamina. Constitutive and transformation relations. Strength of unidirectional lamina. Composite failure theory. Mechanics of multidirectional structural laminates. Lamination theory. Strength and failure analysis of multidirectional laminates. Effect of temperature and moisture.
Components: Lecture
Course Equivalents: AE 457
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ES222 and ES260
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 465(3) **Course ID:008947** **2014-11-18** **Instructor Consent Required**
Advanced Independent Projects I
[Cross-listed with AE 465] An opportunity for the advanced student to undertake an independent investigation in a mechanical engineering field of his or her own choice. Assistance will be given only when the student requests it. The project may be a comprehensive literature investigation, involve laboratory experiments, or involve analytical work by permission of adviser only.
Components: Independent Study
Course Equivalents: AE 465
Req. Designation: Technology

ME 492(3) **Course ID:008952** **2022-03-23**
Welding Metallurgy
Introduction to conventional and non-conventional welding processes. Weldability problems in ferrous, non-ferrous and metal-matrix composite materials will be discussed. Solidification modes and their effects on the mechanical properties of weldments will be examined. Students will perform arc welding and friction welding of alloys, and ultrasonic welding of plastics.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ES260
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 500(3) **Course ID:012590** **2016-07-01**
Elasticity
[Formerly MER 500] The behavior of substances that possess the property of recovering their size and shape when forces producing deformation are removed. Review of stress and strain; study of two-dimensional problems in rectangular, polar, and curvilinear coordinates; introduction to three-dimensional problems; torsion and bending.

Prerequisites: Calculus IV, Linear Algebra and Differential Equations, and Mechanics of Materials or equivalent
Components: Lecture
Attributes: Offered Winter Term
Req. Designation: Technology

ME 501(3) **Course ID:012591** **2016-07-25**
Transport Phenomena
[Formerly MER 501] The fundamentals of momentum, energy, and mass transfer and their analogous transport mechanisms. One-dimensional transport, transport properties, transport with internal generation, transfer coefficients, convective and turbulent transport.

Prerequisites: Linear Algebra and Differential Equations, Heat Transfer Analysis and Design or equivalents
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

ME 502(3) **Course ID:012592** **2016-07-25**
Engineering Analysis
[Formerly MER 502] Topics in applied mathematics needed to analyze and model engineering problems by constructing mathematical models for a physical situation and the reduction of the ensuing mathematical problems to numerical procedures. Matrices, linear algebra, vector and tensor calculus, partial differential equations, calculus of variations, finite element and difference techniques, Fourier series and integrals.

Prerequisites: Calculus, Linear Algebra and Differential Equations or equivalents
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 503(3) **Course ID:012741** **2021-06-01**
Advanced Manufacturing Processes
Brief introduction to the traditional manufacturing processes such as bulk deformation, extrusion, forging/forming, cold & hot working, and joining/welding. Emphasis will be on advanced near net shape forming/processes of engineering materials known as Additive Manufacturing/3D Materials Processing, including 3D processing for Polymers as well as metals.

Components: Lecture
Course Equivalents: ME 390
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 506(3) **Course ID:012593** **2016-07-01**
Mechanical Behavior of Materials
[Formerly MER 506] Strain relationships in elastic and plastic behavior. Metallurgical fundamentals of plastic deformation. Dislocation theory. Materials testing. Creep and metal fatigue.

Prerequisites: Calculus, Linear Algebra, Differential Equations, and Mechanics of Materials or equivalents
Components: Lecture
Req. Designation: Technology

ME 507(3) **Course ID:012594** **2016-07-01**
Design for Manufacturing
[Formerly MER 507] This course will introduce the student to the principles of design for manufacturing. The course will begin by examining modern manufacturing operations including machining, casting, forging, welding, brazing, soldering, finishing, heat treating, assembly, plastic materials processing, powder metallurgy, and specialized manufacturing processes. This section will also include electronics manufacturing, covering both through-hole technology and surface mount devices. For each manufacturing process, capabilities and limitations will be discussed and how they relate to part design and cost. Design for manufacturing principles will be examined, including how the designer affects manufacturing cost, lean manufacturing, six sigma, value stream analysis, manufacturing rate, the cost of quality, process flexibility, process simulation, and process economics.

Components: Lecture
Req. Designation: Technology

ME 508(3) **Course ID:012595** **2016-07-01**
Fracture Mechanics
[Formerly MER 508] Modern theory of fracture in design. The ability to apply fracture mechanics principles to the design and analysis of engineering structures. Subjects treated include occurrence of fracture, fracture toughness, fracture resistance, and fatigue.

Prerequisites: Mechanics of Materials or equivalent
Components: Lecture
Req. Designation: Technology

ME 509(3) **Course ID:012596** **2016-07-01**
Current Approaches to Fatigue in Design
[Formerly MER 509] To provide engineering students with an understanding of fatigue mechanisms, design criteria and realistic examples to avoid and predict fatigue/durability failures in structures and components. The major emphasis of the course is fatigue of metals as applied to a variety of engineering structures and components, including both fatigue mechanisms and design applications. The course material is applicable to ground vehicles, buildings/bridges, aerospace vehicles, ships, nuclear pressure vessels, metal implants/prostheses and others. Both constant amplitude and variable amplitude fatigue life situations are considered.

Prerequisites: Calculus, Differential Equations, Strengths of Materials
Components: Lecture
Req. Designation: Technology

ME 510(3) **Course ID:012597** **2016-07-01**
Advanced Dynamics
[Formerly MER 510] Analytical dynamics with engineering applications to particles and rigid bodies. Topics include three-dimensional kinematics and dynamics, Lagrangian dynamics. Prerequisites: Advanced Mechanics, Rigid Body Mechanics or equivalent
Components: Lecture
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 511(3) **Course ID:012782** **2017-01-11**
Introduction to Acoustics
This course covers the basic concepts of acoustical analysis for engineers. Topics covered included wave propagation, and sound radiation, absorption, and transmission. Treatment of the material is considered from the viewpoint of harmonic oscillators, and builds upon the foundation of frequency domain analysis.

Components: Independent Study
Attributes: Offered Spring Term
Requirement Group: Prerequisites: ME455 or Instructor Permission
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 512(3) **Course ID:012598** **2016-07-01**
Vibrations of Discrete Systems
[Formerly MER 512] Response of single and multi-degree-of-freedom systems to harmonic, periodic and impulsive excitation. Fourier series and transforms; ideal impulse and impulse response; convolution in the time and frequency domains; matrix and modal methods; system eigenvalues and vectors; impulse testing with a spectrum analyzer.

Prerequisites: Dynamics and Kinematics or equivalent, Calculus, Differential Equations, Mat Lab helpful
Components: Lecture
Req. Designation: Technology

ME 513(3) **Course ID:012600** **2016-07-01**
Processing and Selection of Engineering Materials
[Formerly MER 515] A comprehensive examination of processing technologies for engineering materials, and the effects of selected processing routes and materials to meet and satisfy design and applications criteria.

Prerequisites: Mechanics of Materials or equivalent
Components: Lecture
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 515(3) **Course ID:008956** **2014-11-20**
Finite Element Methods
[Cross-listed with CE 538, MA 572] This course is an introduction to the finite element method, from a mathematical as well as a modeling and applications point of view. The basic theory and implementation will be discussed in the context of continuum problems in linear elasticity, potential flow and plate modeling. If time permits, additional applications such as structures, electromagnetics, fluid mechanics, ground water and geotechnics will also be discussed. Topics include: weak formulations and the principle of virtual work, discretization and interpolation-function selection, assembly and solution of the system equations, error estimates and accuracy assessment. When taught in conjunction with CE 438/ME 453 the course requires additional independent work for those registered for the graduate course.
Prerequisites: MA232, MA339 or MA330, ES222, ES330, and the ability to program. Consent of the instructor may be used to replace some prerequisites.
Components: Lecture
Course Equivalents: CE 538, MA 572
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 516(3) **Course ID:012601** **2016-07-01**
Finite Element Methods in Engineering
[Formerly MER 516] This course provides an introduction to the finite element method with an emphasis for solving structural engineering problems. It will cover a review of matrix algebra and the solution to simultaneous linear equations. It will then lead to an introduction of the stiffness method, which will include a review of the equations from elasticity. The method will then be applied to bar and beam equations, followed by 2D plane strain equations. Modeling guidelines will then be covered, along with axisymmetric analysis and isoparametric formulations; finishing up with three dimensional analysis. Prerequisites: Calculus, Differential Equations, Strength of Materials or Equivalent
Components: Lecture
Req. Designation: Technology

ME 517(3) **Course ID:008958** **2016-09-01**
Advanced Thermal Systems
Advanced treatment of steady and transient conduction, convection and radiation heat transfer with applications to various thermal systems such as electronic circuits and HVAC.
Components: Lecture
Same As Offering: ME 517
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 517(3) **Course ID:008958** **2016-09-01**
Advanced Thermal Systems
Advanced treatment of steady and transient conduction, convection and radiation heat transfer with applications to various thermal systems such as electronic circuits and HVAC.
Components: Lecture
Same As Offering: ME 517
Attributes: Given When Needed
Req. Designation: Technology

ME 520(3) **Course ID:013127** **2021-09-28**
Aeroelasticity
Aeroelasticity of lifting surfaces, plates, and shells with particular emphasis on prediction of flutter, divergence, and control surface reversal. Topics will include unsteady aerodynamic effects, multiple mode interactions, prediction techniques, and reduced-order-models.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

ME 524(3) **Course ID:012987** **2019-10-23**
Advanced Biomechanics
[Cross-listed with ME424] Solid biomechanics including structure, function, and mechanical properties of biological tissues. Emphasis will be placed on cell mechanics and signalling, mechanobiology, and remodeling. Current literature topics will be covered.
Components: Lecture
Course Equivalents: ME 424
Attributes: Offered Spring Term
Req. Designation: Technology

ME 527(3) **Course ID:008960** **2019-03-08**
Advanced Fluid Mechanics
An introductory level graduate course in fluid mechanics. Spatial and material coordinates, kinematics of fluid motion, continuity and momentum equations, constitutive relations, simple solutions, potential flows, boundary layer theory, creeping flow, flow through porous media, particle motion, interfacial phenomena, turbulence.
Prerequisites: CH301 or ES330 or equivalent.
Components: Laboratory, Lecture
Same As Offering: ME 527
Course Equivalents: CE 527
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 527(3) **Course ID:008960** **2019-03-08**
Advanced Fluid Mechanics
An introductory level graduate course in fluid mechanics. Spatial and material coordinates, kinematics of fluid motion, continuity and momentum equations, constitutive relations, simple solutions, potential flows, boundary layer theory, creeping flow, flow through porous media, particle motion, interfacial phenomena, turbulence.
Prerequisites: CH301 or ES330 or equivalent.
Components: Laboratory, Lecture
Same As Offering: ME 527
Course Equivalents: CE 527
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 529(3) **Course ID:008962** **2015-04-29**
Stochastic Processes in Engineering
Review of the theory of probability. Single and multiple random variables topics, such as distributions, moments, conditioning, central limit theorem, and Laws of Large Numbers. Stochastic processes. Stationary and nonstationary processes. Time averaging and ergodicity. Correlation and power spectrum. Langevin's equation and Markov processes. Poisson and Gaussian processes. Response of linear systems. Approximate methods for analysis of nonlinear stochastic equations Application to engineering problems, such as random vibrations, turbulence, estimation theory, signal detection, and others.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ME 531(3) **Course ID:008963** **2015-01-20**
Computational Fluid Dynamics
The course will present advanced computational methods for solutions of transient and steady-state problems in fluid mechanics and in transport phenomena, including incompressible flows, compressible flows, heat transfer, transport of suspended particles, etc. The course will require programming in Fortran or other languages. Post processing of data will include the use of computer graphics. Special projects in application of the course material to research-oriented problems in engineering will be emphasized.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

ME 533(3) **Course ID:013017** **2020-01-17**
Additive Manufacturing: Materials and Applications
This course offers a broad introduction to history, current status and future trends of Additive Manufacturing process, while also comparing with other conventional manufacturing techniques. Various aspects of successful AM production process will be discussed, from raw materials to machines and techniques. While 3D printing of metallic materials will be emphasized, brief introductions to Ceramic and Polymer AM will also be provided.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

ME 535(3) **Course ID:013152** **2022-03-17**
Introduction to Acoustics and Voiced Speech Applications
This course provides an introduction to acoustics. The topic is developed using a framework based on vibrations. Topics covered include transverse vibrations, the acoustic wave equation, sound sources, and reflection and transmission. Application to voiced speech production is emphasized in the second half of the course, providing an overview of the anatomy and physiology and mechanics of voiced speech production. Sound production and transmission within the vocal tract is subsequently explored.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

ME 537(3) **Course ID:008967** **2020-04-08**
Fluid Mechanics of Aerosol Dispersion
Review of viscous flow theory. Creeping flows around a sphere. Drag and lift forces acting on particles. Wall effects and nonspherical particles. Diffusion of aerosols in laminar flows. Brownian motion and Langevin equation. Mass diffusion in pipe and boundary layer flows. Dispersion of particles in turbulent flows. Turbulent diffusion and wall deposition of aerosols. Effects of electrostatics, van der Waals and other surface forces. Computational aspects of aerosol dispersion in laminar and turbulent flows. Particle removal and resuspension from surfaces. Coagulation of aerosols due to Brownian movement, presence of a shear field and turbulence. Applications to microcontamination control, air pollution, and particle deposition in human lung.
Prerequisites: Consent of the instructor
Components: Laboratory, Lecture
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 538(3) **Course ID:010174** **2015-01-28**
Experimental Aerosol Mechanics and Instrumentation
Introduction to the mechanics and transport of aerosols. Review of elementary particle mechanics. Brownian motion and diffusion. Particle statistics. Inertial separation of particles. Impactors - design and theory. Periodic motion and sonic
agglomeration. Coagulation. Evaporation and condensation. Condensation nuclei counters. Filtration. Electrical properties. Electrical aerosol analyzers. Differential mobility analyzers - theory and experiments. Aerosol sampling and transport - theory and experiments. Optical properties of aerosols - theory and experiments. Experimentation including aerosol generation, sampling, classification, and measurement.
Prerequisites: consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ME 543(3) **Course ID:008968** **2015-02-19**
Advanced Optimal Design
The optimal design of mechanical systems is studied. The optimization methods discussed in the course include: unconstrained optimization in several variables (e.g. gradient search, random search), constrained optimization in several variables (e.g. linear programming, nonlinear programming, Lagrange multipliers, geometric programming) and problems structured for multistage decision (e.g. dynamic programming). Emphasis is placed on the formulation of problems which can be solved by these techniques. A project involving the application of the methods introduced is required.
Prerequisites: ES222.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

ME 544(3) **Course ID:008969** **2015-01-20**
Advanced CAD (Computer Aided Design)
This course deals with the use of commercially available CAD hardware and software for product development and design. Lectures cover the underlying theories upon which such software is based, the ways in which these theories are implemented and software limitations. Hands-on experience is emphasized. Students entering the course are assumed to have some knowledge of general computer usage and computer graphics.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Mechanical Engineering

ME 551(3) **Course ID:008971** **2014-11-18**
Theory of Elasticity
[Cross-listed with CE 551] A study of the mathematical theory of elasticity and its application to engineering problems; development of general stress-strain relationships, equations of equilibrium and compatibility; plane stress and plane strain; stress functions; applications to beam bending and torsion. Prerequisites: ES222 or equivalent, ME554 or consent of the instructor.

Components: Lecture
Course Equivalents: CE 551
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 552(3) **Course ID:010536** **2021-03-03**
Advanced Strength of Materials
Discussion and theory concerning properties of materials, general stress-strain relationships, modern strength theories, unsymmetrical bending, curved beams, beams on elastic foundations, the equations of elasticity and plasticity (1 credit of design)

Components: Lecture
Course Equivalents: CE 552
Attributes: Offered Fall Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Mechanical Engineering

ME 554(3) **Course ID:008973** **2014-11-20**
Continuum Mechanics
[Cross-listed with CE 554] The course involves the analysis of stress and deformation at a point, and the derivation of the fundamental equations by applying the basic laws of conservation of mass, energy and momentum and those of thermodynamics. Vector and cartesian tensors are reviewed. Relationships are then developed between stress, strain and strain rate and constitutive laws affecting stress-strain relationships. These are used to formulate the basic equations governing the behavior of any continuum with applications to solids and fluids.
Components: Lecture
Course Equivalents: CE 554
Req. Designation: Technology

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ME 555(3) **Course ID:008974** **2015-01-28**
Advanced Mechanical Vibrations
A review of discrete multiple degree-of-freedom systems is presented. The equations of motion of continuous systems such as strings, rods, beams and torsion bars are studied using both classical and approximate solution methods. Hamilton's principle and nonlinear vibrating systems are also covered.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ME 556(3) **Course ID:013016** **2020-01-17**
Advanced Finite Element Methods in Engineering
This course builds on basic concepts of spring and bar type elements, two-dimensional truss analysis, beam bending, plane stress & plane strain analysis, axisymmetric stress analysis, and isoparametric formulation of the finite element method. This course will examine topics in three-dimensional stress analysis, plate bending, heat transfer, fluid flow, electrostatics, thermal stress analysis, structural dynamics, and time-dependent stress analysis. Topics like the direct approach, the principle of minimum potential energy, and Galerkin's residual method will continue to be applied as required in developing required governing equations. This course will examine practical applications including the ability to use and apply the ABAQUS software package. This course will expand on the topics presented in a Fundamentals of Finite Element Methods course and requires knowledge in Mechanical Behavior of Materials, Linear Algebra and Differential Equations.
Components: Lecture
Attributes: Offered Spring When Needed
Requirement Group: Prerequisite: ME516
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: Mechanical Engineering

ME 557(3) **Course ID:008975** **2015-01-20**
Advanced Mechanics of Composite Materials
Nature of composite materials. Classification and characteristics of composite materials, mechanical behavior of composite materials. Macromechanical and micromechanical elastic behavior of unidirectional lamina. Constitutive and transformation relations. Strength of unidirectional lamina. Composite failure theory. Mechanics of multidirectional structural laminates. Lamination theory. Strength and failure analysis of multidirectional laminates. Effect of temperature and moisture.
Prerequisites: ES222 and ES260.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 559(3) **Course ID:008976** **2021-10-11**
Space Robotics
This course establishes principles underpinning space robotics with a thorough and modern approach; chapters build from general physical foundations through an extensive treatment of control systems, perception challenges, and conservation principles in dynamics. After introducing the principles and governing dynamic equations of space robotic systems, the latter part of the course focuses on real-life applications related to space systems including space mechanics and the dynamics of space vehicles. It introduces supervised and unsupervised machine learning (ML) algorithms including implementations of ML techniques for perception challenges that can be applied to a wide range of space vehicles and robotic systems. Applications of dynamics and control theory to real spacecraft systems are also covered. After completing this course, the students will be able to apply basic robotic and machine learning techniques in space robotic systems.

Components: Lecture
Course Equivalents: AE 459
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 560(3) **Course ID:012604** **2016-07-01**
Linear Control Systems
[Cross-listed as EE 657] [Formerly MER 522] This course addresses practical control system design primarily from a classical perspective. Beginning with transfer function modeling of dynamic systems, the course moves through transient, root locus, and frequency response analysis to end with frequency domain techniques for controller design.

Prerequisites: System Modeling and Analysis (Circuits and Systems or Dynamics of Physical Systems), Mat Lab/Simulink helpful
Components: Lecture
Course Equivalents: EE 657
Req. Designation: Technology

ME 561(3) **Course ID:012605** **2018-11-06**
Engineering Optimization
[Formerly MER 525] This course in engineering optimization studies techniques with applications in various aspects of engineering design and other disciplines including: concepts of design variables, constraints, objective functions, penalty functions, and Lagrange multipliers. Techniques for solving constrained and unconstrained optimization problems: classical approaches steepest descent, conjugate gradient, modified Newton, controlled random searches, etc. Applications and examples in the design of engineering components and systems will be presented.
Prerequisites: Calculus, Differential Equations, Mat Lab helpful
Components: Lecture
Same As Offering: ME 561
Req. Designation: Technology

ME 561(3) **Course ID:012605** **2018-11-06**
Engineering Optimization
[Formerly MER 525] This course in engineering optimization studies techniques with applications in various aspects of engineering design and other disciplines including: concepts of design variables, constraints, objective functions, penalty functions, and Lagrange multipliers. Techniques for solving constrained and unconstrained optimization problems: classical approaches steepest descent, conjugate gradient, modified Newton, controlled random searches, etc. Applications and examples in the design of engineering components and systems will be presented.
Prerequisites: Calculus, Differential Equations, Mat Lab helpful
Components: Lecture
Same As Offering: ME 561
Req. Designation: Technology

ME 562(3) **Course ID:012606** **2016-07-01**
Composites
[Formerly MER 532] This course provides a comprehensive introduction to composite materials and motivation for their use in modern applications. Topics include selection and availability of composite materials, manufacturing processes, usable theoretical concepts, testing and characterization of composites, and strength theories.

Prerequisites: Materials Science, Strength of Materials, or equivalent
Components: Lecture
Req. Designation: Technology

ME 563(3) **Course ID:012607** **2016-07-01**
Dynamics of a Viscous Fluid
[Formerly MER 534] Analysis of Laminar and turbulent flow fields. Approximate solutions of the NavierStokes equations according to boundary layer theory. Prerequisites: Fluid Mechanics, Thermodynamics or equivalent, Calculus, Differential Equations
Components: Lecture
Req. Designation: Technology

ME 564(3) **Course ID:012608** **2016-07-01**
Compressible Fluid Flow
[Formerly MER 536] Analysis of internal and external compressible flow fields. Supersonic airfoil analysis according to shock-expansion theory.

Prerequisites: Fluid Mechanics, Thermodynamics or equivalent, Calculus, Differential Equations
Components: Lecture
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 565(3) **Course ID:012609** **2016-07-01**
Combustion Fundamentals
[Formerly MER 537] The study of the chemical and physical processes in combustion. Analysis of thermochemistry and fuel oxidation, premixed and diffusion flame phenomena, combustion of condensed phases, detonation, combustion in practical systems, and combustion generated air pollution. Prerequisites: Thermodynamics or equivalent
Components: Lecture
Req. Designation: Technology

ME 567(3) **Course ID:012611** **2016-07-01**
Thermodynamic Analysis
[Formerly MER 540] Consideration of various particulate and continuum bases for structuring thermodynamic principles and their application to the solution of current and prospective engineering problems.

Prerequisites: Basic Thermodynamics, Heat Transfer or equivalent
Components: Lecture
Req. Designation: Technology

ME 568(3) **Course ID:012612** **2016-07-01**
Thermal Energy Processes
[Formerly MER 541] This course focuses on the analysis of thermal processes relevant to the renewable energy priorities of today’s green economy. The underlying engineering principles of thermal processes, which make the best use of sustainable energy sources through proper acquisition, storage and conversion, will be considered. The course incorporates the fundamentals of thermodynamics and heat exchange necessary to understand the components and cycles that enable these thermal energy processes.

Prerequisites: Fluid Mechanics, Thermodynamics, Heat Transfer
Components: Lecture
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 570(3) **Course ID:013054** **2020-09-18**
Orbital Mechanics
[Cross-Listed AE470] This course provides an overview of the fundamentals of orbital mechanics. Beginning from kinematics and rigid body dynamics, students are introduced to topics in orbital and attitude dynamics and control. In orbital dynamics and control, core topics covered include: the two-body problem, orbital motion, Kepler’s Laws, orbital elements, orbital perturbations, orbital maneuvers, interplanetary trajectories, and the restricted three-body problem. In attitude dynamics and control, core topics covered include: attitude stabilization, torques on a spacecraft, torque-free motion, spin and dual-spin stabilization, gravity-gradient stabilization, and active attitude control.
Components: Lecture
Course Equivalents: AE 470
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 571(3) **Course ID:012615** **2016-07-01**
Convection Heat Transfer
[Formerly MER 552] Analysis of laminar and turbulent heat transfer processes. Approximate solutions of the energy equation according to boundary layer theory.

Prerequisites: Fluid Mechanics, Heat Transfer
Components: Lecture
Req. Designation: Technology

ME 572(3) **Course ID:012616** **2019-09-25**
Dynamics of Inviscid Fluids
[Formerly MER 553] Analysis of the kinematics and dynamics of inviscid fluids. Vector and Cartesian tensor notation. Potential flow theory involving sources, sinks, vortices, Rankine bodies, Joukowski airflows, jets, and channel flow. Complex potential analysis with various conformal mapping and transformations techniques.
Components: Lecture
Req. Designation: Technology

ME 573(3) **Course ID:012617** **2016-07-01**
Flow and Heat Transfer in Multiphase Systems
[Formerly MER 554] Analytical and empirical methods for evaluation of flow characteristics, particularly in liquid vapor systems and boiling and condensing of heat transfer.

Prerequisites: Fluid Mechanics, Heat Transfer
Components: Lecture
Req. Designation: Technology

ME 574(3) **Course ID:012618** **2019-09-25**
Numerical Heat Transfer and Fluids Flow (CFD)
[Formerly MER 555] Fluids Mechanics, Heat Transfer, and Numerical Methods concurrently applied to solve problems of applied engineering. Topics include: derivation, classification, and discretization of the General Transport equations pertaining to unsteady multi-dimensional physics. Computational theory and solution methods include: explicit, implicit, Crank-Nicolson, upwinding, as well as higher order approaches. Scheme stabilities and numerical results are addressed using the von Neumann stability assessment and examination of corresponding Modifiied equations. The coupling of pressure and velocity for imcompressible flow is considered using the SIMPLE algorithm.
Components: Lecture
Req. Designation: Technology

ME 575(3) **Course ID:012619** **2016-07-01**
Nuclear Engineering & Technology
[Cross-listed with EE 687] [Formerly MER 560] The purpose of this course is provide students of various engineering disciplines a functional knowledge of nuclear engineering principles and those most important to the design of nuclear power generation systems. The course will focus both on the nuclear reactor core as well as plant systems. The intent is that students will gain a physical understanding of nuclear engineering principles as they relate to their own filed of interest. Class participation will be highly encouraged and focused through the discussion of current events in the nuclear industry as well as proposed future nuclear technologies.
Components: Lecture
Course Equivalents: EE 687
Req. Designation: Technology

ME 577(3) **Course ID:012621** **2016-07-01**
Engineering Statistics
[Cross-listed with EE 602, CS 506] [Formerly MER 572] Modern engineering practice makes extensive use of statistical methods for the efficient collection and analysis of engineering data, and to support data-based decision making. This course will introduce the statistical tools that are of greatest importance for practicing engineers. Core topics to be covered will include probability and distribution theory, the construction and interpretation of statistical intervals, statistical hypothesis testing, regression analysis and empirical modeling, statistical experimental design, and statistical quality/process control. Additional specialized topics may also be covered, depending upon the interests of the class; possible topics include system reliability analysis, measurement system analysis, process capability analysis (and “six-sigma”), accelerated life testing, and acceptance sampling.
Components: Lecture
Course Equivalents: CS 506, EE 602
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 578(3) **Course ID:012972** **2019-11-11**
Statistical Methods for Reliability and Life Data Analysis
[Cross-listed with EE603 and BOE623]
Reliability analysis is concerned with understanding the failure modes that affect an engineered product, estimating the expected life of the product under service conditions, and predicting the failure rate of the product
as a function of time in service. The primary response variable in reliability analysis is time to failure, which may
be measured in controlled laboratory experiments, or observed empirically from post-introduction studies of products “in the field”. The analysis of data for which the primary variable of interest is time to failure requires
specialized statistical concepts and tools; this course will cover some of the most useful approaches.

Components: Lecture
Same As Offering: ME 578
Course Equivalents: EE 603, EE 603, BOE 623
Attributes: Offered Winter Term
Requirement Group: Prerequisites: EE602, ME577, or CS506 or instructor consent.
Req. Designation: Technology

ME 578(3) **Course ID:012972** **2019-11-11**
Statistical Methods for Reliability and Life Data Analysis
[Cross-listed with EE603 and BOE623]
Reliability analysis is concerned with understanding the failure modes that affect an engineered product, estimating the expected life of the product under service conditions, and predicting the failure rate of the product
as a function of time in service. The primary response variable in reliability analysis is time to failure, which may
be measured in controlled laboratory experiments, or observed empirically from post-introduction studies of products “in the field”. The analysis of data for which the primary variable of interest is time to failure requires
specialized statistical concepts and tools; this course will cover some of the most useful approaches.

Components: Lecture
Same As Offering: ME 578
Course Equivalents: EE 603, EE 603, BOE 623
Attributes: Offered Winter Term
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 580(3) **Course ID:012022** **2014-12-05**
Advanced Modeling and Simulation of Dynamic Systems
This course will incorporate techniques of bond graph theory in the energy-based lumped parameter modeling of electrical, mechanical, hydraulic, magnetic, and thermal energy domains. Bond graph theory offers a unified approach to modeling dynamic energy systems and provides the tools necessary for the analysis of complex systems involving a variety of energy domains. Rather than attempt to cover all of the available analysis techniques, this course will serve to provide an underlying foundation on which to develop a thorough understanding of the interactions of energetic systems. Emphasis of the course will focus on multi-domain interaction.
Components: Lecture
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 581(3) **Course ID:012624** **2016-07-01**
Fuel Cell Science and Hydrogen Engineering
[Cross-listed with EE 640] [Formerly MER 580] Introduce the student to the science and engineering of fuel cell technology. Emphasis will be on developing an understanding of different types of fuel cells, their applications, and the engineering of complete fuel cell systems. Elements of that class will include: electrochemistry; polymer materials science for proton exchange membrane (PEM) based systems; ceramics for solid oxide fuel cells; liquid-electrolytes for phosphoric acid and alkaline fuel cells; and other methods of generating power directly from a fuel and an oxidant. The system requirements of the fuel cell stack will be introduced to provide a complete picture of the technology. Other elements addressed during the course will include thermochemistry; electrochemistry; fuel processing or reforming; electrical & power management; and polymer science and systems engineering. Developing an understanding of the proton exchange membrane fuel cell will be the primary objective. After completing this course, the student is expected to have an
Components: Lecture
Course Equivalents: EE 640
Req. Designation: Technology

ME 582(3) **Course ID:012625** **2016-07-01**
Photovoltaic Engineering
[Cross-listed with EE 643] [Formerly MER 580A] The course focuses on the physical principles, technology, and design of efficient semiconductor photovoltaics. Course goals equip students with the concepts and analytical skills to understand efficiency limitations, to assess the viability of various solar and thermophotovoltaic technologies, and to introduce the physics required for understanding photovoltaic energy conversion. The course will focus on three primary aspects of photovoltaic energy conversion, (i) the transfer and conversion of solar (i.e. thermal) radiation to electronic energy, (ii) the theory and design of the semiconductor photovoltaic cell and (iii) photovoltaic systems and applications.
Components: Lecture
Course Equivalents: EE 643
Req. Designation: Technology

ME 583(3) **Course ID:012626** **2016-07-01**
Turbine Engineering
[Cross-listed with EE 683] [Formerly MER 580B] Course on fundamentals of design, analysis, and technology of turbo machinery – jet engines, gas turbines, steam turbines, water turbines, and wind turbines. The course will provide an understanding of all aspects of system development: thermodynamic cycles, design-point and off-design performance; function and design of components (inlets, compressors, combustors, turbines, outlets), operational limits, and environmental concerns; structural analysis, lifting, and materials; rotor dynamics and blade aeromechanics; clearance analysis, sealing, and packing; heat transfer, blade and component cooling; starting and control; power and thrust generation; testing and instrumentation. The student is expected to develop a broad understanding of the state-of-the-art, challenges, and future of turbine systems.

Components: Lecture
Course Equivalents: EE 683
Req. Designation: Technology

ME 586(3) **Course ID:012628** **2016-07-01**
Welding
[Formerly MER 580D] Welding metallurgy is a technologically important field that covers a wide range of scientific disciplines. This course uses welding metallurgy as a vehicle to introduce basic and broadly applicable concepts in solid state physics, chemistry, materials science, fluid mechanics, and solid mechanics. Topics covered include welding processes, heat and fluid flow, chemical reactions, residual stresses, solidification phenomena, phase transformations, and welding defects. Special emphasis will be placed on applied engineering problems and on the behavior of structural engineering materials. Real life examples will be used to illustrate the fundamental concepts of the course. Homework assignments and a final project are required.

Prerequisites: Materials Science, Strength of Materials or equivalent.
Components: Lecture
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 587(3) **Course ID:012629** **2016-07-01**
Solar Energy Engineering
[Cross-listed with EE 685] [Formerly MER 580E] This course is designed to enable the student to effectively grasp the complex and quickly changing solar industry. The course will cover such topics as the economy of solar, photovoltaic devices, systems and applications. In order to cover this broad range of technical topics, the course will utilize multiple instructors. Each instructor has significant expertise and depth in the given field and the student will be able to draw from their experience. Students completing this course will develop knowledge of the solar industry, looking at the past, present and future of this technology area. Students will gain key technical background in every aspect of the industry and will be able to assess new technologies as they are developed. Understanding of the economics of solar and its future will also be obtained.
Components: Lecture
Course Equivalents: EE 685
Req. Designation: Technology

ME 588(3) **Course ID:012630** **2016-07-01**
Wind Energy Engineering
[Cross-listed with EE 684] [Formerly MER 580F] The course focuses on 'Wind Farm Project Design and Development' and 'Wind Turbine Technology.' Part I: Teams will demonstrate understanding of complete wind farm design/development process inclusive of site selection, wind resource evaluating target land area, turbine choice, location, energy projection, cost and transmission. Part 2: Focuses on technical understanding of Wind Turbine attributes such as structural, blade system, Uacelle system, electrical system, performance, and future opportunities.
Components: Lecture
Course Equivalents: EE 684
Req. Designation: Technology

ME 589(3) **Course ID:012631** **2016-07-02**
Synchronous Electrical Generators
[Cross Listed EE686][Formerly MER 580G] This course covers fundamentals of design and analysis of power generators, such as those used in thermal power plants and wind turbines. The course will address the basic operating principles of the synchronous machine and consider configurations such as would field, permanent magnet, and doubly fed generators. Key topics will include understanding and analysis of the magnetics within the machine, losses and efficiency, thermal performance, mechanical behavior, operation on the power system, and key IEEE and IEC standards. Further topics will include the duty imposed on the machine during service, as well as the duty it imposes on the turbine. The student is expected to develop a broad functional understanding of the current engineering technology, challenges, and future of generator technology. Cross Listed EE686
Components: Lecture
Course Equivalents: EE 686
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 590(3) **Course ID:008977** **2022-01-01**
Advanced Welding Metallurgy
Introduction to various aspects of welding processes. Weldability problems in ferrous, non-ferrous and metal-matrix composite materials will be discussed in detail. Solidification modes and their effects on the mechanical properties of austenitic and duplex stainless steel weldments will be examined.
Prerequisites: consent of the instructor.
Components: Laboratory, Lecture
Same As Offering: ME 590
Attributes: Given When Needed
Req. Designation: Technology

ME 590(3) **Course ID:008977** **2022-01-01**
Advanced Welding Metallurgy
Introduction to various aspects of welding processes. Weldability problems in ferrous, non-ferrous and metal-matrix composite materials will be discussed in detail. Solidification modes and their effects on the mechanical properties of austenitic and duplex stainless steel weldments will be examined.
Prerequisites: consent of the instructor.
Components: Laboratory, Lecture
Same As Offering: ME 590
Attributes: Given When Needed
Req. Designation: Technology

ME 591(3) **Course ID:008978** **2015-01-28**
Selected Topics in Materials Engineering
An advanced graduate course in the field of materials engineering. Topics to be covered will be selected to conform to the mutual interests and needs of students and faculty.
Prerequisites: consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

ME 594(3) **Course ID:008979** **2015-02-09**
Selected Topics in Manufacturing
An advanced graduate course in the field of manufacturing. Topics to be covered will be selected to conform to the mutual interests and needs of students and faculty.
Prerequisites: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

ME 595(3) **Course ID:008980** **2021-09-14**
Principles of Physical Metallurgy
Topics include: structure of metals, diffraction techniques (X-Ray, SEM-TEM), dislocation phenomena, diffusion in solids, precipitation hardening, nucleation and growth, solidification and phase transformation in solids.
Prerequisites: consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 598(0) **Course ID:013008** **2020-01-02**
MS-ME Graduate Project - Studies
This non-credit Seminar project provides a capstone experience for Mechanical Engineering graduate students not completing a thesis or independent study (i.e., all course work). The candidate and faculty advisor agree on project scope and evaluation process. The candidate performs required analytical and/or experimental studies to complete a Graduate Project Paper and Presentation.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

ME 599(0) **Course ID:012638** **2020-01-02**
MS-ME Graduate Project - Defense
[Formerly MER 599] This non-credit Seminar project provides a capstone experience for Mechanical Engineering graduate students not completing a thesis or independent study (i.e., all course work). The candidate will deliver and defend results from studies documented in a Graduate Project Paper and Presentation. The candidate receives a pass/fail grade which appears on the official transcript.
Components: Seminar
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 610(1 - 2) **Course ID:008982** **2015-02-09**
Mechanical Engineering Seminar
Students, staff and visiting lecturers present research results and topics of current interest.
Components: Seminar
Attributes: Offered Each Term
Req. Designation: Technology

ME 614(1 - 15) **Course ID:008983** **2015-02-09**
Thesis, Dissertation Credits
Analytical or experimental studies in mechanical and aeronautical engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

ME 616(1 - 7) **Course ID:008984** **2015-02-09**
Special Project Credits
Engineering project credits associated with a Masters of Engineering degree under the direction of a faculty advisor.
Components: Project Team
Attributes: Offered Each Term
Req. Designation: Technology

ME 618(3) **Course ID:008986** **2015-02-09**
Selected Topics in Heat Transfer
An upper level graduate course in the field of heat transfer. Areas of coverage will be selected to conform to the mutual interests and needs of students and faculty.
Prerequisites: consent of the instructor.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

ME 621(3) **Course ID:011998** **2015-02-19**
Computational Mechanics of Materials
The objective of this class is to teach the nonlinear finite element analysis for modeling various advanced solid mechanics problems. Both geometric and material nonlinearities will be covered. A wide range of constitutive models, hyper-/hypo-elasticity, viscoelasticity, classical plasticity, crystal plasticity and piezoelectricity will be introduced. Variational formulation will be developed under both the Lagrangian and Eulerian description. Explicit and implicit integration schemes will be covered, and the stability will be discussed. Students will then learn to implement finite element models that can capture geometric and material nonlinearities that represent a wide range of material behavior. The course is expected to make a student comfortable using Abaqus package for advanced problems including developing their own constitutive models and linking these models to the Abaqus package.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: ME554 or CE554, and ME515 or MA572, or by instructor consent
Req. Designation: Technology

ME 628(3) **Course ID:008988** **2015-02-09**
Selected Topics in Fluid Mechanics
An advanced graduate course in fluid mechanics. Topics of special interest will be chosen to coincide with current needs. Description of the course content in any particular term will be announced in advance.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

ME 632(3) **Course ID:013131** **2021-10-11**
Elastic and Inelastic Stress Analysis
Presents certain key aspects of inelastic solid mechanics centered around viscoelasticity, creep, viscoplasticity, and plasticity. It is divided into three parts consisting of the fundamentals of elasticity, useful constitutive laws, and applications to simple structural members, providing extended treatment of basic problems in static structural mechanics, including elastic and inelastic effects.
Components: Lecture
Course Equivalents: CE 632
Attributes: Offered Even Springs
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 633(3) **Course ID:008972** **2015-01-28**
Plasticity
This course provides an introduction to the subject of plasticity. The physical background of inelastic deformation in metals and geological materials is discussed. Continuum constitutive theory is presented including yield criteria, flow rules, and plastic hardening. Extension to the rate-dependent (viscoplastic) material is discussed. Uniqueness and extremum theorems are derived and discussed and field equations for general, two-dimensional and axisymmetric problems are presented. Selected problems from metal and soil/rock plasticity are presented and solved using various techniques, including slip-line theory, limit analysis and exact methods. Other topics such as localization and diffuse instability in plastic deformation and application of FEM in plasticity are presented as time allows.
Prerequisite: CE554 or ME554; recommended CE551 or ME551.
Components: Lecture
Course Equivalents: CE 633
Attributes: Given When Needed
Req. Designation: Technology

ME 637(3) **Course ID:008992** **2015-01-20**
Particle Transport, Deposition and Removal II
Introduction to turbulent flows and turbulent modelings. One and several equation models. Drag, lift, virtual mass, and Basset forces acting on particles. Wall effects and nonspherical particles. Aerosol transport and dispersion in turbulent flows. Turbulent diffusion and wall deposition of aerosols. Particle charging mechanics and electrostatics forces. Thermophoretic and electrophoretic effects. Introduction to colloids and electrokinetic phenomena. Computational aspects of aerosol dispersion and deposition in turbulent flows. Sublayer model approach. Approximate simulation of turbulence and turbulence transport. DNS simulation methods. Nonspherical particle transport in turbulent flows. Coagulation of aerosols due to shear and tubulence. Experimental techniques for turbulent flow measurements. Hot-wire anemometry, Isokinetic sampling. Particle concentration and velocity measurements with phase-doppler, and PIV. Applications to microcontamination control, air pollution, combustor, spray, and particle deposition in human lung.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: ME537
Req. Designation: Technology

ME 639(3) **Course ID:008993** **2021-12-14**
Advanced Turbulence
Review of viscous flow theory. Review of instability of viscous flows. Origin of turbulence. Phenomenological theories of turbulence. Reynolds' equation. Energy budget and vorticity dynamics in turbulence. Free shear and internal flows. Turbulent boundary layer. Introduction to turbulence modeling. The k-e and stress transport models. Recent developments in turbulence modeling, stress transport models, multipoint closure methods, and thermodynamical formulation. Turbulent diffusion, isotropic turbulence, and Karman-Howarth equation. Kraichnan's direct interaction approximation.Wiener-Hermite expansion approach. Characteristic functional formulation and Hopf's theory. Lundgren's probabilistic formulation and Chung's kinetic theory of turbulence. Direct and Large-Eddy simulation techniques. Proper orthogonal decomposition Techniques. Chaos and dynamical systems, stochastic estimation, Lagrangian approaches.
Components: Laboratory, Lecture
Attributes: Given When Needed
Req. Designation: Technology

ME 654(3) **Course ID:008994** **2015-01-28**
Elastic Waves in Solids
The course concerns with stress propagation problems in elastic solids and waveguides. Following the derivation of governing elasto-dynamics equations, formal mathematical issues, such as uniqueness, reciprocal identity, and completeness theorem, are addressed. The most commonly used solution techniques (e.g. Green's functions, integral transforms, normal mode expansions, and series analysis) with examples are provided. Problems considered include propagation in half spaces (refections and transmissions), approximate rod and plate theories, and classes of composite materials (e.g. laminated bars, and plates). Well-known experimental techniques are also covered. Assignments consist of mathematical derivations, computer simulations and presentations.
Prerequisites: ME551/CE551 and ME554/CE554 or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 657(1 - 3) **Course ID:008997** **2015-02-09**
Selected Topics in Solid Mechanics
An advanced graduate course in solid mechanics. Topics of special interest will be selected to conform to the mutual interests and needs of students and faculty.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - CRC Engineering Programs - Subject: Mechanical Engineering

ME 690(3) **Course ID:012632** **2016-07-01**
Independent Study
[Formerly MER 590] Advance graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Independent Study
Req. Designation: Technology

ME 691(3) **Course ID:013166** **2022-01-01**
Independent Study
Advance graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course in any particular term will be announced in advance.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

ME 692(3) **Course ID:012634** **2022-01-01**
Independent Study
Advance graduate course in the field of engineering sciences. Topics of special interest will be selected for current needs. A description of the course content in any particular term will be announced in advance.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

ME 696(3) **Course ID:012929** **2019-02-14**
Structural Dynamics
Analysis of elastic and inelastic single and multiple degree-of-freedom structural systems under time-dependent loads including harmonic, impulse, earthquake, and other general dynamic loads. Development of equations of motion. Analytical and numerical evaluation of free and forced vibration response. identification of dynamic system properties. Modal analysis. Vibration isolation and force transmissibility. Dynamic measurement sensors. Shock loading spectrum Frequency-domain analysis.

Prerequisites: Knowledgeable background in Dynamics, Linear/Matric Algebra, Ordinary and Partial Differential Equations. MATLAB Experience useful
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Engineering - Mechanical & Aerospace Eng - Subject: Mechanical Engineering

ME 999(1 - 10) **Course ID:011131** **2015-01-19**
Special Topics in Mechanical Engineering
Used for graduate transfer credit for which Clarkson does not have an equivalent ME course number.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Business - School of Business - Subject: Marketing

MK 1(2 - 4) **Course ID:009085** **2015-07-16**
Marketing Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

MK 2(2 - 4) **Course ID:009086** **2015-07-16**
Marketing Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

MK 306(3) **Course ID:009087** **2017-03-10**
Professional Sales
This course focuses on understanding the sales process mainly at the business-to-business level. Students will learn both theoretical and applied models of sales, with a focus on practical application in the types of companies that Clarkson graduates work at. Topics covered include identification of customer needs, customer relationship management, identification of differentiating factors across products and services, fundamentals of relationship management, managing customer expectations, working with international customers (managing cultural and legal differences), working across internal functional boundaries to sell and support products and services, pricing, negotiation basics, closing a contract, customer satisfaction, and after-sales support and services.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

MK 320(3) **Course ID:009088** **2022-04-05**
Principles of Marketing
(May be used to satisfy a CUSB MBA or MS foundation requirement). Familiarizes students with various marketing terms, concepts, principles, institutions and practices. Topics covered include: buyer behavior, market research, product planning, pricing, distribution, personal selling and advertising. The changing nature of marketing and the trends in domestic and international marketing are also examined. Experiential exercises are an intrinsic and important part of this course.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Corequisite: Sophomore Standing
Req. Designation: Technology

MK 321(3) **Course ID:009089** **2015-07-06**
Consumer Behavior
[Cross-listed with PY 321] Extensive coverage of selected consumer behavior theories and models. Special emphasis given to the most recent research along with marketing mix applications. Topics include classic and operant conditioning, motivation and attribution theories and the elaboration likelihood model. Students are required to complete a term project.
Components: Lecture
Course Equivalents: PY 321
Requirement Group: Prerequisite: MK320.
Req. Designation: Technology

MK 332(3) **Course ID:009093** **2015-07-06**
Marketing Research
Introductory coverage of various concepts and tools relevant to market information acquisition, analysis, and interpretation. Primary focus is on decision making in marketing research. Students are required to complete a term project.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MK320 and MA/STAT282 or MA/STAT383.
Req. Designation: Technology

Business - School of Business - Subject: Marketing

MK 419(0) **Course ID:012893** **2018-10-09**
New Product Development and Marketing Portfolio
This New Product Development and Marketing Portfolio is the mechanism by which students enrolled in the New Product Development and Marketing Minor maintain a repository of their work within the minor and in related areas of study and work during their time at Clarkson. This portfolio should include at least evidence from four (4) new product development and/or marketing projects that were completed by the student during their Clarkson experience. The portfolio can by multimedia and include both coursework and work from extracurricular activities, entrepreneurial initiatives, or Internship/co-op work experiences.
Components: Independent Study
Requirement Group: Prerequisites: Senior Standing
Req. Designation: Technology

MK 436(3) **Course ID:009098** **2015-07-06**
Creativity, Innovation & New Product Development
This course provides an introduction and broad overview of the strategic decision making process for managing three critical components for firm growth: creativity, innovation and new product development. The fostering of creativity, the stimulation and management of innovation and the strategic new product development process are discussed within the context of interdisciplinary management. This course concentrates on the front end of new product development focusing on understanding, fostering and managing the creative processes, grasping the importance of innovation in satisfying market needs, and the development of new products up to and including the design stage of new product development. The course provides students with the ability to understand, appreciate and manage new products and the new product development process. Marketing research methods, current topics and critical examination of traditional management strategies applicable to creativity, innovation and new product development and management will be explored through lecture, case
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: MK320.
Req. Designation: Technology

MK 487(1 - 3) **Course ID:009100** **2017-01-13** **Instructor Consent Required**
Special Project in Marketing
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisites: Permission of the instructor
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MK 609(2) **Course ID:009106** **2015-07-06**
Marketing Management (MBA Module)
[Cross-listed with MK 610] The problems, decisions and decision-making processes of marketing managers as they seek to increase the effectiveness of performing marketing activities. The objectives are: to update the discussion of marketing principles and practices in the light of recent national and international events; to deepen the discussion of business environmental factors of increased importance, such as energy, inflation, changing consumer life style, government regulation, consumerism and environmentalism; and to aid students in experiencing real-life business situations through the discussion of marketing cases.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Discussion, Lecture
Course Equivalents: MK 610, MK 610
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: Marketing

MK 610(3) **Course ID:009107** **2018-08-22**
Marketing Management
[Cross-listed with MK 609] This course provides graduate students with a fundamental command of marketing concepts, processes, and management, as well as creating an understanding of the critical strategic role marketing plays in the management of organizations. The objectives are two-fold. The first objective is to provide the student with an introduction to the fundamental concepts of marketing and their role in effective marketing management. Thus students will explore central topics including product, price, place, and promotion decisions, examine the roles of consumer behavior and market research, and investigate how organizations blend these inter-related components to create and sustain value. The second objective is to allow students to apply that knowledge in the context of strategic marketing management. Here, strategic elements associated with marketing are integrated into strategic marketing framework to understand and develop marketing strategy and to illustrate how marketing can assist the firm in arriving at a competitive
Components: Lecture
Same As Offering: MK 610
Course Equivalents: MK 609
Attributes: Offered Fall Term
Req. Designation: Technology

MK 610(3) **Course ID:009107** **2018-08-22**
Marketing Management
[Cross-listed with MK 609] This course provides graduate students with a fundamental command of marketing concepts, processes, and management, as well as creating an understanding of the critical strategic role marketing plays in the management of organizations. The objectives are two-fold. The first objective is to provide the student with an introduction to the fundamental concepts of marketing and their role in effective marketing management. Thus students will explore central topics including product, price, place, and promotion decisions, examine the roles of consumer behavior and market research, and investigate how organizations blend these inter-related components to create and sustain value. The second objective is to allow students to apply that knowledge in the context of strategic marketing management. Here, strategic elements associated with marketing are integrated into strategic marketing framework to understand and develop marketing strategy and to illustrate how marketing can assist the firm in arriving at a competitive
Components: Lecture
Same As Offering: MK 610
Course Equivalents: MK 609
Attributes: Offered Fall Term
Req. Designation: Technology

MK 626(3) **Course ID:012553** **2016-07-01**
Marketing Research Techniques
[Formerly MBA 626] Marketing research is primarily conducted to reduce the amount of uncertainty managers would otherwise face in their decision-making. This course is designed to develop students' knowledge of marketing research by both exposing them to many major important issues involved with marketing research and requiring them to complete a marketing research report from start to finish. Topics discussed include research designs, data collection methods, survey development, measurement, sampling methods and sample size determination, descriptive statistics, parameter estimation, independent samples t-test analysis, correlation analysis, chi-square analysis, code sheet development, non-sampling errors, and ethics in marketing research.
Components: Lecture
Req. Designation: Technology

MK 629(3) **Course ID:012555** **2016-07-02**
Consumer Behavior
[Formerly MBA 628] This course is designed to enhance students' understanding of consumers. Topics explored involve the many, many influences that may shape an individual's behaviors in the marketplace, including the impact of these influences on managerial decision-making situations. Observational research methods are also covered.
Components: Lecture
Req. Designation: Technology

Business - School of Business - Subject: Marketing

MK 630(3) **Course ID:013018** **2019-11-01**
Marketing and Social Media Analytics
The course will provide you with an introduction to marketing and social media analytics. We will study how to conceptualize and apply decision modeling to derive marketing insights from empirical data in areas such as pricing, segmentation, customer lifetime analysis, targeting and positioning, and branding. This will be a hands-on course based on the analytic approach, in which you will acquire skills to translate conceptual understanding into specific marketing plans in various decision contexts.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: IA 530 or equivalent.
Req. Designation: Technology

MK 640(3) **Course ID:011776** **2016-08-27**
Marketing Management for Innovation
This course introduces students to the fundamentals of marketing management including consumer behavior, market research, professional selling, and marketing strategy all with a focus on managing the innovation process. The course is designed for graduate students who have undergraduate training in a technical field, most likely engineering and need exposure to the theory and practice of marketing and thus, integrates the concept and practice of innovation throughout the topics covered.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Business - CRC Business - Subject: Marketing

MK 665(3) **Course ID:012573** **2016-07-25**
International Marketing Management
[Formerly MBA 665] This course examines development of international marketing strategies, from determining objectives and evaluating international market opportunities through coordinating strategies in world markets. Particular emphasis is placed on application of marketing principles in the multinational environment.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - School of Business - Subject: Marketing

MK 687(1 - 3) **Course ID:009110** **2015-07-06**
Independent Project in Marketing
Practical application of marketing theory in an independent research project conducted under the guidance of a Marketing faculty member.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

MK 689(3) **Course ID:010241** **2015-07-06**
New Product Marketing
Accepted analytical models are used to analyze current data obtained from major companies regarding new products which have been test marketed. The objective is to introduce students to a new and crucial aspect of product management: the ability to use computers and analytical tools in brand decisions.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: MK609 (Marketing Management)
Req. Designation: Technology

MK 696(3) **Course ID:009118** **2015-07-06**
Marketing Methods
Intended to equip the student with a thorough knowledge of an arsenal of research methods, including the assumptions, methodology, and limitations of these methods. Enhances students' ability to conceptualize and operationalize a research question. Some statistical content is included as an introduction to data analysis. Applications of these methods are discussed within the context of research problems faced by both academic researchers and practitioners (e.g., managers, engineers, economists, marketing researchers, information system designers). A research project will be an integral part of the course.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Other - Computer Science - Subject: Multidisciplinary

MP 151(0 - 3) **Course ID:009140** **2017-01-13** **Instructor Consent Required**
Multidisciplinary Course (Open Source Software Projects)
Student teams will engage in projects in the following areas: administer, create, modify, test, or document Open Source Software (OSS); analyze business and policy issues involving OSS; and create and run outreach/tutorial programs that introduce interested persons to OSS or enhance the skill of persons already using OSS. Project status will be reported during regularly scheduled weekly meetings. Students will document projects on the Clarkson Open Source Institute (COSI) web site and will construct individual, web-based portfolios of their work. Students are expected to have some experience or course preparation in their project areas. Given Pass/No Credit.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MP 152(0 - 3) **Course ID:010338** **2017-01-13** **Instructor Consent Required**
Internet Teaching Laboratory Projects Course
In conjunction with Clarkson's Internet Teaching Laboratory, students will participate in projects related to computer networking such as implementing network software, configuring networking hardware, simulating large-scale networks, evaluating and testing computer security, administering the Internet Teaching Laboratory, deploying networked solutions for community members or developing network tutorials for other students. Students will construct web-based portfolios and give oral presentations of their work. Given Pass/No Credit. By permission of instructor.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Inst for a Sustainable Environ - Provost - Subject: Multidisciplinary

MP 210(1 - 3) **Course ID:013001** **2020-10-15**
Food-to-Energy: A K-12/University Partnership to develop a Resource Recovery Program
Clarkson students will work with Clarkson University and a local school district to encourage food waste diversion from the solid waste stream and to explore beneficial uses of food waste for nutrient and energy recovery. Students will develop lesson plans to be implemented in K-12 classes as well as work with student teams to promote best food waste practices.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Other - Computer Science - Subject: Multidisciplinary

MP 251(0 - 3) **Course ID:010115** **2017-01-13** **Instructor Consent Required**
Open Source Software Projects
A continuation of MP 151
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MP 252(0 - 3) **Course ID:010339** **2017-01-13** **Instructor Consent Required**
Internet Teaching Laboratory Projects Course
In conjunction with Clarkson's Internet Teaching Laboratory, students will participate in projects related to computer networking such as implementing network software, configuring networking hardware, simulating large-scale networks, evaluating and testing computer security, administering the Internet Teaching Laboratory, deploying networked solutions for community members or developing network tutorials for other students. Students will construct web-based portfolios and give oral presentations of their work. Given Pass/No Credit. By permission of instructor.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Inst for a Sustainable Environ - Provost - Subject: Multidisciplinary

MP 310(1 - 3) **Course ID:013061** **2020-10-15**
Food to Energy: A K-12/University Partnership to develop a Resource Recovery Program
Clarkson students will work with Clarkson University and a local school district to encourage food waste diversion from the solid waste stream and to explore beneficial uses of food waste for nutrient and energy recovery. Students will develop lesson plans to be implemented in K-12 classes as well as work with student teams to promote best food waste practices.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Other - Computer Science - Subject: Multidisciplinary

MP 351(0 - 3) **Course ID:010116** **2017-01-13** **Instructor Consent Required**
Open Source Software Projects
A continuation of MP 251.
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MP 352(0 - 3) **Course ID:010340** **2017-01-13** **Instructor Consent Required**
Internet Teaching Laboratory Projects Course
In conjunction with Clarkson's Internet Teaching Laboratory, students will participate in projects related to computer networking such as implementing network software, configuring networking hardware, simulating large-scale networks, evaluating and testing computer security, administering the Internet Teaching Laboratory, deploying networked solutions for community members or developing network tutorials for other students. Students will construct web-based portfolios and give oral presentations of their work. Given Pass/No Credit. By permission of instructor.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Other - Civil & Environmental Eng - Subject: Multidisciplinary

MP 401(3) **Course ID:009166** **2015-01-20** **Instructor Consent Required**
Multidisciplinary Course (Environmental Remediation Design)
Science and engineering concepts are synthesized to generate safe, economics and effective solutions to real-world environmental restoration projects. Emphasis is placed on multidisciplinary teamwork and communication.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - School of Engineering - Subject: Multidisciplinary

MP 414(0 - 3) **Course ID:009174** **2020-03-30** **Instructor Consent Required**
Multidisciplinary Course (Applied Robotics)
Clarkson students work together with local high school students to participate in a nation-wide robotics competition and get a hands-on, inside look at the engineering profession. During the fall semester, students plan for the upcoming spring competition by participating in a series of seminars that focus on various aspects of mobile robot design and construction. Competition rules are announced at the start of the spring semester, and during an intense six-week period, students work to brainstorm, design, construct, and test their robot entry. With only six weeks of build time, all jobs are critical path. Teams from across the nation then compete in a tournament complete with referees, cheerleaders and time clocks. The competition changes each year, so returning team members always have a new challenge.

Components: Project Team
Attributes: Offered Each Term
Req. Designation: Technology

Other - Civil & Environmental Eng - Subject: Multidisciplinary

MP 418(3) **Course ID:009177** **2015-02-09** **Instructor Consent Required**
Project-Based Learning Program
Clarkson students will work with students from two local school districts to increase their understanding of science, math, engineering and technology. Clarkson students in this project will develop and then teach a holistic, project-based learning approach to problem solving. Both the Clarkson and K-12 students will gain an appreciation for the relevance and usefulness of science and engineering within a larger social, political and economic context. Year long projects will be oriented towards understanding and solving environmentally related problems that affect their school or community.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Provost - Subject: Multidisciplinary

MP 425(3) **Course ID:012776** **2016-12-06**
Multidisciplinary Course - Sustainable Housing Solution
[Cross-listed with MP525] A team of Clarkson students from multiple majors will collaborate to design, optimize, and build a prototype of a housing solution. Principles of sustainable design, alternatives assessment, resource management, multidisciplinary teamwork, and communication will be emphasized.
Components: Lecture
Course Equivalents: MP 525
Attributes: One communication unit, Offered Spring Term
Req. Designation: Technology

Other - Computer Science - Subject: Multidisciplinary

MP 451(0 - 3) **Course ID:010117** **2017-01-13** **Instructor Consent Required**
Open Source Software Projects
A continuation of MP 441
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

MP 452(0 - 3) **Course ID:010341** **2017-01-13** **Instructor Consent Required**
Internet Teaching Laboratory Projects Course
In conjunction with Clarkson's Internet Teaching Laboratory, students will participate in projects related to computer networking such as implementing network software, configuring networking hardware, simulating large-scale networks, evaluating and testing computer security, administering the Internet Teaching Laboratory, deploying networked solutions for community members or developing network tutorials for other students. Students will construct web-based portfolios and give oral presentations of their work. Given Pass/No Credit. By permission of instructor.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

Business - Engineering & Management - Subject: Multidisciplinary

MP 456(3) **Course ID:012845** **2017-10-18** **Instructor Consent Required**
Special Topics in E&M: Lean Six Sigma for Healthcare
Students will have a first-hand experience in solving a real-world problem by applying lean six sigma tools. To this aim, students will be assigned to a process improvement research project and will closely collaborate with stakeholders of a Healthcare organization in the North Country. Students will gather and analyze data, and provide process insights and recommendations for redesigning a process. To this aim, students will have to commute on a regular basis to the Healthcare organization facilities that can be located in Canton, Potsdam, or in the Adirondacks. The goal is to bring a tangible improvement that ultimately results in an effective and efficient operational process that consistently satisfies customers/patients.

Requirement: Instructor permission
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Other - Civil & Environmental Eng - Subject: Multidisciplinary

MP 518(3) **Course ID:009193** **2015-02-09** **Instructor Consent Required**
Project-Based Learning Program
See MP 318 for course description.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Provost - Subject: Multidisciplinary

MP 525(3) **Course ID:012775** **2016-12-06**
Multidisciplinary Course - Sustainable Housing Solution
[Cross-listed with MP425] A team of Clarkson students from multiple majors will collaborate to design, optimize, and build a prototype of a housing solution. Principles of sustainable design, alternatives assessment, resource management, multidisciplinary teamwork, and communication will be emphasized.
Components: Lecture
Course Equivalents: MP 425
Attributes: One communication unit, Offered Spring Term
Req. Designation: Technology

Other - Computer Science - Subject: Multidisciplinary

MP 551(0 - 3) **Course ID:010118** **2015-08-15** **Instructor Consent Required**
Open Source Software Projects
Student teams will engage in projects in the following areas: administer, create, modify, test, or document Open Source Software (OSS); analyze business and policy issues involving OSS; and create and run outreach/tutorial programs that introduce interested persons to OSS or enhance the skill of persons already using OSS. Project status will be reported during regularly scheduled weekly meetings. Students will document projects on the Clarkson Open Source Institute (COSI) web site and will construct individual, web-based portfolios of their work. Students are expected to have some experience or course preparation in their project areas. Given Pass/No Credit.
Components: Project Team
Attributes: Given When Needed
Req. Designation: Technology

MP 552(0 - 3) **Course ID:010342** **2015-08-15** **Instructor Consent Required**
Internet Teaching Laboratory Projects Course
In conjunction with Clarkson's Internet Teaching Laboratory, students will participate in projects related to computer networking such as implementing network software, configuring networking hardware, simulating large-scale networks, evaluating and testing computer security, administering the Internet Teaching Laboratory, deploying networked solutions for community members or developing network tutorials for other students. Students will construct web-based portfolios and give oral presentations of their work. Given Pass/No Credit. By permission of instructor.
Components: Project Team
Attributes: Offered Each Term
Req. Designation: Technology

Other - Military Science - Subject: Military Science

MS 111(1) **Course ID:009194** **2015-02-19**
Leadership and Personal Development
Introduces cadets to the personal challenges and competencies that are critical for effective leadership. Cadets learn how the personal development of life skills such as critical thinking, goal setting, time management, physical fitness, and stress management relate to leadership, officership, and the Army profession.
The focus is on developing basic knowledge and comprehension of Army leadership dimensions while gaining a big picture understanding of the ROTC program, its purpose in the Army, and its advantages for the student. Class meets weekly for one hour with a co-requisite laboratory and one weekend field training exercise. Physical fitness training is also required.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

MS 112(1) **Course ID:009195** **2015-01-20**
Introduction to Tactical Leadership
Overviews leadership fundamentals such as setting direction, problem-solving, listening, presenting briefs, providing feedback, and using effective writing skills. Cadets explore dimensions of leadership values, attributes, skills, and actions in the context of practical, hands-on, and interactive exercises. Continued emphasis is placed on recruitment and retention of cadets. Cadre role models and the building of stronger relationships among the cadets through comment experience and practical interaction are critical aspects of the MS112 experience. Class meets weekly for one hour with a co-requisite laboratory and one weekend field training exercise. MS111 recommended but not required as prerequisite; Physical fitness training is also required. No military obligation for non-contracted students.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

MS 221(2) **Course ID:009196** **2015-02-19**
Innovative Team Leadership
Explores the dimensions of creative and innovative tactical leadership strategies and styles by examining team dynamics and two historical leadership theories that form the basis of the Army leadership framework (trait and behavior theories). Cadets practice aspects of personal motivation and team building in the context of planning, executing, and assessing team exercises and participating in leadership labs.
Focus is on continued development of the knowledge of leadership values and attributes through an understanding of Army rank, structure, and duties and basic aspects of land navigation and squad tactics. Case studies provide tangible context for learning the Soldier s Creed and Warrior Ethos as they apply in the contemporary operating environment (COE). Class meets weekly for two hours with co-requisite laboratory and one weekend field training exercise. Physical fitness training is also required. MS111 and MS112 recommended but not required as prerequisites. No military obligation for non-contracted students.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

MS 222(2) **Course ID:009197** **2015-01-20**
Foundations of Tactical Leadership
Examines the challenges of leading tactical teams in the complex contemporary operating environment (COE). The course highlights dimensions of terrain analysis, patrolling, and operations orders. Further study of the theoretical basis of the Army leadership framework explores the dynamics of adaptive leadership in the context of military operations. MS222 provides a smooth transition into MS331. Cadets develop greater self awareness as they assess their own leadership styles and practice communication and team building skills. COE case studies give insight into the importance and practice of teamwork and tactics in real-world scenarios. Class meets weekly for two hours with co-requisite laboratory and one weekend field training exercise. Physical training is also required. MS111, MS112, MS221 recommended but not required as prerequisites. No military obligation for non-contracted students.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Other - Military Science - Subject: Military Science

MS 331(3) **Course ID:009199** **2015-02-19**
Adaptive Tactical Leadership
Challenges cadets to study, practice, and evaluate adaptive leadership skills as they are presented with challenging scenarios related to squad tactical operations. Cadets receive systematic and specific feedback on their leadership attributes and actions. Based on such feedback, as well as their own self-evaluations, cadets continue to develop their leadership and critical thinking abilities. The focus is developing cadets tactical leadership abilities to enable them to succeed at ROTC s summer Leadership Development and Assessment Course (LDAC). Class meets weekly for three hours with co-requisite laboratory and one weekend field training exercise. Physical fitness is also required.
Prerequisite: MS Basic Course or equivalent.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

MS 332(3) **Course ID:009200** **2015-01-20**
Leadership in Changing Environments
Uses increasingly intense situational leadership challenges to build cadet awareness and skills in leading tactical operations up to platoon level. Cadets review aspects of combat, stability, and support operations. They also conduct military briefings and develop proficiency in garrison operation orders. The focus is on exploring, evaluating, and developing skills in decision-making, persuading, and motivating team members in the contemporary operating environment (COE). MS332 cadets are evaluated on what they know and do as leaders is they prepare to attend the ROTC summer Leader Development Assessment Course (LDAC). Class meets weekly three hours with co-requisite laboratory and one weekend field training exercise. Physical fitness training is also required.
Prerequisite: MS Basic Course or equivalent.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Req. Designation: Technology

MS 441(3) **Course ID:009201** **2015-02-19**
Developing Adaptive Leaders
Develops cadet proficiency in planning, executing, and assessing complex operations, functioning as a member of a staff, and providing performance feedback to subordinates. Cadets assess risk, make ethical decisions, and lead fellow ROTC cadets. Lessons on military justice and personnel processes prepare cadets to make the transition to Army officers. MS IV cadets analyze, evaluate, and instruct cadets for their first unit of assignment. They identify responsibilities of key staff, coordinate staff roles, and use situational opportunities to teach, train, and develop subordinates. Class meets weekly for three hours with co-requisite laboratory an done weekend field training exercise. Physical fitness training also required.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Req. Designation: Technology

MS 442(3) **Course ID:009202** **2015-01-20**
Leadership in a Complex World
Explores the dynamics of leading in the complex situations of current military operations in the contemporary operating environment (COE). Cadets examine differences in customs and courtesies, military law, principles of war, and rules of engagement in the face of international terrorism. They also explore aspects of interacting with non-government organizations, civilians on the battlefield, and host nation support. The course places significant emphasis on preparing cadets for their first unit of assignment. It uses case studies, scenarios, and What Now, Lieutenant? exercises to prepare cadets to face the complex ethical and practical demands of leading as commissioned officers in the United States Army. Class meets weekly for three hours with co-requisite laboratory and one weekend field training exercise. Physical fitness training also required.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Req. Designation: Technology

Engineering - Materials Science & Engineerin - Subject: Materials Sci & Engineering

MSE 451(3) **Course ID:012917** **2022-02-03**
Advanced Characterization of Materials
[Cross-listed with MSE551] Advanced methods for characterizing materials, such as scattering methods, including laser light scattering and x-ray diffraction (powder patters & Laue patters); microscopy, including optical microscopy; scanning electron microscopy (including EDX), transmission electron microscopy, and atomic force microscopy; and spectroscopy, including nuclear magnetic resonance, surface plasmon resonance, and scanning confocal Raman microscopy.

Components: Lecture
Course Equivalents: MSE 551
Attributes: Given When Needed
Requirement Group: Prerequisites: CM132 (or CM104 and CM106), PH132, and ES260
Req. Designation: Technology

School of Arts and Sciences - Materials Science & Engineerin - Subject: Materials Sci & Engineering

MSE 551(3) **Course ID:011560** **2022-02-03**
Advanced Materials Characterization
Advanced methods for characterizing materials, such as scattering methods, including laser light scattering and x-ray diffraction (powder patters & Laue patters); microscopy, including optical microscopy; scanning electron microscopy (including EDX), transmission electron microscopy, and atomic force microscopy; and spectroscopy, including nuclear magnetic resonance, surface plasmon resonance, and scanning confocal Raman microscopy.
The following undergraduate courses should be completed prior to taking this course: CM371 (Physical Chemistry I); PH132 (Physics II); and ES260 (Materials Science and Engineering I)
Components: Lecture
Course Equivalents: MSE 451
Req. Designation: Technology

Graduate Interdisciplinary - Materials Science & Engineerin - Subject: Materials Sci & Engineering

MSE 560(3) **Course ID:011561** **2022-02-03**
Advanced Materials Science and Engineering I
Atomic and molecular structure of solids (crystalline and glassy); atomic and molecular bonding; thermodynamics of materials (condensed matter); kinetics, diffusion and phase transformation; properties of bulk solids compared to thin films, and nano-sized materials; methods for forming solids and thin films (solidification, crystallization, precipitation, evaporation, physical vapor deposition, chemical vapor deposition, etc.); materials chemistry; defects (point, line, surface); mechanical, thermal, electrical, and optical properties; relationship between materials processing and materials properties.
The following undergraduate courses should be completed prior to taking this course: CM371 (Physical Chemistry I); PH132 (Physics II); and ES260 (Materials Science and Engineering I)
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Materials Science & Engineerin - Subject: Materials Sci & Engineering

MSE 575(3) **Course ID:012126** **2022-02-03**
Sustainable Nanotechnology
[Cross-listed with CM 575, and ES 575] The goal of this course is to provide graduate students and advanced undergraduates with a modern view of current and emerging research in nanotechnology. Topics will include: fundamental nanoscale properties and applications, green manufacturing and assembly in functional devices, interaction of nanomaterials with biological systems, the physical and chemical phenomena at nano-bio interfaces, fate, transport and transformation of engineered nanomaterials, environmental and health impact, nanometrology, nanotoxicology and hazard identification of nano-based products. Development of analytical methods and characterization tools for assessing nanoscale properties and materials will also be discussed. Students will be exposed to interdisciplinary topics and an integrated training bridging material and environmental sciences with biology and analytical chemistry. Students will be able to demonstrate a basic awareness of risks and benefits of emerging technologies and evaluate overall environmental and societal
Components: Lecture
Course Equivalents: CM 475, CM 575, ES 575
Attributes: Offered Spring Term
Req. Designation: Technology

MSE 587(3) **Course ID:012911** **2022-02-03**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: PH 587, CM 487, CM 587, PH 487, ES 587
Attributes: Offered Spring Term
Req. Designation: Technology

Engineering - Materials Science & Engineerin - Subject: Materials Sci & Engineering

MSE 614(1 - 15) **Course ID:012021** **2022-02-03**
Thesis, Dissertation
Analytic or experimental studies in materials science & engineering under the direction of a faculty adviser. Credit for this work is given when the requirements for the degree are completed including the presentation of a thesis or dissertation as appropriate to the degree program.
Components: Thesis Research
Attributes: Given When Needed
Req. Designation: Technology

MSE 999(1 - 4) **Course ID:012875** **2022-02-03**
Material Science and Engineering Elective
Used for awarding transfer credits for graduate courses completed elsewhere for which no equivalent Clarkson University graduate course can be identified. (Not offered at Clarkson, for transfer credit only).
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Engineering - School of Engineering - Subject: Multidisciplinary Project Team

MT 51(0) **Course ID:010554** **2021-10-21**
Introduction to Basic Shop Skills
This course covers simple shop procedures including measurement and layout, drills and drill presses, use of hand taps, proper use of the various ban saws, and use of the shear and brake; involves use of the composite lab and wood working equipment. MT 51 consists of three hours of lecture, and three hours of hands-on lab experience.
Components: Lecture
Req. Designation: Technology

MT 52(0) **Course ID:010555** **2019-02-06**
Basic Lathe Operations
This course covers the basic theory and operation of the metal lathe; topics include tool grinding, turning, facing, boring, fits, tapers, etc. this course consists of three lectures of 1.5 hours each and four labs of 2 hours each. Offered Pass/No Credit.
Components: Laboratory, Lecture
Requirement Group: Prerequisite: MT 51
Req. Designation: Technology

MT 53(0) **Course ID:010556** **2019-02-06**
Basic Milling Procedures
Basic Milling will cover the theory and operation of the Bridgeport type mill; topics covered include set-up of the mill, fixturing, zeroing parts, cutters, and milling techniques for various materials. This course would consist of three lectures of 1.5 hours each and four labs of 2 hours each. Offered Pass/No Credit.
Prerequisite: MT52.
Components: Laboratory, Lecture
Requirement Group: Prerequisite: MT 51
Req. Designation: Technology

MT 54(0) **Course ID:010557** **2017-09-13**
CNC Mill Procedures
Basics of CNC Machine programming and operation of the Haas Bed Mill; topics covered include machine start up and homing, conversational programming, drill patterns, profiles, and pockets. The course would consist of three lectures of 1.5 hours and four labs of 2 hours each.
Components: Laboratory, Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: MT53
Req. Designation: Technology

MT 55(0) **Course ID:010558** **2019-02-06**
Basic Welding Procedures
Basic welding addresses the operation and use of welding equipment in a safe and effective manner; topics include general welding safety, oxygen-acetylene techniques, basic arc welding, MIG welding, TIG welding, and use of the plasma cutting torch. The course would consist of three lectures of 1.5 hours each and four labs of 2 hours each. Offered Pass/No Credit.
Prerequisite: MT51.
Components: Laboratory, Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: MT 51
Req. Designation: Technology

MT 56(0) **Course ID:011053** **2019-02-06**
Introduction to MasterCam
This course is an overview of the CAD software MasterCam. Students will draw, choose tool paths, create machine code, and run programs on CNC mills using CAD.
Components: Laboratory, Lecture
Requirement Group: Prerequisite: MT 54
Req. Designation: Technology

MT 57(0) **Course ID:011054** **2019-02-06**
Advanced Lathes
This course will cover the use of the precision lathes in the student shop. Students will set up and machine on several different lathes using advanced techniques and tooling. Prerequisite: MT52.
Components: Laboratory, Lecture
Requirement Group: Prerequisite: MT 52
Req. Designation: Technology

Engineering - School of Engineering - Subject: Multidisciplinary Project Team

MT 58(0) **Course ID:011587** **2019-03-14**
CNC Lathe Operation
CNC Lathe Operations and Programming. Topics covered include machine programming and operation; using g-code programs generated by CAD/CAM software, tool path creation utilizing conversational HAAS lathe programming and basic g-code. Students will learn how to turn complex profiles and mill a variety of 3D contours. This course will consist of four lectures of 1.25 hours each and four labs of 2 hours each.
Components: Laboratory, Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: MT56, and MT 57
Req. Designation: Technology

MT 109(0) **Course ID:009127** **2014-10-29** **Instructor Consent Required**
Mini Baja Car Project
Active participation in Mini Baja Car project. Pass/No Credit only. Must have permission of instructor.
Components: Project Team
Req. Designation: Technology

MT 110(0 - 3) **Course ID:009128** **2014-09-22** **Instructor Consent Required**
Multidisciplinary Course (CPS OM-DINI)
Active participation in Creative Problem Solving -- Odyssey of the Mind/Destination Imagination project. Pass/No Credit only. Must have permission of instructor.
Prerequisite: consent of the instructor.
Components: Project Team
Req. Designation: Technology

MT 209(0) **Course ID:009146** **2014-10-29** **Instructor Consent Required**
Mini Baja Car Project
Active participation in Mini Baja Car project. Pass/No Credit only. Must have permission of instructor.
Components: Project Team
Req. Designation: Technology

MT 210(0 - 3) **Course ID:009670** **2014-09-22** **Instructor Consent Required**
Multidisciplinary Course (CPS OM-DINI)
See MT 110 for course description.
Components: Project Team
Req. Designation: Technology

MT 214(0) **Course ID:009147** **2015-02-09** **Instructor Consent Required**
Multidisciplinary Course (FIRST Robotics Competition)
Clarkson students work together with local high school students to participate in a nation-wide robotics competition and get a hands-on, inside look at the engineering profession. During the fall semester, students plan for the upcoming spring competition by participating in a series of seminars that focus on various aspects of mobile robot design and construction. Competition rules are announced at the start of the spring semester, and during an intense six-week period, students work to brainstorm, design, construct, and test their robot entry. With only six weeks of build time, all jobs are critical path. Teams from across the nation then compete in a tournament complete with referees, cheerleaders and time clocks. The competition changes each year, so returning team members always have a new challenge.
Components: Project Team
Attributes: Offered Each Term
Req. Designation: Technology

MT 309(0) **Course ID:009158** **2014-10-29** **Instructor Consent Required**
Mini Baja Car Project
Active participation in Mini Baja Car project. Pass/No Credit only. Must have permission of instructor.
Components: Project Team
Req. Designation: Technology

MT 310(0 - 3) **Course ID:009676** **2014-09-22** **Instructor Consent Required**
Multidisciplinary Course (CPS OM-DINI)
See MT 110 for course description.
Components: Project Team
Req. Designation: Technology

Engineering - School of Engineering - Subject: Multidisciplinary Project Team

MT 409(0) **Course ID:009172** **2014-10-29** **Instructor Consent Required**
Mini Baja Car Project
Active participation in Mini Baja Car project. Pass/No Credit only. Must have permission of instructor.
Components: Project Team
Req. Designation: Technology

School of Arts and Sciences - CRC Education Program - Subject: Educational Mathematics

MTH 524(3) **Course ID:012652** **2022-04-08**
Geometry for Math Teachers
This geometry course will focus primarily on content in the new high school Common Core geometry course. The main domains in this course are congruency, similarity, circle properties, measurement and modeling, and coordinate geometry. Emphasis will be on changes in the high school course especially in the areas of transformations, geometric constructions, trigonometric concepts, and modeling with geometry. Students will develop strong proof and reasoning skills throughout this course.

Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Educational Mathematics

MTH 560(3) **Course ID:012657** **2021-10-08**
Common Core Math Standards for Teachers
Common Core Mathematics is a 3-credit course that focuses on the changes in teaching mathematics in the present day classroom. Teachers in the Common Core classroom faces changes in curriculum, modeling, assessments and APPR. This class prepares teachers by analyzing pedagogical shifts, discussing the eight mathematical practices, and examining the new rigorous curriculum. Students will be able to demonstrate models in class and will show the progression from concrete, pictorial and finally abstract representations.
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

MTH 580(3) **Course ID:012661** **2021-10-08**
MAT Project in Mathematics (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

MTH 988(3) **Course ID:012668** **2017-07-01**
Independent Study in Mathematics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

MTH 989(3) **Course ID:012669** **2017-07-01**
Independent Study in Mathematics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 1(2 - 4) **Course ID:009204** **2015-01-19**
Operations Management Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

OM 2(2 - 4) **Course ID:009205** **2015-01-19**
Operations Management Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Business Foundation Curriculum Requirement.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

OM 331(3) **Course ID:009010** **2022-04-05**
Operations & Supply Chain Management
[Cross-listed with EM 331] (May be used to satisfy a CUSB MBA and MS foundation requirement.) An introduction to the planning, analysis and control of production systems. Topics include product and service design, manufacturing processes, aggregate production planning, inventory models and MRP, just-in-time systems, facility layout, forecasting/demand planning, project management, and quality management. Students acquire problem solving experience using ERP software.
Components: Lecture
Course Equivalents: EM 331
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: STAT 282 or STAT 383 or MA 330, and at least sophomore standing
Req. Designation: Technology

OM 341(3) **Course ID:009019** **2017-10-11**
Supply Chain Design & Management
[Cross-listed with EM 341]Fierce competition in today's global markets has forced business enterprises to focus on reducing costs while meeting rising customer expectations by designing and managing effective and sustainable supply chains. This course focuses on a systems approach to review state-of-the-art models and practical tools for inventory and materials management, design for supply chain, as well as supply chain integration. Topics covered include managing inventories in the supply chain, the bullwhip effect, risk pooling, delayed differentiation, measuring the financial performance of supply chains, the value of information and the role of information technology in the supply chain, coordination and collaboration with channel partners, supply chain related strategic alliances, and outsourcing/off-shoring/reshoring trends. Several team projects and hand-on experiences are utilized to demonstrate real world issues and applications.
Components: Lecture
Course Equivalents: EM 341
Attributes: Offered Spring Term
Requirement Group: Prerequisite: OM331 and at least junior standing.
Req. Designation: Technology

OM 371(3) **Course ID:012840** **2022-02-10**
Strategic Sourcing
This course provides an in-depth analysis of the procurement process and supplier management, with strong emphasis on managing a supplier base for both products and services. Topics covered include the strategic role of sourcing in supply chains, the identification and evaluation of requirements, the strategic make versus buy decision, supplier selection, development and evaluation processes, the supplier coordination and control mechanisms, the relationship between product design and the supplier base and the impact of information technology on strategic sourcing. Both theoretical and quantitative perspectives will be offered. In addition, the topics will be addressed from strategic, financial, sustainability and global perspectives. Students will also develop practical skills in using quantitative tools to select and evaluate suppliers.
Components: Lecture
Course Equivalents: EM 371
Attributes: Offered Fall Term
Requirement Group: Prerequisites: OM/EM331 and at least junior standing
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 380(3) **Course ID:009030** **2018-04-09**
Project Management
[Cross-listed with EM 380] This course will introduce students to all phases of project management from project initiation to termination. Topics covered include project selection, organization, contracts, planning and scheduling (PERT and CPM), estimating, budgeting and cost control, procurement, resource allocation, variance analysis, auditing and termination procedures. Project management software, case studies, and student team projects will be an integral part of the course.
Components: Lecture
Course Equivalents: EM 380
Attributes: Economics and Organizations, Offered Each Term
Requirement Group: Restrictions: Enrollment is limited to students in E&M, CUSB, Software Engineering, Project Management

Req. Designation: Technology

OM 451(3) **Course ID:009032** **2022-02-10**
Quality Management & Lean Enterprise
[Cross-listed with EM 451] This course will introduce the students to both the managerial and technical aspects of quality improvement. The course emphasizes statistical applications to quality related topics such as process/product design, process capability, quality control, design of experiment, and inspections/sampling. Other topics of interest include: Juran quality trilogy, six-sigma project methodology, and cost of quality. The course consists of a series of lecture and problems solved in class.
Components: Lecture
Course Equivalents: EM 451
Attributes: Offered Fall and Spring
Requirement Group: Prerequisites: MA/STAT282 or MA/STAT383 or MA330 or permission of instructor.
Req. Designation: Technology

OM 476(3) **Course ID:009029** **2015-07-06**
Management of Technology
[Cross-listed with EM 476] Management of technology links together the engineering, science, and management disciplines to plan, develop, and implement technological capabilities to be competitive in the global arena. Students taking the course will gain an understanding of the following topics: innovation, product life cycles, product development process, concurrent engineering, management of technology strategy, selecting technical projects, management of the R&D process, initiating new ventures, international technology transfer, and the management of complex projects. Lectures, readings, and case studies focus on firms operating in an international context.
Components: Lecture
Course Equivalents: EM 476
Attributes: Science, Technology and Society, Offered Each Term
Requirement Group: Prerequisite: OM331.
Req. Designation: Technology

OM 484(3) **Course ID:012745** **2022-02-10**
Advanced Project Management
[Cross listed with EM484] This course builds on the foundation of EM/OM380 (Project Management) by introducing advanced topics in decision making, risk, and cost control as well as providing comprehensive knowledge of project scheduling and other PM tools. This course also provides an opportunity for students to further extend their PM skills in managing and controlling projects by applying the PM methods in a project management simulation using typical project management software. Students are exposed to advanced research topics in the emerging PM areas.
Components: Lecture
Course Equivalents: EM 484
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: EM/OM380
Req. Designation: Technology

OM 487(1 - 3) **Course ID:009033** **2017-01-13** **Instructor Consent Required**
Special Project in Operations Management
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisites: Permission of the instructor
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 602(2) **Course ID:009044** **2015-07-06**
Decision Analysis and Supply Chain Modeling (MBA Module)
In today's fast-paced competitive environment, successful managers need the ability to define business problems, construct quantitative models and effectively utilize decision making tools. This course will introduce students to decision analysis techniques by focusing on the development and analysis of models for a variety of business management problems. Topics include supply chain network design, project management, decision making under uncertainty and risk, business process management, and simulation modeling of supply chain systems. Microsoft Excel will be used as a modeling and analysis environment to investigate a variety of analytic techniques.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Business - CRC Business - Subject: Operations Management

OM 603(3) **Course ID:009045** **2020-01-05**
Decision Analysis & Supply Chain Modeling
This course introduces students to different approaches, support tools, and analytical methods for decision making in various business management situations. The objective is to develop the students' ability to define business problems, construct quantitative models and effectively utilize decision making application software. Topics such as linear programming, network modeling, project management, decision making under uncertainty and risk, queueing theory, business process simulation, and Monte Carlo simulation will be explored. Special attention will be given to supply chain modeling and applications. Microsoft Excel will be used as a spreadsheet modeling and analysis environment to investigate a variety of analytic techniques.
Components: Lecture
Same As Offering: OM 603
Attributes: Offered Spring Term
Requirement Group: Prerequisites: OM607
Req. Designation: Technology

OM 603(3) **Course ID:009045** **2020-01-05**
Decision Analysis & Supply Chain Modeling
This course introduces students to different approaches, support tools, and analytical methods for decision making in various business management situations. The objective is to develop the students' ability to define business problems, construct quantitative models and effectively utilize decision making application software. Topics such as linear programming, network modeling, project management, decision making under uncertainty and risk, queueing theory, business process simulation, and Monte Carlo simulation will be explored. Special attention will be given to supply chain modeling and applications. Microsoft Excel will be used as a spreadsheet modeling and analysis environment to investigate a variety of analytic techniques.
Components: Lecture
Same As Offering: OM 603
Attributes: Offered Spring Term
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 606(2) **Course ID:009047** **2015-08-06**
Supply Chain Management (MBA Module)
[Cross-listed with OM 607] Global supply chains are networks of facilities around the globe that procure raw materials, transform them into intermediate and final products, and subsequently deliver the products to customers worldwide through distribution systems. Rapid advances in information technology are accelerating productivity by providing a multitude of new, lower-cost options for integrating supply chains. In this course we review and discuss state-of-the-art concepts and practical tools to effectively design and management the supply chain. Topics covered include a strategic framework for supply chain management, supply chain design and operation, logistics strategies and design for logistics, inventory management and risk pooling, warehousing and material handling systems, supplier relations, and new and future trends in supply chain management.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Lecture
Course Equivalents: OM 607, OM 607
Req. Designation: Technology

OM 607(3) **Course ID:009048** **2017-11-13**
Global Supply Chain Management
[Cross-listed with OM 606] Intense global competition has forced business enterprises to redesign and integrate their supply chains to effectively meet rising customer expectations at a reasonable cost. This course will start with selected introductory topics before covering the state-of-the-art concepts and practical tools to effectively design and manage the supply chain. Topics covered include a strategic framework for supply chain management, supply chain design, managing inventories in the supply chain, global logistics and distribution strategies, design for logistics, global sourcing, managing supply chain risk/disruptions, and new and future trends in supply chain management. Some combination of team projects, case studies, simulation games, and consulting experiences will be utilized to demonstrate real world issues, challenges and applications.
Components: Lecture
Same As Offering: OM 607
Course Equivalents: OM 606
Req. Designation: Technology

Business - CRC Business - Subject: Operations Management

OM 607(3) **Course ID:009048** **2017-11-13**
Global Supply Chain Management
[Cross-listed with OM 606] Intense global competition has forced business enterprises to redesign and integrate their supply chains to effectively meet rising customer expectations at a reasonable cost. This course will start with selected introductory topics before covering the state-of-the-art concepts and practical tools to effectively design and manage the supply chain. Topics covered include a strategic framework for supply chain management, supply chain design, managing inventories in the supply chain, global logistics and distribution strategies, design for logistics, global sourcing, managing supply chain risk/disruptions, and new and future trends in supply chain management. Some combination of team projects, case studies, simulation games, and consulting experiences will be utilized to demonstrate real world issues, challenges and applications.

Components: Lecture
Same As Offering: OM 607
Course Equivalents: OM 606
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 620(3) **Course ID:013019** **2019-11-01**
Supply Chain and Operations Analytics
Data-driven decision making is essential to drive performance and growth in modern supply chain management. This course showcases real-life applications of data analytics (descriptive, predictive and prescriptive) in various fields of supply chain management. Students learn to define the right data set, ask the right questions to drive supply chain excellence and business value, and use the right models and tools to develop data-driven decisions. Topics include demand forecasting, retail analytics, transportation analytics fulfillment diagnostic in logistic systems, sales and operations analytics in production, and inventory and resource management.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: IA 530 or equivalent.
Req. Designation: Technology

OM 650(3) **Course ID:009061** **2016-08-27**
Operations Strategy and International Competitiveness
The emphasis of the course is the operations and logistics function in firms that source, produce, distribute and market in multiple nations. The management of logistics in such firms differs from its domestic counterpart along several key dimensions. First, there is the need to be able to identify and analyze factors that differ across nations that influence the effectiveness of this function. These include worker productivity, process adaptability, governmental concerns, transportation availability, culture, and so on. In addition, because of the distances involved, transportation and distribution are of greater significance. Finally, these geographically dispersed set of facilities and markets must be integrated and managed to enhance the strategy of the business unity.
Components: Lecture
Req. Designation: Technology

OM 671(3) **Course ID:010251** **2015-07-06**
Supply Chain Environmental Management
Manufacturing organizations have increased their interest in environmental management through activities such as green purchasing, reverse logistics, product stewardship and design-for-the environment. These activities, usually involving several organizations, are often part of what is known as supply chain environment management. This course aims to gain a greater understanding of supply chain environmental management by examining: (i) the advantages and business risks of adopting and implementing environmental practices and technologies in the supply chain, (ii) the role of suppliers and customers to facilitate the adoption/ implementation of environmental practices and technologies, and (iii) the implications of such supply chain activities on an organization's operations strategy. This course consists of a mix of lectures and class discussion and relies primarily on a set of readings and a series of cases that will be analyzed in class.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: OM606 (Supply Chain Management)
Req. Designation: Technology

OM 672(3) **Course ID:013103** **2018-10-08**
Supply Management Strategy and Analysis
Effective supply management strategies and management enhances efficiency, customer service, and innovations, ultimately contributing to the profitability and competitive advantages of the entire organization and its supply chain. This course equips you with analytical methods and theoretical strategies to develop and implement an effective supply management strategy for your company. Specific topics include global sourcing and supply chain management strategy alignment, pricing and cost strategy, supplier network evaluation and development, contract management, and sustainable sourcing. Highly interactive format features student-led discussions and staged debates. Includes assignments on case studies and sourcing analysis, as well as projects and a final exam.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

OM 676(3) **Course ID:009071** **2015-07-06**
Developing and Managing Technology
This course covers the creation, design, development, implementation, diffusion and transfer of product and process innovation. The course covers the full range of activities from laying a foundation of technical knowledge in research, through the creation of new products and processes, to the integration of marketing, manufacturing and engineering, to commercialization. Topics include innovation management, managing r&d, product and process development, concurrent engineering, project selection, initiating new ventures, and technology transfer. Lectures, cases, reading, and projects focus on managing technology in companies.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Corequisite: OS610 (or equivalent)
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 680(3) **Course ID:009073** **2016-02-04**
Strategic Project Management
[Cross-listed with ES 510, OM 681] A project is a one-time or infrequently occurring operation with a unique goal, a limited lifespan and limited resources. This course will focus on project management from a decision-making perspective and how projects can be used to implement organizational strategy. The course follows the project life cycle model from project initiation to implementation to termination. Topics covered include such things as project scope development, project selection, organizational strategy, leadership, team building, planning, conflict resolution, budgeting, resource allocation, information management, control, auditing, and termination procedures. Computer applications such as MS Project, case studies, project simulations and student project teams will be an integral part of the course. This course satisfies the educational prerequisite for the Project Management Institute's (PMI) Certified Associate in Project Management (CAPM) and Project Management Professional (PMP) certifications.

Components: Lecture
Course Equivalents: ES 510, OM 681
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: Operations Management

OM 681(3) **Course ID:012010** **2017-03-17**
Strategic Project Management
[Cross-listed with ES 510, OM 680] A project is a one-time or infrequently occurring operation with a unique goal, a limited lifespan and limited resources. This course will focus on project management from a decision-making perspective and how projects can be used to implement organizational strategy. The course follows the project life cycle model from project initiation to implementation to termination. Topics covered include such things as project scope development, project selection, organizational strategy, leadership, team building, planning, conflict resolution, budgeting, resource allocation, information management, control, auditing, and termination procedures. Computer applications such as MS Project, case studies, project simulations and student project teams will be an integral part of the course. This course satisfies the educational prerequisite for the Project Management Institute's (PMI) Certified Associate in Project Management (CAPM) and Project Management Professional (PMP) certifications.

Components: Lecture
Course Equivalents: ES 510, OM 680
Attributes: Offered Summer Term
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 685(3) **Course ID:009075** **2016-02-04**
Quality Management and Process Improvement
[Cross-listed with ES 572, OM 686] This course will introduce the students to both the managerial and technical aspects of quality improvement techniques. The discussion of statistical topics will be tied to the Six Sigma methodology for the improvement of quality, productivity, and competitive position. A systemic and strategic approach to quality management will be provided, with emphasis on process improvement tools and methodologies. The course is designed to expose students to the integral elements of a total quality management system within both manufacturing and service organizations. Several individual and team projects involving class presentations, discussion of supplemental articles and case studies are utilized to demonstrate real world issues and applications.

Prerequisites: SB284 or consent of the instructor.
Components: Lecture
Course Equivalents: OM 686
Req. Designation: Technology

Business - CRC Business - Subject: Operations Management

OM 686(3) **Course ID:012004** **2017-03-17**
Quality Management and Process Improvement
[Cross-listed with ES 572, OM 685] This course will introduce the students to both the managerial and technical aspects of quality improvement techniques. The discussion of statistical topics will be tied to the Six Sigma methodology for the improvement of quality, productivity, and competitive position. A systemic and strategic approach to quality management will be provided, with emphasis on process improvement tools and methodologies. The course is designed to expose students to the integral elements of a total quality management system within both manufacturing and service organizations. Several individual and team projects involving class presentations, discussion of supplemental articles and case studies are utilized to demonstrate real world issues and applications.

Components: Lecture
Course Equivalents: OM 685
Attributes: Offered Fall Term
Req. Designation: Technology

Business - School of Business - Subject: Operations Management

OM 687(1 - 6) **Course ID:009076** **2015-07-06**
Independent Project in Management
[Cross-listed with OM 688] An investigation of a problem undertaken by the student under the guidance of an individual faculty member. The course provides an opportunity for the student to explore an area of management research in depth on an independent study basis. To register students must receive approval of the faculty member.
Prerequisites: consent of the instructor.
Components: Independent Study
Req. Designation: Technology

Business - School of Business - Subject: Organizational Studies

OS 1(2 - 4) **Course ID:009207** **2015-01-19**
Organizational Studies Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

OS 2(2 - 4) **Course ID:009208** **2015-01-19**
Organizational Studies Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Business Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

OS 286(3) **Course ID:009016** **2015-07-06**
Organizational Behavior I
[Cross-listed with EM 286, PY 286] (May be used to satisfy a CUSB MBA or MS foundation requirement.) An introduction to the processes required to manage contemporary organizations with a focus on individual behaviors as they relate to the functions of planning, organizing, controlling, and leading. The most recent concepts of behavioral science in the practice of management are presented to assist the student in gaining understanding of the pervasiveness of the discipline in all types of organizations and processes. Topics include motivation, leadership, perceptions, personality theory, learning theory, personnel issues, stress management, organizational culture, and decision making.
Components: Lecture
Course Equivalents: PY 286, EM 286
Attributes: Individual and Group Behavior, Offered Each Term
Requirement Group: Prerequisites: sophomore standing or the permission of the instructor.
Req. Designation: Technology

OS 352(3) **Course ID:009013** **2015-07-06**
Strategic Human Resource Management
This course provides an introduction to the strategic management of human resources in organizations. Topics include human resource planning, recruitment and selection of employees, training and development, performance appraisal, employee motivation, compensation and benefits, and employee and labor/management relations. These topics should be understood in the context of business strategy, pressures external to organizations, and relevant theories of human and organizational behavior.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: OS 286 (or equivalent)
Req. Designation: Technology

OS 432(3) **Course ID:009021** **2015-07-06**
Organizational Policy and Strategy
[Cross-listed with EM 432] A capstone course designed to integrate the functional areas and tools of management studied in previous courses within a strategic planning framework giving due attention to ethical and social responsibility concerns and international business issues. Emphasis is placed on the business environment in a global economy, industry analysis, tactical planning, overall strategic planning, policy establishment and implementation. Case analysis, in the small group setting, is utilized, enabling students to share their expertise and explore their value structure. Students present results via written and oral reports.
Components: Lecture
Course Equivalents: EM 432
Attributes: Two communication units, Offered Each Term
Requirement Group: Prerequisites: FN361, OM331, OS286, MK320 and Senior standing.
Req. Designation: Technology

Business - School of Business - Subject: Organizational Studies

OS 452(3) **Course ID:011767** **2015-07-08**
Advanced Human Resource Management
This course provides advanced instruction in the strategic management of human resources in organizations. The focus is on the development and critical evaluation of sound HR policies and systems in key HR areas such as selection, training and development, performance management, and compensation. The course will also address the use of HR metrics, employee surveys, and the relationship between strategic HR practices and organizational performance. Knowledge and skills will be developed through qualitative and quantitative data analysis, evaluating best practices, and linking current HR research to practice.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: OS352.
Req. Designation: Technology

OS 466(3) **Course ID:009028** **2015-07-06**
Negotiations and Relationship Management
This course introduces students to the complex problems associated with the management of stakeholder relationships. The course emphasis in on the establishing, negotiating, building, sustaining, and repairing of both workplace and external relationships, including relationships with employees, management, customers, suppliers, manufacturers, shareholders, society, and other key stakeholders. This course introduces theories of negotiation, conflict, complaint handling, and norms and ethics of fairness. The course introduces labor relations, collective bargaining, and U.S. labor and employment laws, and considers corresponding implications for union and nonunion workplaces.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: OS286 and Junior Standing.
Req. Designation: Technology

OS 487(1 - 3) **Course ID:010260** **2017-01-13** **Instructor Consent Required**
Special Project in Organizational Studies
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisite: Permission of the instructor
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

Business - CRC Business - Subject: Organizational Studies

OS 602(1.5) **Course ID:011254** **2017-03-17**
Leadership Development I - Foundations of Leadership & Organizational Behavior
The purpose of this course is to help students understand the general principles and processes of organizational behavior and effective leadership so that they can lead in a wide variety of situations. Course concepts include personality, motivation, decision making, power, team dynamics, and leadership styles. This course proceeds from the premise that leadership skills supplement the technical and diagnostic skills learned in other Clarkson MBA courses. Students in this course will develop an understanding of the course topics through hands-on experience, using a business simulation and a number of team exercises.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

OS 603(3) **Course ID:011256** **2017-07-21**
Leadership and Organizational Behavior
[Cross-listed with OS 608] This course builds upon the lessons learned in OS602 and other MBA classes to allow students to further develop their leadership skills and understanding of behavior within an organizational setting. Specific topics to be covered include organizational culture and structure, influencing others through formal and informal means, negotiations, and analysis of organizational congruence. The course uses business cases, videos, articles from the academic and popular press, as well as in-class exercises.
Components: Lecture
Course Equivalents: OS 608
Attributes: Offered Fall and Spring
Req. Designation: Technology

Business - School of Business - Subject: Organizational Studies

OS 608(2) **Course ID:009049** **2016-07-21**
Organizational Behavior and Performance Management
[Cross-listed with OS 603] The purpose of this module is to prepare students for leadership responsibilities in the organization. The module may focus around one or more of several topics: managing your own performance and that of subordinates; managing organizational change; managing power, politics and conflicts; working in and managing groups effectively; managing technology to enhance productivity. Other topics will be covered as appropriate.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Lecture
Course Equivalents: OS 603
Attributes: Offered Fall Term
Req. Designation: Technology

OS 610(2) **Course ID:009051** **2015-07-06**
Strategic Planning
[Cross-listed with OS 611] This course provides an integrative approach to recognition, analysis and solution of strategic issues or challenges facing business executives in their quest to gain and sustain strategic advantage in the world marketplace. Through case analyses, as well as other instructional methods, students will develop the synthetic, critical thinking, and communication skills necessary for effectively managing in a global context. Students will also develop an ethical/moral understanding of the dynamics involved in the creation and distribution of value among organizational stakeholders.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: AC603, EC604, FN607, MK609, OM606, OS608, and SB609.
Req. Designation: Technology

Business - CRC Business - Subject: Organizational Studies

OS 651(3) **Course ID:012565** **2016-07-25**
High Performance Leadership
[Formerly MBA 652] This course emphasizes cognitive skills and experiential practicum learning applied to ongoing leadership and organizational problems. Students learn about leadership roles and competencies essential for building and supporting organizational capabilities and business strategies in global markets. The course also enables students to learn a method to diagnose their strengths and weaknesses in leadership capacities and measure their proficiency against bench-marked models of high performance leadership.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

OS 654(3) **Course ID:012567** **2017-07-14**
Labor Relations
[Formerly MBA 654] This comprehensive course ties together the history of modern labor movements in the United States with issues facing workers in the Twenty-First Century, including the impact of globalization and international outsourcing. Subtopics include negotiation, conflict resolution, and workforce diversity. In addition, a comparative study on international unions will be examined. Each week, current events and their implications for labor relations will be discussed.
Components: Lecture
Same As Offering: OS 654
Attributes: Offered Summer Term
Req. Designation: Technology

OS 654(3) **Course ID:012567** **2017-07-14**
Labor Relations
[Formerly MBA 654] This comprehensive course ties together the history of modern labor movements in the United States with issues facing workers in the Twenty-First Century, including the impact of globalization and international outsourcing. Subtopics include negotiation, conflict resolution, and workforce diversity. In addition, a comparative study on international unions will be examined. Each week, current events and their implications for labor relations will be discussed.
Components: Lecture
Same As Offering: OS 654
Attributes: Offered Summer Term
Req. Designation: Technology

Business - School of Business - Subject: Organizational Studies

OS 657(3) **Course ID:009066** **2016-02-04**
Leading Organizational Change
[Cross-listed with OS 656] This course examines the processes of organizational change in dynamic technological and global business environments to enhance organizational quality, productivity, and overall operation. The course focuses on leadership approaches that facilitate stakeholder acceptance of change and employee contribution to the management of change. Topics include: change models and theories, the various types of organizational change, planned organizational change, resistance to change, the role of change management consultants, and human resource management practices that facilitate change. The types of change considered range from minor change interventions to transformational change, including technological, cultural, and work design changes. The course utilizes case studies, skills development exercises, and group projects in the study of organizational change.
Components: Lecture
Requirement Group: Prerequisite: OS 608 (Organizational Behavior and Performance Management), or OS 603 (Leadership Devel

Req. Designation: Technology

OS 666(3) **Course ID:009069** **2015-07-06**
Negotiations and Relationship Management
[Cross-listed with OS 667] This course examines the complex problems associated with the management of stakeholder relationships under conditions of rapid economic change and intense global competition. The course emphasis is on the establishing, negotiating, building, sustaining, and repairing of both workplace and external relationships, including relationships with employees, management, customers, suppliers, manufacturers, shareholders, society, and other key stakeholders. This course provides an in-depth understanding of the theories of negotiation, conflict, complaint handling, and norms and ethics of fairness. The course also provides a foundation on labor relations, collective bargaining, and U.S. labor and employment laws, with an emphasis on the corresponding implications for union and nonunion workplaces. The course is intended to be applicable to a broad spectrum of work- or business-related relationship issues faces by managers and professionals.
Components: Lecture
Course Equivalents: OS 667, OS 667
Requirement Group: Prerequisites: OS608 (Organizational Behavior & Performance Management) or OS602 (Leadership Developme

Req. Designation: Technology

Business - CRC Business - Subject: Organizational Studies

OS 667(3) **Course ID:012006** **2018-12-12**
Negotiations and Relationship Management
[Cross-listed with OS 666] This course examines the complex problems associated with the management of stakeholder relationships under conditions of rapid economic change and intense global competition. The course emphasis is on the establishing, negotiating, building, sustaining, and repairing of both workplace and external relationships, including relationships with employees, management, customers, suppliers, manufacturers, shareholders, society, and other key stakeholders. This course provides an in-depth understanding of the theories of negotiation, conflict, complaint handling, and norms and ethics of fairness. The course also provides a foundation on labor relations, collective bargaining, and U.S. labor and employment laws, with an emphasis on the corresponding implications for union and nonunion workplaces. The course is intended to be applicable to a broad spectrum of work- or business-related relationship issues faces by managers and professionals.
Components: Lecture
Same As Offering: OS 667
Course Equivalents: OS 666
Attributes: Offered Summer Term
Requirement Group: Prerequisites: OS603 or OS602
Req. Designation: Technology

OS 667(3) **Course ID:012006** **2018-12-12**
Negotiations and Relationship Management
[Cross-listed with OS 666] This course examines the complex problems associated with the management of stakeholder relationships under conditions of rapid economic change and intense global competition. The course emphasis is on the establishing, negotiating, building, sustaining, and repairing of both workplace and external relationships, including relationships with employees, management, customers, suppliers, manufacturers, shareholders, society, and other key stakeholders. This course provides an in-depth understanding of the theories of negotiation, conflict, complaint handling, and norms and ethics of fairness. The course also provides a foundation on labor relations, collective bargaining, and U.S. labor and employment laws, with an emphasis on the corresponding implications for union and nonunion workplaces. The course is intended to be applicable to a broad spectrum of work- or business-related relationship issues faces by managers and professionals.
Components: Lecture
Same As Offering: OS 667
Course Equivalents: OS 666
Attributes: Offered Summer Term
Requirement Group: Prerequisites: OS603 or OS602
Req. Designation: Technology

OS 675(3) **Course ID:012579** **2016-07-01**
Human Resource Management Systems
[Formerly MBA 675] This course covers theories, empirical research and practical applications relevant to strategic human resource management from three major perspectives: legal, management and social science. The course will provide foundational knowledge in human resource and anti-discrimination law, job analysis, and strategic human resource planning processes. Four functional areas of human resource management will be addressed: recruitment/selection, training/development, motivation (e.g., performance management, compensation/benefits) and maintenance (e.g., communications, health and safety, labor relations, corrective action/discipline).
Components: Lecture
Req. Designation: Technology

OS 676(3) **Course ID:012580** **2016-07-25**
Current Issues in Human Resource Management
[Formerly MBA 676] This course addresses the strategic practice of human resource management from the perspective of an organizational leader striving to work strategically, ethically, and effectively with people. Current topics of importance in human resources (such as employee engagement, diversity/inclusion, work-life integration strategies, shifting employment relationships) will be addressed, discussing ways to manage human resources effectively in organizations' dynamic legal, social and economic environments. Course topics will be examined using a problem solving approach, through analyses of case studies and court cases, social science research, and federal/state/local legislation.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: Organizational Studies

OS 677(3) **Course ID:012581** **2016-07-25**
International Human Resources
[Formerly MBA 677] International Human Resource Management will focus on how effective human resource policy and practice contributes to a global company's competitiveness. This course will be considered within the context of strategic business objectives, culture, and resource management constraints given by the various national entities. Special focus will be placed on understanding the unifying human resource policies that support the strategic objectives of a global organization. This course will draw on practical examples from companies that have experienced challenges of international human resource management.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

OS 681(3) **Course ID:012582** **2020-08-11**
Strategic Management
[Formerly MBA 681] This capstone course provides an integrative approach to the recognition, analysis, and action that managers need as part of the effective strategic management process. Critical thinking, creative thinking, and analytical skills applicable to strategy formulation and implementation are developed across a variety of organizational contexts. Concepts including multiple strategic frameworks, competitor analysis, and competitive advantage are applied to real organizations. Enhanced written and oral communications skills are developed to persuasively and credibly present strategic conclusions and recommendations. Different types of data are analyzed and tools and models from core MBA coursework are integrated. A strategic assessment is conducted, including relevant recommendations that consider ethical practices and corporate social responsibilities.
Components: Lecture
Same As Offering: OS 681
Requirement Group: Prerequisites: AC 604, EC 605, FN 608, MK 610, OM 607, OS 603, and SB 610
Req. Designation: Technology

OS 681(3) **Course ID:012582** **2020-08-11**
Strategic Management
[Formerly MBA 681] This capstone course provides an integrative approach to the recognition, analysis, and action that managers need as part of the effective strategic management process. Critical thinking, creative thinking, and analytical skills applicable to strategy formulation and implementation are developed across a variety of organizational contexts. Concepts including multiple strategic frameworks, competitor analysis, and competitive advantage are applied to real organizations. Enhanced written and oral communications skills are developed to persuasively and credibly present strategic conclusions and recommendations. Different types of data are analyzed and tools and models from core MBA coursework are integrated. A strategic assessment is conducted, including relevant recommendations that consider ethical practices and corporate social responsibilities.
Components: Lecture
Same As Offering: OS 681
Req. Designation: Technology

Business - School of Business - Subject: Organizational Studies

OS 687(1 - 6) **Course ID:010109** **2015-08-19** **Instructor Consent Required**
Project in Organizational Studies
An investigation of an problem undertaken by the student under the guidance of an individual faculty member. The course provides an opportunity for the student to explore an area of organizational research in depth on an independent study basis. To register students must receive approval of the faculty member.
Prerequisites: consent of the instructor.
Components: Independent Study
Course Equivalents: OS 688
Req. Designation: Technology

Business - CRC Business - Subject: Organizational Studies

OS 688(1 - 6) **Course ID:012039** **2017-03-17** **Instructor Consent Required**
Project in Organizational Studies
An investigation of an problem undertaken by the student under the guidance of an individual faculty member. The course provides an opportunity for the student to explore an area of organizational research in depth on an independent study basis. To register students must receive approval of the faculty member.
Prerequisites: consent of the instructor.

Components: Independent Study
Course Equivalents: OS 687
Attributes: Given When Needed
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 501(4) **Course ID:012048** **2019-01-15**
Gross Anatomy
This course will provide students with a sound working knowledge of the structure of the human body with a strong emphasis on the musculoskeletal and nervous systems through the study of clinical anatomy. The relationship between structure and function will be addressed and the integration of these body systems during normal and abnormal function will be reviewed. Course structure will focus on regional anatomy and therefore will emphasize the relationship between various structures including muscles, nerves and arteries. The laboratory is designed to facilitate the study of human anatomy through the dissection of human cadavers and examination of skeletal materials and anatomical models. In addition, dissection provides students a unique opportunity to consider and discuss issues of professionalism, team-building, ethics, and death and dying.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 503(4) **Course ID:012049** **2019-04-24**
Neuroscience
This course will focus on the application of neuroscience theory and clinical principles of nervous system function to behavioral outcomes in sensation, movement, perception and cognition as typically seen by rehabilitation professionals. Anatomy and function of the human nervous systems will be taught with emphasis placed on their role in development, movement and motor learning, the sensory system, cognition, perception and behavior for the purpose of understanding rehabilitation principles and intervention. Components of normal function and dysfunction of the peripheral and central nervous systems will be reviewed from the perspective of the rehabilitation specialist. Nervous system components including the spinal cord, brainstem, cerebrum and the auditory, visual and vestibular systems will be reviewed. Primary roles and functions, knowledge of the physical structures involved and the neural pathways that link systems will be reviewed. Examination of human brain specimens and anatomical models will be used both in this course and
Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

OT 507(4) **Course ID:012051** **2018-12-11**
Basic Science: Cognition and Occupational Performance
In this basic science course, students are introduced to the tenets of cognitive and perceptual rehabilitation in occupational therapy. Students will explore how cognitive and perceptual deficits impact occupational performance and health related quality of life. Neurocognitive disorders will be reviewed, along with current assessments, evidence-based interventions, and practice models. Competency will be assessed with two simulation practical examinations.
Components: Lecture
Attributes: Offered Even Springs
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 511(2) **Course ID:012073** **2019-01-15**
Development and Occupational Performance Across the Lifespan
In this course, students will explore motor, cognitive and psychosocial development and age-related changes that occur from birth through older adulthood in typical individuals. Students will gain an appreciation for, and understanding of, individual and contextual factors that influence development and aging, including but not limited to biologic, social, environmental and health-related factors. They will examine the relationship between development and aging on performance skills, and apply this knowledge to gain a deeper understanding of activity demands. Students will be able to recognize the challenges that are presented when typical development does not occur or when age-related conditions negatively impact occupational performance.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 521(2) **Course ID:012056** **2019-04-24**
Basic Science: Mental Health and Occupational Performance
This basic science course provides students the opportunity to revisit the roots of occupational therapy, as students explore the role of the profession as it relates to mental health issues. Students will compare the traditional role of OT practice in this field with current trends and emerging practice as they explore the impact of mental health and psychosocial issues on occupational performance across a lifespan. Additionally, students will explore how mental health and psychosocial issues can impact all areas of practice, from pediatrics, to adult physical dysfunction, to non-traditional practice areas.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 531(3) **Course ID:012052** **2019-01-15**
Foundations in Occupation Based Practice
In this foundational course, students are introduced to the profession of occupational therapy through history, theory, and current practice and professional affiliations. Overview of the value of occupational therapy in society is presented as students examine professional terminology, historical constructs of occupation, and the use of activities as therapeutic and healing practices. Students will be introduced to professional behaviors, ethical codes of behavior, professional documentation and the global community of the profession.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 533(2) **Course ID:012053** **2019-04-24**
Basic Science: Applied Kinesiology for OT's
Kinesiology is the study of human motion. Students will demonstrate knowledge and understanding of the structure and function of the human body as it relates to human movement and occupation. This course is designed to establish a basis of general biomechanical principles as it relates to Occupational Therapy practice. The course consists of both lecture and laboratory sessions. Laboratory sessions will provide the student with practical applications of principles discussed in lectures. In addition, the laboratory sessions will allow the student to become proficient in the areas of surface anatomy and palpation, manual muscle testing, and goniometry. The student will study normal and pathological movements. Students will employ logical thinking, critical analysis, problem solving, and creativity throughout this course. The influence of the environment on occupational performance will be explored. Cases will invite the exploration of the learned concepts to subjective experiences of meaningful engagement in work and play.
Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

OT 537(2) **Course ID:012074** **2019-02-25**
Bridging Science to Pediatric Assessment
In this course, students will develop skills in obtaining, interpreting and reporting evaluative information and data through both standardized and non-standardized methods. They will gain the ability to utilize comprehensive evaluation results to identify meaningful and realistic intervention goals that are relevant to the practice setting, and reflect client/family needs and priorities. Students will gain an ability to accurately and professionally report the results of an evaluation both orally and in a formal evaluation report.

Prerequisites: Successful completion of all semester 3 courses.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

OT 539(3) **Course ID:012059** **2019-09-26**
Experiential Learning Lab 4: Professional Practice, Leadership, Management and Activism
What is OT the unique solution for? How can occupational engagement and participation be core components to an abundant world? This course begins with an exploration of theories related to management and leadership and ends investigating the concept of social entrepreneurs and change agents. Students will explore aspects of the OT profession as they learn what it takes to practice as an OT from a business and leadership perspective.
Prerequisites: Successful completion of all semester 4 courses.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 541(3) **Course ID:012054** **2019-01-15**
Foundations in Research
Students will refine their ability to locate, evaluate, and incorporate research evidence into the practice of occupational therapy. Students will build upon research analysis and information literacy skills from prior coursework as they develop clinical questions, conduct database searches to obtain evidence, critically analyze available evidence, and determine relevancy to clinical practice. Students will review quantitative and qualitative research methodologies and designs, analyze scholarly works and assess both role established and role emergent concerns in occupational therapy profession. Students will identify an over-arching research question derived from their own area of interest and begin to examine the current body of knowledge related to their variables of interest, identify appropriate methodologies for the question. Students will work with faculty to develop a proposal from which their scholarly activity and propose a plan for their scholarly study will evolve. This course will include the development of a Critically Appraised Paper (CAP).
Components: Lecture
Attributes: Offered Even Falls
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 549(3) **Course ID:012055** **2019-09-26**
Synthesizing Evidence and Practice to Become an Evidence-Based Practitioner
This experiential learning course is the final course in the occupational therapy research sequence. The course provides an in-depth examination of research and its relationship to multiple areas of practice and practice assumptions. Students will obtain an advanced understanding of theory-based research, selecting appropriate methodology and units of analysis in the design of research, ways of evaluating practice, and approaches to analyzing data. They will learn how to carry out and complete a scholarly activity. At the conclusion of this course, students will produce a scholarly report and participate in the dissemination of their work.
Prerequisites: Successful completion of all previous semester courses.
Components: Lecture
Attributes: Offered Even Springs
Req. Designation: Technology

OT 551(3) **Course ID:012065** **2019-01-15**
Foundations in Defining and Understating Occupational Performance
This course will incorporate a combination of lecture, video, guest lectures and collaborative group learning activities to reinforce the connection between the Occupational Therapy Practice Framework and real-life. Students will apply knowledge of human development, behavior, and newly acquired knowledge of occupational performance to observations of humans engaged in daily routines and activities. They will employ critical thinking skills to explore the relationships between client factors, context and environment, and occupation, and how this impacts health and disability. Through active learning assignments, students will apply concepts of occupation and activity to therapeutic intervention, and become familiar with various service delivery models. Throughout the course, core competencies of interpersonal skills, oral and written communication, critical thinking and scientific reasoning will be reinforced. Students can expect to gain an understanding of the role and process of occupational therapy in promoting health among individuals with and
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 553(2) **Course ID:012057** **2019-04-24**
Basic Science: Cognition and Occupational Performance
In this basic science course, students are introduced to the tenets of cognitive and perceptual rehabilitation in occupational therapy. Students will explore how cognitive and perceptual deficits impact occupational performance and health related quality of life. Neurocognitive disorders will be reviewed, along with current assessments, evidence-based interventions, and practice models. Competency will be assessed with two simulation practical examinations.
Prerequisites: Successful completion of all previous semester courses.
Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 557(2) **Course ID:012050** **2019-02-25**
Bridging Science to Upper Extremity Rehabilitation
In this hands-on, highly interactive course, students will link learned science concepts from anatomy, neuroanatomy, kinesiology, and occupational science to the art and science of upper extremity rehabilitation. Upper extremity assessment and intervention, and the link to meaningful occupational engagement, will be explored through cases. The importance of the hand in everyday functioning will be explored through an anthropology, biological, and occupational science perspective. Experiential learning component of the course will require students to create orthotic devices aimed toward the client's social and cultural adaptation to disabilities and to maximize health and participation.

Prerequisites: Successful completion of all semester 3 courses.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

School of Arts and Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 563(2) **Course ID:012811** **2018-09-12**
Bridging Science to Adult Conditions and Assessment
This course links concepts learned in gross anatomy (OT 500) to the first experiential learning lab (OT 583). Clinical correlations covered in lectures as well as laboratory will present the fundamentals of human anatomy in a clinical context. Material covered will provide students with a rich foundation in which they will develop clinical reasoning that guides occupational therapy practice, professional inquiry and evidence based decision-making.
Components: Lecture
Requirement Group: Corequisite: OT583
Req. Designation: Technology

OT 567(2) **Course ID:012812** **2019-03-06**
Bridging Science to Adult Neuro Conditions and Assessment
This course links concepts learned in Neuroscience (OT 503) to the second experiential learning (OT 587). Clinical correlations covered in lectures as well as laboratory will present the fundamentals of understanding and identifying neuroscience related health conditions in a clinical context. Material covered will provide students with a rich foundation in which they will develop clinical reasoning that guides occupational therapy practice, professional inquiry and evidence based decision-making.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 579(2) **Course ID:012995** **2019-11-19**
Experiential Learning Lab III: Group Dynamics Across Practice Settings
This course utilizes self-directed, life-long learning concepts as students explore therapeutic use of self and group dynamics. Using case studies and experiential learning, students will explore and apply these concept domains while examining daily living tasks, activities, and engagement in performance of occupations. Using the group process, students identify a variety of intervention techniques affording the client opportunities to engage in meaningful occupations. The overarching purpose of this course is to enable students to understand the group process experience as a viable intervention option. Students will develop entry level skills of the student occupational therapist sufficient for intervention planning, note writing, patient/consumer safety, and student safety in varied practice settings.
Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

OT 583(3) **Course ID:012879** **2019-04-24**
Experiential Learning Lab I: Adult Assessment and Intervention Lab
This course serves as the experiential lab for common conditions and ailments seen by OTs in the adult population. Students integrate knowledge of gross anatomy, the impact of disease and disability throughout the lifespan and related pathological conditions to explore the impact of life style choice, health and disability on occupational performance and participation. Students begin to become competent in administering, interpreting and documenting the evaluation process and the related impact on client factors, performance skills and patterns, occupational performance, and the interconnectedness of cultural, contextual and environmental factors. The use of evaluation data to design and implement interventions with those who are at risk for, or who have acquired, disabilities due to disease or trauma will be explored in this course. Case studies are woven throughout this course to provide a platform for students to develop critical thinking skills, design and implement theoretically sound, evidence based interventions through goal setting,
Components: Laboratory
Req. Designation: Technology

School of Arts and Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 587(3) **Course ID:012940** **2019-04-17**
ELL II: Applied Neuroscience and Human Occupation: Conditions and Function
This course serves as the experiential lab for OT 503 Case Base Reasoning II: Gross Anatomy, Neuro-Rehabilitation and Human Occupation. Students integrate knowledge focused on the neurological concepts and related pathological conditions to explore the impact on occupational performance and participation with the adult population. Students will become competent in identifying, administering, interpreting and documenting the evaluation process and the related impact on client factors, performance skills and patterns, occupational performance, the impact of contextual and environmental factors. Students will develop critical thinking skills to provide sound rationale for, design and implement evidence based interventions through goal setting, treatment planning and the use of a variety of intervention techniques incorporating innovation and technology to allow the client to engage in meaningful occupations. Students must achieve competence in assessment, intervention and documentation of the OT process for all conditions covered in this course.

Components: Laboratory
Attributes: Offered Odd Springs
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 589(3) **Course ID:012058** **2019-09-26**
Experiential Learning Lab IV: Pediatric Intervention Lab
This is the final of four experiential learning labs. The focus of the course is to allow students the opportunity to critically evaluate ecological perspectives for occupational therapy intervention as we move through crises and transitions across our lifespans. Students will use evaluation data and experiential learning to explore the interrelatedness of the individual, the environment and the engagement in occupation and examine the ways multiple contextual influences impact intervention and health outcomes. Students will critically assess the concept of 'thinking locally and globally' as they analyze theoretical approaches from a literature and a variety of intervention techniques.
Prerequisites: Successful completion of all previous semester courses.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

OT 591(2) **Course ID:012061** **2019-01-15**
Professional Seminar A: Professionalism in Occupational Therapy
In this highly interactive, advanced seminar, students will explore their own strengths and challenges, and explore how to utilize that information to optimize the learning experience, work in a cohort, and work as an occupational therapist . Professional behaviors, group cohesion and interprofessional communication will be examined as a means of developing oneself as a professional and agent of change. Entry-level concepts such as ethical practice and medical documentation will also be explored. This class is the first of four professional seminar classes.
Components: Seminar
Attributes: Offered Odd Falls
Requirement Group: Prerequisite: Students must be admitted into the OT-MS program
Req. Designation: Technology

OT 595(2) **Course ID:012062** **2019-04-03**
Professional Seminar B: Inter-professional Practice and Emerging Practice
Students will explore inter-professional practice, emerging practice, and understand the crucial, unique, and vital role occupational therapists play in a variety of teams. Through the exploration of different practice areas, students will understand how occupational performance plays a key role in health and wellness, despite practice setting. Health literacy and advocacy are addressed, as students start exploring clinical questions, critically analyze available evidence, and begin learning how to convey this knowledge to clients, colleagues, and other stakeholders. This class is the second of four professional seminar classes.

Prerequisites: Successful completion of all semester 2 courses.
Components: Seminar
Attributes: Offered Odd Springs
Req. Designation: Technology

OT 597(2) **Course ID:012063** **2019-02-25**
Professional Seminar C: Clinical Scholarship
This seminar provides students the opportunity to examine and discuss specialty topics related to practice. Topics are taught in modules, allowing students to explore each topic in depth. During each module, students will explore research as it applies to occupation based practice, understand ways to collect evidence in the clinic and incorporate that evidence into occupational therapy best practice, learn ways to disseminate this information to peers, colleagues, and clients, and advocate for change. Examples of concepts covered in this class may include, death and dying, cancer, social determinants of health, and driving. The course will remain fluid to allow for educational changes as the profession changes. This class is the third of four professional seminar classes.

Prerequisites: Successful completion of all semester 3 courses.
Components: Seminar
Attributes: Offered Even Falls
Req. Designation: Technology

OT 599(2) **Course ID:012064** **2019-09-26**
Professional Seminar D: Innovation and Advanced Cases
This seminar provides students with the opportunity to synthesize and integrate core concepts throughout the entire academic program through the utilization of advanced cases. Concepts related to OT practice, client assessment and treatment, pharmacology, research and evidence-based practice, and management/leadership will be intricately linked together as students examine advanced cases and begin preparation for the NBCOT exam and Level II fieldwork. This is the final professional seminar class.
Prerequisites: Successful completion of all semester 4 courses
Components: Seminar
Attributes: Offered Even Springs
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 603(3) **Course ID:012066** **2019-04-24**
Engineering Health through Creativity, Craft and Analysis of Occupation
Students will explore both historic and present-day relevance of Mary Reilly's quote: '"Man, through the use of his hands as they are energized by mind and will, can influence the state of his own health." Students will examine the relationship between creativity, activity, and occupation through personal involvement in creative endeavors and analysis. This course explores how creative expression plays a vital role in health and personal transformations. Students will learn to gather occupational history, analyze tasks and skills, identify necessary performance skills, and explore current and innovative adaptations and modifications to foster participation.
Prerequisites: Successful completion of all previous semester courses.
Components: Lecture
Attributes: Offered Odd Springs
Req. Designation: Technology

OT 605(2) **Course ID:012067** **2019-02-25**
Engineering Pathways to Participation through Technology
In this course, students will explore the role that modifications and adaptations have in maximizing independence, functional capabilities, and occupational performance and engagement for individuals with a variety of health conditions. They will gain an understanding of concepts of Universal Design as a proactive means of supporting participation among all individuals. They will also acquire an understanding of the no-tech, low-tech, mid-tech and high-tech interventions that can be implemented to address specific functional areas. Students will gain an understanding of the process of selecting appropriate strategies, adaptive equipment or assistive technologies, while ensuring a good fit between client needs and intervention/tool characteristics.

Prerequisites: Successful completion of all semester 2 courses.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

OT 630(2) **Course ID:012075** **2021-05-11**
Engineering Pathways to Clinical Practice: Technology for Health-Related Quality of Life I
Students who elect to participate in the Technology for HRQoL track will have the opportunity to capitalize o n the entrepreneurial spirit that is inherent in a Clarkson education and leverage Clarkson'
s expertise through cross disciplinary collaborations. Faculty will assist students to identify a need, form ulate a plan to action, and develop a well thought out solution.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

OT 631(2) **Course ID:012076** **2021-05-11**
Engineering Pathway to Clinical Practice: Occupational Therapist as a Researcher I
In this first course of the Research Track, students will take what they learned in Foundations in Research a step further, focusing on becoming practitioners of research methods. Students will begin by completing crit ically appraised papers for quantitative and qualitative research, conducting a brief needs assessment, and e ngaging with topics in research ethics. At the same time, students will decide on their capstone research top ics and begin to develop the research. For some, this may involve working on an Institutional Review Board pr oposal; for others, it may involve specialized training to conduct specific assessments or design a program. During the final three didactic semesters, all students in the Research Track will receive advanced training in qualitative interviewing, ethnomethodology, and grounded theory. Classic texts on advanced research method s will be assigned as appropriate. All students will complete a research paper and poster for presentation at the end of the spring semester.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

OT 632(2) **Course ID:012077** **2021-05-11**
Engineering Pathway to Clinical Practice: Innovative Practitioner I
Students who elect to participate in the Innovation track will have the opportunity to capitalize on the entr epreneurial spirt that is inherent in a Clarkson education and leverage Clarkson'
s expertise through cross-disciplinary collaborations. Faculty will assist students to identify a need, form ulate a plan to action, and develop a well thought-out solution.
Components: Lecture
Attributes: Offered Even Falls
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 640(2) **Course ID:012078** **2020-06-04**
Engineering Pathway to Clinical Practice: Technology for Health-Related Quality of Life II
In the second track courses, students will develop their own learning project or research under the tutelage of the course instructor and/or a mentor advisor. Students remain in their chosen track course, and by doing so, have an opportunity to immerse themselves in their specialty area of interest, expand their knowledge and skills, and apply their knowledge and skills to produce a scholarly project that contributes to the profession. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.

Prerequisites: Successful completion of all semester 3 courses.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

OT 641(2) **Course ID:012079** **2020-06-04**
Engineering Pathway to Clinical Practice: Occupational Therapist as a Researcher II
In the second track courses, students will develop their own learning project or research under the tutelage of the course instructor and/or a mentor advisor. Students remain in their chosen track course, and by doing so, have an opportunity to immerse themselves in their specialty area of interest, expand their knowledge and skills, and apply their knowledge and skills to produce a scholarly project that contributes to the profession. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.

Prerequisites: Successful completion of all semester 3 courses.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

OT 642(2) **Course ID:012080** **2020-06-04**
Engineering Pathway to Clinical Practice: Innovative Practitioner II
In the second track courses, students will develop their own learning project or research under the tutelage of the course instructor and/or a mentor advisor. Students remain in their chosen track course, and by doing so, have an opportunity to immerse themselves in their specialty area of interest, expand their knowledge and skills, and apply their knowledge and skills to produce a scholarly project that contributes to the profession. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.

Prerequisites: Successful completion of all semester 3 courses.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Institute for STEM Education - Occupational Therapy - Subject: Occupational Therapy

OT 650(2) **Course ID:012964** **2019-09-26**
Engineering Pathways to Clinical Practice: Technology for Health-Related Quality of Life III
In the third and final track courses, students will finalize their own learning project or research. Students continue to immerse themselves in their specialty area of interest as they remain in their chosen track course. The final scholarship project results in disseminating the outcomes of the project to the greater community. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.
Prerequisites: Successful completion of all semester 4 courses.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

OT 651(2) **Course ID:012962** **2019-09-26**
Engineering Pathways to Clinical Practice: Occupational Therapist as a Researcher III
In the third and final track courses, students will finalize their own learning project or research. Students continue to immerse themselves in their specialty area of interest as they remain in their chosen track course. The final scholarship project results in disseminating the outcomes of the project to the greater community. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.
Prerequisites: Successful completion of all semester 4 courses.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

OT 652(2) **Course ID:012963** **2021-06-03**
Engineering Pathways to Clinical Practice: Innovative Practitioner III
In the third and final track courses, students will finalize their own learning project or research. Students continue to immerse themselves in their specialty area of interest as they remain in their chosen track course. The final scholarship project results in disseminating the outcomes of the project to the greater community. Throughout this process students will be encouraged to engage in activities to promote personal and professional growth while developing the critical skills of a life-long learner.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 700A(2) **Course ID:012081** **2019-04-24**
Fieldwork Level I
OT 700 provides the student with an introduction to the fieldwork experience and the opportunity to develop a basic comfort level with and understanding of client needs. Students will develop professional and ethical behaviors while exploring current and emerging roles of occupational therapy with a variety of populations across the lifespan, in a variety of settings. While assisting in service delivery and intervention, students engage in an exploration of efficacy, therapeutic use of self, empathy and mindfulness and the development of self-awareness to support the art, craft and skill of effective therapeutic relationships. Students will reflect on the role of innovation and technology in meeting the needs of clients in a rural context. Students will begin to develop a deeper understanding of how psycho-social factors influence engagement in occupation. Students also participate in an accompanying seminar that offers the opportunity for peer interaction, mentoring and feedback as professional competence begins to emerge.

Components: Field Studies
Attributes: Offered Fall and Spring
Req. Designation: Technology

School of Arts and Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 700B(2) **Course ID:012799** **2019-04-23**
Fieldwork Level I
OT 700 provides the student with an introduction to the fieldwork experience and the opportunity to develop a basic comfort level with and understanding of client needs. Students will develop professional and ethical behaviors while exploring current and emerging roles of occupational therapy with a variety of populations across the lifespan, in a variety of settings. While assisting in service delivery and intervention, students engage in an exploration of efficacy, therapeutic use of self, empathy and mindfulness and the development of self-awareness to support the art, craft and skill of effective therapeutic relationships. Students will reflect on the role of innovation and technology in meeting the needs of clients in a rural context. Students will begin to develop a deeper understanding of how psycho-social factors influence engagement in occupation. Students also participate in an accompanying seminar that offers the opportunity for peer interaction, mentoring and feedback as professional competence begins to emerge.

Components: Field Studies
Attributes: Offered Fall and Spring
Req. Designation: Technology

Health Sciences - Occupational Therapy - Subject: Occupational Therapy

OT 705(9) **Course ID:012082** **2017-12-06**
Fieldwork Level II A
This is the first 12-week placement which will allow the student to begin their transition from an OT academic role to that of entry-level therapist. Potential placements will encompass the lifespan, a variety of client populations and service delivery models, and will allow the student to apply skills in their area of specialty interest. Fieldwork is highly individualized and may span from local to global, traditional to emerging and innovative roles. Students will have opportunities to utilize critical thinking and clinical reasoning to apply curricular theories and concepts to practice in the evaluation process, intervention planning, and the use of occupation as intervention and outcome.
Components: Field Studies
Attributes: Offered Summer Term
Requirement Group: Prerequisites: OT 507, OT 517, OT 527, OT 547, and (OT 640 or OT 641 or OT 642)
Req. Designation: Technology

OT 710(9) **Course ID:012083** **2020-11-03**
Fieldwork Level II B
This second 12-week placement will allow the student to complete their transition from an OT academic role to that of entry-level therapist. Potential placements will encompass the lifespan, a variety of client populations and service delivery models, and will allow the student to apply skills in their area of specialty interest. Fieldwork is highly individualized and may span from local to global, traditional to emerging and innovative roles. Students will have opportunities to utilize critical thinking and clinical reasoning to apply curricular theories and concepts to practice in the evaluation process, intervention planning, and the use of occupation as intervention and outcome.
Prerequisites: Successful completion of all previous semester courses.
Components: Field Studies
Attributes: Given When Needed, Offered Odd Falls
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 501(6) **Course ID:011500** **2016-04-08**
Clinical Medicine I
This is the first in a series of courses designed to provide an intensive study of human diseases and disorders, using a lifespan approach from pediatrics to geriatrics, in the areas of clinical medicine including epidemiology, etiology, historical data, clinical manifestations, progression, therapeutic management, prevention, laboratory medicine, imaging, and prognosis. Emphasis will be on disease processes common to primary care practices and the emergency department following the NCCPA Blueprint, and the development of differential diagnoses and plans based upon the patient's clinical presentation. This course will be facilitated through lecture and problem-based learning.
Prerequisite: Admission to the PA program
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 502(6) **Course ID:011501** **2016-04-08**
Clinical Medicine II
This is the second in a series of courses designed to provide an intensive study of human diseases and disorders, using a lifespan approach from pediatrics to geriatrics, in the areas of clinical medicine including epidemiology, etiology, historical data, clinical manifestations, progression, therapeutic management, prevention, laboratory medicine, imaging and prognosis. Emphasis will be on disease processes common to primary care practices and the emergency department following the NCCPA Blueprint, and the development of differential diagnoses and plans based upon the patient's clinical presentation. This course will be facilitated through lecture and problem-based learning.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

PA 503(6) **Course ID:011504** **2016-04-08**
Clinical Medicine III
This is the third in a series of courses designed to provide an intensive study of human diseases and disorders, using a lifespan approach from pediatrics to geriatrics, in the areas of clinical medicine including epidemiology, etiology, historical data, clinical manifestations, progression, therapeutic management, prevention, laboratory medicine, imaging, and prognosis. Emphasis will be on disease processes common to primary care practices and the emergency department following the NCCPA Blueprint, and the development of differential diagnoses and plans based upon the patient's clinical presentation. This course will be facilitated through lecture and problem-based learning.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PA 504(2) **Course ID:011505** **2016-04-08**
Basic Science I
This is the first in a series of courses designed to develop an understanding of normal physiology, genetics, pathologic, and pathophysiologic concepts of diseases per organ system, and clinical anatomy with an emphasis on important anatomical landmarks required in physical evaluation of patients, anatomical relationships of structures to each other, and anatomical components of body systems.
Prerequisite: Admission to the PA program
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 505(2) **Course ID:011506** **2016-04-08**
Basic Science II
This is the first in a series of courses designed to develop an understanding of normal physiology, genetics, pathologic, and pathophysiologic concepts of diseases per organ system, and clinical anatomy with an emphasis on important anatomical landmarks required in physical evaluation of patients, anatomical relationships of structures to each other, and anatomical components of body systems.
Prerequisite: Successful completion of previous semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 506(2) **Course ID:011515** **2016-04-08**
Basic Science III
This is the third in a series of courses designed to develop an understanding of normal physiology, genetics, pathologic, and pathophysiologic concepts of diseases per organ system, and clinical anatomy with an emphasis on important anatomical landmarks required in physical evaluation of patients, anatomical relationships of structures to each other, and anatomical components of body systems.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PA 507(3) **Course ID:011516** **2016-04-08**
Pharmacotherapeutics I
This is the first in a series of courses designed to develop skills related to the principles of pharmacology as they pertain to therapeutic agents, prescription, and non-prescription medications. Discussion will include the principal mechanisms of action of the major classes of therapeutic agents, understanding of pharmacodynamics, uses, side effects, and toxicities.
Prerequisite: Admission to the PA program
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 508(3) **Course ID:011517** **2016-04-08**
Pharmacotherapeutics II
This is the second in a series of courses designed to develop skills related to the principles of pharmacology as they pertain to therapeutic agents, prescription, and non-prescription medications. Discussion will include the principal mechanisms of action of the major classes of therapeutic agents, understanding of pharmacodynamics, uses, side effects, and toxicities.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

PA 509(3) **Course ID:011521** **2016-04-08**
Pharmacotherapeutics III
This is the third in a series of courses designed to develop skills related to the principles of pharmacology as they pertain to therapeutic agents, prescription, and non-prescription medications. Discussion will include the principal mechanisms of action of the major classes of therapeutic agents, understanding of pharmacodynamics, uses, side effects, and toxicities.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PA 510(3) **Course ID:011522** **2016-04-08**
Patient Assessment I
This is the first in a series of courses designed to develop the knowledge and skills required to obtain and record the complete medical history, use of appropriate equipment, proper techniques, and accurate medical terminology to document findings. This course will provide an overview of the medical record as well as development of writing and organizational skills for medical record keeping and oral presentation skills. Skills will be developed through lecture and structured laboratory exercises.
Prerequisite: Admission to the PA program
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 511(3) **Course ID:011523** **2016-04-08**
Patient Assessment II
This is the second in a series of courses designed to develop the knowledge and skills required to obtain and record the complete medical history, use of appropriate equipment, proper techniques, and accurate medical terminology to document findings. This course will provide an overview of the medical record as well as development of writing and organizational skills for medical record keeping and oral presentation skills. Skills will be developed through lecture and structured laboratory exercises.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 512(3) **Course ID:011524** **2016-04-08**
Patient Assessment III
This is the third in a series of courses designed to develop the knowledge and skills required to obtain and record the complete medical history, use of appropriate equipment, proper techniques, and accurate medical terminology to document findings. This course will provide an overview of the medical record as well as development of writing and organizational skills for medical record keeping and oral presentation skills. Skills will be developed through lecture and structured laboratory exercises.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PA 513(1) **Course ID:011525** **2016-04-08**
The Patient and the PA I
This is the first in a series of courses designed to develop skills in the area of patient communication, patient counseling, patient education, and cultural diversity and how they influence all aspects of medical practice. Instruction is focused on the detection and application of preventive measures and treatment of health risk behaviors including stress, abuse and violence, substance abuse, sexuality, end of life issues, and reaction to illness. The course will also include discussions on medical ethics.
Prerequisite: Admission to the PA program
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 514(1) **Course ID:011526** **2016-04-08**
The Patient and the PA II
This is the second in a series of courses designed to develop skills in the area of patient communication, patient counseling, patient education, and cultural diversity and how they influence all aspects of medical practice. Instruction is focused on the detection and application of preventive measures and treatment of health risk behaviors including stress, abuse and violence, substance abuse, sexuality, end of life issues, and reaction to illness. The course will also include discussions on medical ethics.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

PA 515(1) **Course ID:011527** **2016-04-08**
The Patient and the PA III
This is the third in a series of courses designed to develop skills in the area of patient communication, patient counseling, patient education, and cultural diversity and how they influence all aspects of medical practice. Instruction is focused on the detection and application of preventive measures and treatment of health risk behaviors including stress, abuse and violence, substance abuse, sexuality, end of life issues, and reaction to illness. The course will also include discussions on medical ethics.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PA 516(1) **Course ID:011528** **2016-04-08**
Medical Informatics
This course will cover the importance of evidence-based medicine and review basic statistics, research methods, and ethical standards in research. It will also cover the interpretation of medical literature and application of various types of clinical articles in answering clinical questions. It will also include the basics of medical writing to provide added guidance for upcoming projects.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 517(2) **Course ID:011529** **2016-04-08**
Clinical Procedures
This course will prepare the student for the upcoming clinical year. The focus will be on procedures, such as bedside and surgical procedures including aseptic technique, air and blood-borne pathogen transmission prevention, phlebotomy, IV placement, foley catheter insertion, lumbar puncture, injections, surgical techniques, and casting.
Prerequisite: Successful completion of prior semester of PA course work or program permission
Components: Clinical
Attributes: Offered Fall Term
Req. Designation: Technology

PA 518(1) **Course ID:012888** **2018-10-08**
Laboratory and Diagnostics I
Introduction to basic laboratory and diagnostic testing/studies as it applies to physician assistant studies.
Components: Laboratory
Attributes: Offered Spring Term
Requirement Group: PA 518 Prerequisites as required for entry into the didactic phase of Clarkson PA education
Req. Designation: Technology

PA 600(3) **Course ID:011530** **2021-09-14**
Supervised Practice - Ambulatory Medicine
This 5 week clinical course will be within a Family Medicine clinic setting. This course provides the PA student with experience in the outpatient evaluation and treatment of pediatric and adult patients, including preventive medicine, acute and chronic illness, and patient education.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 601(3) **Course ID:011531** **2021-09-14**
Supervised Practice - Internal Medicine
This 5 week clinical course will be within an Internal Medicine practice. It will include a substantial inpatient experience for the PA student to gain knowledge of the evaluation and treatment of the multiple diseases and conditions of the adult population requiring hospitalization.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 602(3) **Course ID:011532** **2021-09-14**
Supervised Practice - General Surgery
This 5 week clinical course will be within a surgical practice. PA students will participate in Operating Room (OR) cases and hospital consultations as well as clinic based cases and visits in caring for conditions that require surgical management. This will include preoperative, intra-operative, and post-operative care.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 603(3) **Course ID:011533** **2021-09-14**
Supervised Practice - Emergency Medicine
This 5 week clinical course will be within a hospital Emergency Department. PA students will gain knowledge and learn skills relevant to the triage, stabilization, diagnosis, and management of acute, lifethreatening injuries and illnesses as well as the care of less threatening conditions.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 604(3) **Course ID:011534** **2021-09-14**
Supervised Practice - Pediatrics
This 5 week clinical course will provide the PA student with experience in outpatient and/or in-patient management of pediatric patients. The student will have the opportunity to perform well child exams, problem oriented exams, evaluate common pediatric illnesses, and the care of the newborn and children.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 605(3) **Course ID:011535** **2021-09-14**
Supervised Practice - Women's Health
This 5 week clinical course provides the PA student with experience in managing common gynecologic disorders. The obstetric experience will include routine prenatal and postpartum care. It will include labor & delivery when possible.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 606(3) **Course ID:011536** **2021-09-14**
Supervised Practice - Behavioral Health
This 5 week clinical course will provide the PA student with a behavioral medicine experience in caring for ambulatory and/or hospitalized patients with psychiatric disorders. The student will perform basic psychiatric evaluations, monitor medications, and support the clinical management plan for patients after psychiatric evaluation and treatment.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 607(3) **Course ID:011537** **2021-09-14**
Supervised Practice - Elective I
This 5 week clinical course will provide the PA student the opportunity to practice in any available medical setting of the student’s choice. This may be used to augment a previous clinical experience or explore an area of interest or potential future employment.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 608(3) **Course ID:011538** **2021-09-14**
Supervised Practice - Elective II
This 5 week clinical course will provide the PA student the opportunity to practice in any available medical setting of the student’s choice. This may be used to augment a previous clinical experience or explore an area of interest or potential future employment.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission
Components: Field Studies
Attributes: Offered Fall, Spring, and Summer
Req. Designation: Technology

PA 609(3) **Course ID:011539** **2021-05-13**
Clinical Research Elective
This 5 week course allows the PA student to participate in research in any medical area of interest in preparation for the student’s Master’s Project. The student may engage the multiple academic departments of Clarkson University outside of PA Studies for this research. Topics for research must be approved by the Department Chair and must be approved by the appropriate university review board. As an alternative, the student may perform a service learning project during this time as part of the Master’s Project.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

Health Sciences - Physician Assistant Studies - Subject: Physician Assistant Studies

PA 610(1) **Course ID:011540** **2016-04-08**
Summative Review
This course, presented near the end of the clinical year, will include intensive board review in preparation for the PANCE, review for clinical skills testing, CV preparation, and interviewing skills. It also include a final clinical skills exam as well as a cumulative written test, both of which must be successfully passed to graduate from the program.
Prerequisite: Successful completion of the preclinical year and all supervised practice rotations
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PA 611(2) **Course ID:011541** **2018-01-01**
Master Project
This course is a follow up to Medical Informatics and the Research elective. It is designed to allow the PA student to complete a master's degree project under the guidance of Clarkson faculty or a community advisor. Students may identify an area of medicine, disease process or condition, conduct research, and produce a paper worthy of publication. The student may also perform a learning service project resulting in a publishable paper or product for use in the community. The student will prepare and present an oral presentation on their topic at the conclusion of the year.
Prerequisite: Completion of the preclinical year of the physician assistant program or program permission.
Components: Research
Attributes: Offered Spring Term
Req. Designation: Technology

PA 900(1 - 12) **Course ID:011762** **2015-02-11**
PA Clinical Placeholder
This course is a clinical rotation placeholder until final clinical assignments have been finalized. Once finalized, students will be placed into the correct clinical assignment course number.
Components: Independent Study
Req. Designation: Technology

Other - The Clarkson School - Subject: Physical Education

PE 100(1) **Course ID:009210** **2014-11-20**
First Year Seminar
[Cross-listed with FY 100] See FY 100 First Year Seminar for description.
Components: Lecture
Requirement Group: Prerequisite: for Clarkson School students only.
Req. Designation: Technology

Other - Athletics - Subject: Physical Education

PE 101(0) **Course ID:009211** **2015-01-20**
Introduction to Lifetime Activities
This will be a 14 week course combining seven lifetime activities (racquetball, weight training/physical fitness, badminton, volleyball, golf, indoor soccer, and tennis) Each activity will go for two week and will cover rules, strategies, and skills.
Components: Physical Education
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Athletics - Subject: Physical Education

PE 315(3) **Course ID:013153** **2022-03-17**
Introduction to Complex Networks
This course will introduce the student to the new, burgeoning field of Complex Networks, their analysis and applications to everyday-life. Elementary concepts from Graph Theory, Statistical Physics and Discrete Math techniques will be taught as demanded by the material. Covered topics will include: Basic concepts from Graph Theory, Global vs. local algorithms of analysis, Erdos-Renyi Random Graph, Small-World model of Watts & Strogatz, Scale-free networks, Barabasi-Albert and Krapivsky-Redner models, Recursive scale-free models and their applications; The percolation problem and its applications to epidemic spreading, vaccination strategies, etc. and Kleinberg navigation.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 1(2 - 4) **Course ID:009246** **2015-01-19**
PH Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PH 2(2 - 4) **Course ID:009247** **2015-01-19**
PH Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PH 31(2) **Course ID:009248** **2015-01-28**
Elementary Physics I
Introduction to Newtonian Mechanics. Given as a Pass or No-Credit (P/NC) only. Credit does not count toward graduation.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 121(1) **Course ID:009254** **2015-02-19**
Physics Freshman Seminar
Activities and facilities in the Physics Department, curriculum choices, and career options in Physics will be introduced to incoming freshmen through group discussions and faculty seminars. Challenge problem solving and team projects will cover selected topics beyond the material in general freshman Science courses.
Components: Seminar
Attributes: Offered Fall Term
Req. Designation: Technology

PH 131(4) **Course ID:009255** **2015-02-12**
Physics I
Calculus-based general physics course covering elements of Newtonian mechanics and thermal physics. Laboratory experiments keyed to the lectures to illustrate and demonstrate some of the physical principles and concepts.
Components: Laboratory, Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Corequisite: MA 131
Req. Designation: Technology

PH 132(4) **Course ID:009256** **2015-02-12**
Physics II
Calculus-based general physics course covering elements of electricity and magnetism, waves and optics. Laboratory experiments keyed to the lectures to illustrate and demonstrate some of the physical principles and concepts.
Components: Laboratory, Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisite: PH131 Corequisite: MA132
Req. Designation: Technology

PH 141(4) **Course ID:009257** **2022-06-07**
Physics for Life Sciences I
General physics course covering elements of mechanics, thermal physics, and physics of fluids, with emphasis on topics and applications relevant for biological sciences, physical therapy, and pre-med (MCAT). Laboratory experiments keyed to the lectures to illustrate and demonstrate some of the physical principles and concepts.

Corequisite: MA180.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 142(4) **Course ID:009258** **2022-06-07**
Physics for Life Sciences II
General physics course covering elements of electricity and magnetism, waves, optics, and modern physics, with emphasis on topics and application relevant for biological sciences, physical therapy, and pre-med (MCAT). Laboratory experiments keyed to the lectures to illustrate and demonstrate some of the physical principles and concepts.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: PH141 or equivalent
Req. Designation: Technology

PH 157(3) **Course ID:012028** **2022-06-07**
Elementary Astronomy
This course will cover basic concepts in astronomy. The course will cover the planets and planet formation, life cycle of stars, clusters, galaxies, and the scientific principles used in astronomy and astrophysics.
Components: Lecture
Attributes: Offered Fall and Spring
Req. Designation: Technology

PH 165(3) **Course ID:013088** **2022-06-07**
Solar Energy
Solar radiation, Spectral irradiance, Air mass. Electricity basics. Si solar cells: Band structure and doping of semiconductors; Semiconductor junctions; Light absorption; I-V characteristics, fill factor and efficiency of a solar cell; Power losses. Si solar cell fabrication process. Solar panels and modules. Thin film solar cells; Solar energy storage. Electrical and mechanical designs of PV systems; Performance analysis and maintenance of PV systems. Applications: Domestic supply, telecommunication, satellite.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PH 221(3) **Course ID:009267** **2015-01-20**
Theoretical Mechanics I
Kinematics and dynamics of a single particle and systems of particles, conservation laws, central force problem, oscillatory and rotational motion. Introduction to Lagrangian and Hamiltonian formulations of classical mechanics.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PH132 Corequisites: MA232
Req. Designation: Technology

PH 230(3) **Course ID:012137** **2016-02-22**
Physics III
This course introduces certain fundamental concepts of waves, optics and thermal physics, including the basic mathematical framework necessary to describe the associated physical phenomena. Specific topics of waves phenomena include: Transverse and longitudinal waves, wave equation, superposition principle, interference of waves, phasors; electromagnetic waves, Maxwell's equations; Poynting vector, radiation pressure; polarization, reflection and refraction; Young's interference experiment; coherence; Michelson's interferometer; wave theory of light, diffraction grating, X-Ray diffraction; photoelectric effect, and matter waves. Topics of thermal physics include: Temperature, thermal expansion; absorption of heat; heat transfer mechanisms; first and second laws of thermodynamics; entropy. With an emphasis on problem solving, this course serves to bridge the concepts developed in Physics II (PH 132) and Modern Physics (PH 231), and is strongly recommended as a PH elective to physics majors.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: PH132 and MA132
Req. Designation: Technology

PH 231(3) **Course ID:009268** **2022-06-07**
Fundamentals of Modern Physics
Introduction to the most important developments of 20th century physics, including applications to technology. Foundations and implications of special relativity, introduction to waves and quantum theory. Survey of applications in solid state, atomic, nuclear and particle physics.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisites: PH132 Corequisites: MA232
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 232(1) **Course ID:009269** **2022-06-07**
Modern Physics Laboratory
Laboratory course to supplement PH 231. Experiments keyed to the lectures to illustrate and demonstrate some of the physical principles and concepts.
Components: Laboratory
Attributes: One communication unit, Offered Each Term, Writing Intensive Course
Requirement Group: Corequisites: PH231
Req. Designation: Technology

PH 245(3) **Course ID:013087** **2022-06-07**
Medical Physics
Material phases (solid, liquid, gas, plasma). Basic laws of fluids; viscosity, diffusion, osmotic pressure. Surface tension, adsorption. Basic thermodynamics. Mechanism of respiration. Blood pressure measurement. Electric processes in organisms; Membrane potential of nerve cell, Action potentials (nerve fiber and heart cell), Echocardiogram. Pacemakers; Defibrillation. Acoustics and hearing basics. Ultrasound imaging. Basic optics. Lenses, microscopes. Optics of human vision. Interaction of radiation with matter. X-ray imaging, Computed Tomography. Excitation and ionization of atoms. Atomic nuclei and their magnetic properties. Magnetic resonance imaging. Basics of radioactivity (decay law, radioactive series; accelerators). Detection of radiation, radiation dosimetry. Nuclear medicine
Components: Lecture
Attributes: Given When Needed
Requirement Group: PH142 or Instructor Consent
Req. Designation: Technology

PH 301(1 - 2) **Course ID:009272** **2015-02-19**
Teaching Methodology in Physics I
Assisting a faculty member in a physics course, in order to prepare the student for teaching physics with emphasis on skills needed for work as a teaching assistant (TA) in a graduate school.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

PH 302(1 - 2) **Course ID:009273** **2015-01-20**
Teaching Methodology in Physics II
Assisting a faculty member in a physics course, in order to prepare the student for teaching physics with emphasis on skills needed for work as a teaching assistant (TA) in a graduate school.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

PH 315(3) **Course ID:013155** **2022-03-17**
Introduction to Complex Networks
This course will introduce the student to the new, burgeoning field of Complex Networks, their analysis and applications to everyday-life. Elementary concepts from Graph Theory, Statistical Physics and Discrete Math techniques will be taught as demanded by the material. Covered topics will include: Basic concepts from Graph Theory, Global vs. local algorithms of analysis, Erdos-Renyi Random Graph, Small-World model of Watts & Strogatz, Scale-free networks, Barabasi-Albert and Krapivsky-Redner models, Recursive scale-free models and their applications; The percolation problem and its applications to epidemic spreading, vaccination strategies, etc. and Kleinberg navigation.
Components: Lecture
Course Equivalents: MA 315
Attributes: Offered Fall Term
Requirement Group: Prerequisite: MA132
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 320(3) **Course ID:012858** **2022-06-07**
Physical Models of Living Systems
This course focuses on modeling essential processes in living systems using the tools and techniques of physics, including computer modeling. Using case studies in virus dynamics, bacterial genetics and naturally evolved cellular circuits, the course will explore how living organisms use physical mechanisms to gain information about their surroundings, process information and make decisions. It will also examine some of the cutting edge techniques used by scientists at the forefront of biophysical and life sciences research to study living organisms and understand their behavior. This course is broadly aimed at students studying in physics, chemistry, mathematics, computer science, chemical engineering, and biomedical engineering, in addition to biology majors with advanced math classes.
Components: Lecture
Course Equivalents: PH 520
Attributes: Given When Needed
Requirement Group: Prerequisites: PH132 and MA132
Req. Designation: Technology

PH 323(3) **Course ID:009276** **2022-06-07**
Optics
Geometrical optics: reflection and refraction at plane and spherical surfaces, lenses, lens aberrations. Physical optics: interference, diffraction, polarization, photons, absorption, scattering, electrooptics.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisite: PH132 or consent of the instructor.
Req. Designation: Technology

PH 325(3) **Course ID:009277** **2015-02-19**
Thermal Physics
Temperature, heat, thermodynamics and applications. Introduction to kinetic theory and classical and quantum statistical mechanics.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PH231 and MA231 or consent of the instructor.
Req. Designation: Technology

PH 327(1 - 3) **Course ID:009278** **2022-06-07**
Experimental Physics I
Experiments selected from the fields of atomic physics, electricity and magnetism, thermal physics, condensed matter physics and optics. A major component of the course involves statistical analyses of experimental data and random uncertainties. The topics of data analysis include: Standard deviation and standard deviation of the mean; variance, co-variance and Schwarz inequality; weighted averages, histograms and distribution functions; confidence limit; least-squares fitting, uncertainties in slopes and intercepts, error-bars, coefficients of correlation and determination, chi squared test; general formula of error propagation and its applications. Computer based graphing and data analyses are routinely used throughout the course. Elements of writing technical research papers are practiced in the laboratory reports.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisites: PH 132 and MA 132, or consent of the instructor
Req. Designation: Technology

PH 328(1 - 3) **Course ID:009279** **2022-06-07**
Experimental Physics II
Continuation of PH 327.
Components: Lecture
Attributes: Offered Spring Term, Writing Intensive Course
Requirement Group: Prerequisite: PH327 or consent of the instructor.
Req. Designation: Technology

PH 331(3) **Course ID:009280** **2015-01-20**
Quantum Physics I
Basic principles of quantum mechanics, Schrödinger equation for simple potentials including harmonic oscillator and hydrogen atom. Selected application to atomic, molecular and nuclear structure.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PH 231 and MA 232
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 341(3) **Course ID:009282** **2022-06-07**
Solid State Physics I
This course focuses on the fundamental physical processes that occur in solid state materials. Topics include crystal structure of solids, point defects and dislocations, crystal bonding, X-ray diffraction, lattice vibrations, thermal properties, specific heat, thermal conductivity, free electron gas theory of metals, energy bands, theory of semiconductors, band gaps, doping, and a brief introduction to device physics. Graduate students will do additional coursework.

Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PH231, or ES260, or consent of the instructor
Req. Designation: Technology

School of Arts and Sciences - Chemistry & Biomolecular Sci - Subject: Physics

PH 371(3) **Course ID:009283** **2014-11-20**
Physical Chemistry I
[Cross-listed with CM 371] This course covers the gaseous state, kinetic theory and chemical thermodynamics, with applications to chemical and phase equilibria. The emphasis is on mathematics and problem solving.
Components: Lecture
Course Equivalents: CM 371
Requirement Group: Prerequisites: CM104 or CM132, MA132, PH131 Corequisites: PH132
Req. Designation: Technology

PH 372(3) **Course ID:009284** **2014-11-20**
Physical Chemistry II
[Cross-listed with CM 372] A continuation of PH 371. Topics may include quantum mechanics, atomic structure, chemical bonds, intermolecular forces, spectroscopy, molecular symmetry, optical activity, photochemistry and photobiology.
Components: Lecture
Course Equivalents: CM 372
Attributes: Offered Spring Term
Requirement Group: Prerequisites: CM371 or BY371 or PH371.
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 380(3) **Course ID:009285** **2015-02-19**
Electromagnetic Theory I
Fundamental properties of electric and magnetic fields. Gauss law, Poisson equation, dielectrics, boundary value problems, vector potential, inductance, Maxwell equations, electromagnetic waves.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PH132 and MA231 or consent of the instructor.
Req. Designation: Technology

PH 401(1 - 2) **Course ID:009287** **2015-02-19**
Teaching Methodology in Physics III
Assisting a faculty member in a physics course, in order to prepare the student for teaching physics with emphasis on skills needed for work as a teaching assistant (TA) in a graduate school.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Fall Term
Req. Designation: Technology

PH 402(1 - 2) **Course ID:009288** **2015-01-21**
Teaching Methodology in Physics IV
Assisting a faculty member in a physics course, in order to prepare the student for teaching physics with emphasis on skills needed for work as a teaching assistant (TA) in a graduate school.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

PH 426(3) **Course ID:009291** **2022-06-07**
Introduction to Biophysics
[Cross-listed by BY 426] This course concentrates on the fundamental physical processes that occur within living organisms, particularly the cell. Topics include the structure and physics of macromolecules, biological membranes, the thermodynamics of living systems, muscle contraction and the propagation of signals in nerve cells.
Components: Lecture
Course Equivalents: PH 526
Attributes: Given When Needed
Requirement Group: Prerequisites: BY160 or BY312 or consent of instructor
Req. Designation: Technology

PH 432(3) **Course ID:009292** **2022-06-07**
Quantum Physics II
Continuation of PH 331. Transformation theory and matrix formulation of quantum mechanics; angular momentum, spin, perturbation theory, variational methods, scattering theory.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisite: PH331 or consent of the instructor.
Req. Designation: Technology

PH 435(1) **Course ID:009295** **2015-02-19**
Physics Senior Seminar
Forum for discussion of current research in physics. Exploration of employment and career opportunities for physics majors. Preparation for GRE in Physics.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PH 445(1 - 3) **Course ID:009300** **2015-01-28**
Undergraduate Thesis I
Investigation of a topic selected by the student in consultation with a thesis adviser. A written thesis is required.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Two communication units, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 447(3) **Course ID:009302** **2022-06-07**
Nuclear Physics
An introduction to nuclear structure, nuclear radiation and elementary particle physics. Topics include properties of nuclei, the two-nucleon forces, complex nuclei, interaction of radiation with matter, accelerators, nuclear reactions, elementary particles and their classification.
Components: Lecture
Course Equivalents: PH 547
Attributes: Offered Even Falls
Requirement Group: Prerequisites: PH331 or consent of the instructor.
Req. Designation: Technology

PH 451(3) **Course ID:009303** **2022-06-07**
Statistical Mechanics I
Review of thermodynamics and classical ensembles. Modern theories of phase transitions, critical phenomena, liquid structure. Introduction to Monte Carlo methods, nonequilibrium phenomena.
Components: Lecture
Course Equivalents: PH 551
Attributes: Given When Needed
Requirement Group: Prerequisites: PH325 or consent of the instructor.
Req. Designation: Technology

PH 455(3) **Course ID:009305** **2022-06-07**
Mathematical Methods in Physics
Mathematics methods used in theoretical physics. Topics covered include complex variables, Fourier transforms, special functions, eigenfunction expansions, Green's functions, differential equations, linear algebra and linear spaces, with physical applications.
Prerequisite: consent of the instructor.
Components: Lecture
Course Equivalents: PH 555
Attributes: Offered Even Springs
Req. Designation: Technology

PH 457(3) **Course ID:009306** **2022-06-07**
Introduction to Astrophysics
Radiation from astrophysical sources and measurement of position, mass, temperature, velocity, density, composition and age. Emphasis will be on recent discoveries and interpretations.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Prerequisites: PH231 or consent of the instructor.
Req. Designation: Technology

PH 460(3) **Course ID:009307** **2022-06-07**
Physics of Fluids
Discussion of the mechanics of fluids based on the Navier-Stokes equation. Laminar and turbulent flows, dimensional analysis. Special topics with applications.
Components: Lecture
Course Equivalents: PH 560
Attributes: Given When Needed
Requirement Group: Prerequisites: PH221 and PH325 or consent of the instructor.
Req. Designation: Technology

Institute for STEM Education - Physics - Subject: Physics

PH 463(3) **Course ID:013027** **2020-02-18**
Computer Simulation Methods in Physics
[Cross-listed with PH563] This is a computer laboratory course that explores physical concepts using computer simulations. Topics include: Euler
method and its applications in classical mechanics an thermodynamics; the cooling of coffee, motion of falling objects,
planetary motion with and without the solar wind, simple harmonic oscillator, damped oscillations, Molecular Dynamics,
Boltzmann distribution, random walk and Brownian Dynamics, percolation model, and Monte Carlo Method.

Components: Lecture
Course Equivalents: PH 563
Attributes: Two communication units, Given When Needed
Requirement Group: PH463/563 Prerequisites: PH132, MA232; PH325 or ES340 and PH380 or EE381 or instructor consent.
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 470(1 - 3) **Course ID:009308** **2015-01-28**
Directed Study Experimental
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 471(1 - 3) **Course ID:009309** **2015-01-28**
Directed Study Experimental
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 473(1 - 3) **Course ID:009311** **2015-01-28**
Directed Study Experimental
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 474(1 - 3) **Course ID:009312** **2015-01-28**
Directed Study Theoretical
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 475(1 - 3) **Course ID:009313** **2005-05-15**
Directed Study Theoretical
Prerequisite: consent of the instructor.
Components: Independent Study
Req. Designation: Technology

PH 476(1 - 3) **Course ID:009314** **2005-05-15**
Directed Study Theoretical
Prerequisite: consent of the instructor.
Components: Independent Study
Req. Designation: Technology

PH 478(1 - 3) **Course ID:011319** **2017-01-13**
Directed Research in Experimental Physics
Students will carry out research in experimental physics under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Req. Designation: Technology

PH 479(1 - 3) **Course ID:011320** **2017-01-13**
Directed Research in Theoretical Physics
Students will carry out research in theoretical physics under the supervision of a faculty member. Topics will be determined by faculty research programs. A formal report is required at the conclusion of the course.
Components: Research
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 480(1) **Course ID:009316** **2009-04-21**
Internship/Co-op in Physics
Students will gain practical work experience in Physics under the direction and supervision of professionals outside their department. Students must submit a formal report describing work performed as well as the Internship/Co-op learning opportunities. Report approval is required for the award of credit. Feedback will be provided by their Internship/Co-op field supervisor. This course will be graded on a pass/no-credit basis.
Components: Independent Study
Req. Designation: Technology

PH 487(3) **Course ID:012910** **2018-11-02**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: PH 587, CM 487, CM 587, MSE 587, ES 587
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PH132 or consent of the instructor; ES260 and/or PH231 are recommended prerequisites
Req. Designation: Technology

PH 520(3) **Course ID:012859** **2022-06-07**
Physical Models of Living Systems
This course focuses on modeling essential processes in living systems using the tools and techniques of physics, including computer modeling. Using case studies in virus dynamics, bacterial genetics and naturally evolved cellular circuits, the course will explore how living organisms use physical mechanisms to gain information about their surroundings, process information and make decisions. It will also examine some of the cutting edge techniques used by scientists at the forefront of biophysical and life sciences research to study living organisms and understand their behavior. This course is broadly aimed at students studying in physics, chemistry, mathematics, computer science, chemical engineering, and biomedical engineering, in addition to biology majors with advanced math classes.
Components: Lecture
Course Equivalents: PH 320
Attributes: Given When Needed
Req. Designation: Technology

PH 523(3) **Course ID:009324** **2022-06-07**
Optics
Geometrical optics: reflection and refraction at plane and spherical surfaces, lenses, lens aberrations. Physical optics: interference, diffraction, polarization, photons, absorption, scattering, electrooptics.
Prerequisite: PH132 or consent of the instructor.
Components: Lecture
Attributes: Offered Odd Falls
Req. Designation: Technology

PH 525(3) **Course ID:009325** **2015-02-19**
Thermal Physics
Temperature, heat, thermodynamics and applications. Introduction to kinetic theory and classical and quantum statistical mechanics.
Prerequisites: PH231 and MA231 or consent of the instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PH 526(3) **Course ID:009326** **2022-06-07**
Introduction to Biophysics
[Cross-listed by BY 526] This course concentrates on the fundamental physical processes that occur within living organisms, particularly the cell. Topics include the structure and physics of macromolecules, biological membranes, the thermodynamics of living systems, muscle contraction and the propagation of signals in nerve cells.
Prerequisite: consent of the instructor.
Components: Lecture
Course Equivalents: PH 426
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 531(3) **Course ID:009327** **2015-01-21**
Quantum Physics I
Basic principles of quantum mechanics, Schrödinger equation for simple potentials including harmonic oscillator and hydrogen atom. Selected application to atomic, molecular and nuclear structure.
Prerequisites: PH231 and MA232, or consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PH 532(3) **Course ID:009328** **2022-06-07**
Quantum Physics II
Continuation of PH 531. Transformation theory and matrix formulation of quantum mechanics; angular momentum, spin, perturbation theory, variational methods, scattering theory.
Prerequisites: PH331 or PH531, or consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 541(3) **Course ID:009332** **2022-06-07**
Solid State Physics I
This course focuses on the fundamental physical processes that occur in solid state materials. Topics include crystal structure of solids, point defects and dislocations, crystal bonding, X-ray diffraction, lattice vibrations, thermal properties, specific heat, thermal conductivity, free electron gas theory of metals, energy bands, theory of semiconductors, band gaps, doping, and a brief introduction to device physics. Graduate students will do additional course work.
Prerequisites: PH231 or ES260, or consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PH 547(3) **Course ID:009334** **2022-06-07**
Nuclear Physics
An introduction to nuclear structure, nuclear radiation and elementary particle physics. Topics include properties of nuclei, the two-nucleon forces, complex nuclei, interaction of radiation with matter, accelerators, nuclear reactions, elementary particles and their classification.
Prerequisites: PH331 or PH531, or consent of the instructor.
Components: Lecture
Course Equivalents: PH 447
Attributes: Offered Even Falls
Req. Designation: Technology

PH 551(3) **Course ID:009335** **2022-06-07**
Statistical Mechanics I
Review of thermodynamics and classical ensembles. Modern theories of phase transitions, critical phenomena, liquid structure. Introduction to Monte Carlo methods, nonequilibrium phenomena.
Prerequisites: PH325 or PH525, or consent of the instructor.
Components: Lecture
Course Equivalents: PH 451
Attributes: Given When Needed
Req. Designation: Technology

PH 555(3) **Course ID:009337** **2022-06-07**
Mathematical Methods in Physics
Mathematics methods used in theoretical physics. Topics covered include complex variables, Fourier transforms, special functions, eigenfunction expansions, Green's functions, differential equations, linear algebra and linear spaces, with physical applications.
Prerequisite: consent of the instructor.
Components: Lecture
Course Equivalents: PH 455
Attributes: Offered Even Springs
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 560(3) **Course ID:009339** **2022-06-07**
Physics of Fluids
Discussion of the mechanics of fluids based on the Navier-Stokes equation. Laminar and turbulent flows, dimensional analysis. Special topics with applications.
Prerequisite: consent of the instructor.
Components: Lecture
Course Equivalents: PH 460
Attributes: Given When Needed
Req. Designation: Technology

PH 563(3) **Course ID:013028** **2020-02-18**
Computer Simulation Methods in Physics
[Cross-listed with PH463] This is a computer laboratory course that explores physical concepts using computer simulations. Topics include: Euler
method and its applications in classical mechanics an thermodynamics; the cooling of coffee, motion of falling objects,
planetary motion with and without the solar wind, simple harmonic oscillator, damped oscillations, Molecular Dynamics,
Boltzmann distribution, random walk and Brownian Dynamics, percolation model, and Monte Carlo Method.
Components: Lecture
Course Equivalents: PH 463
Attributes: Given When Needed
Requirement Group: PH463/563 Prerequisites: PH132, MA232; PH325 or ES340 and PH380 or EE381 or instructor consent.
Req. Designation: Technology

PH 570(1 - 3) **Course ID:009340** **2015-01-28**
Directed Study Experimental
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 574(1 - 3) **Course ID:009344** **2015-01-28**
Directed Study Theoretical
A course of study of subjects not otherwise available in formal courses may be undertaken under the supervision of a faculty member.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 580(3) **Course ID:009348** **2015-02-19**
Electromagnetic Theory I
Fundamental properties of electric and magnetic fields. Gauss law, Poisson equation, dielectrics, boundary value problems, vector potential, inductance, Maxwell equations, electromagnetic waves.
Prerequisites: PH132 and MA231, or consent of the instructor.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

PH 587(3) **Course ID:009355** **2018-11-02**
Applications of Synchrotron and Electron Based Techniques
The purpose of the course is to familiarize all students with the x-ray and electron based experimental techniques available at Brookhaven National Lab and other similar facilities. Students will be cognizant of the applications of these cutting edge facilities, and well positioned to use them in their own research. This course is suitable for graduate students, postdocs, and advanced undergrads in physical sciences and engineering, as well as students in biological, environmental, and chemical sciences who may have the interest to learn more about the techniques they may use for their research.
Components: Lecture
Course Equivalents: CM 487, CM 587, PH 487, MSE 587, ES 587
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 625(1 - 3) **Course ID:011370** **2009-08-24**
Computer Modeling in Physics
Physical concepts using computer simulations: Euler method and its applications in classical mechanics and thermodynamics (cooling of coffee, Styrofoam ball fall, motion of planets, pendulum), random walks (Brownian dynamics), percolation, Monte Carlo method.
Pre-requisites: PH325, MA232 and knowledge of any programming language (Java, Fortran, C, C++, Matlab, etc.) or consent of the instructor. (Optional PH231/PH331 and PH380/PH381.)
Components: Independent Study
Req. Designation: Technology

PH 626(3) **Course ID:013023** **2020-02-18** **Instructor Consent Required**
Electroanalytical Methods
This course explores fundamental principles and selected applications of modern electroanalytical methods. Topics include: Ions in electrolytes; transport numbers, specific conductivity, Walden's rule, ionic strength; Laplace transform and diffusion problems. Electrode potentials and kinetics; Nernst equation, Butler-Volmer formulation. Voltammetry, chronoamperometry, and chronopotentiometry. Mixed potential effects, corrosion and Pourbaix diagram. Double layer models, specific adsorption and isotherms. Electrochemical impedance spectroscopy (EIS); analyses of EIS data; complex impedance elements; nonlinear least square method, circuit models of interfacial reactions; Kramers Kronig transform, statistical analyses, F-test and t-test. Applications of electroanalysis; fuel cells, electrocatalysis, corrosion protection, chemical mechanical planarization, batteries and supercapacitors. The course requires a strong undergraduate background in mathematics.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 661(3) **Course ID:009363** **2016-09-12** **Instructor Consent Required**
Classical Mechanics
Basic concepts of classical mechanics. The two body central force problem, Lagrange's equations, kinematics and dynamics of a rigid body, many particle systems, variational principles, Hamilton's equations, canonical transformations, Hamilton-Jacobi theory, perturbation theory, small oscillations, and continuous systems and fields.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 663(3) **Course ID:009364** **2016-09-12** **Instructor Consent Required**
Electromagnetic Theory I
This course includes theoretical treatment of static electric and magnetic fields, time-dependent fields, electromagnetic waves in a vacuum, in homogeneous isotropic media, and at boundaries. Also included are selected topics from special relativity, wave guides and resonant cavities, radiation and magnetohydrodynamics.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PH 669(3) **Course ID:009367** **2015-01-21** **Instructor Consent Required**
Quantum Mechanics I
General formulation of quantum mechanics and its interpretation, matrix formulation, advanced perturbation and variational methods, scattering theory, atomic structure, radiative transitions and applications to atoms, nuclei, molecules and solids.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PH 681(1 - 3) **Course ID:009371** **2015-01-28** **Instructor Consent Required**
Selected Topics in Physics I
An advanced treatment of selected topics in fields of current interest not presently covered in other courses.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Physics - Subject: Physics

PH 682(1 - 3) **Course ID:009372** **2015-01-28** **Instructor Consent Required**
Selected Topics in Physics II
An advanced treatment of selected topics in fields of current interest not presently covered in other courses.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PH 683(1) **Course ID:009373** **2021-09-20**
Graduate Seminar I
Faculty, distinguished visiting speakers, and graduate students report on current research. An important objective is to encourage the graduate students to keep informed of current developments in physics and closely related fields, and practice presentation techniques of research results. Professional development of graduate students, including resume development, practicing in written article reviews, training in research ethics, and other relevant training.
Prerequisite: consent of the instructor.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

PH 684(1) **Course ID:009374** **2017-08-25**
Graduate Seminar II
Continuation of PH 683.
Prerequisite: consent of the instructor.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

PH 699(1 - 15) **Course ID:009382** **2015-02-09**
Thesis, Dissertation or Special Project
An investigation of a problem undertaken by the student under the guidance of a faculty member.
Prerequisite: consent of the instructor.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

PH 999(1 - 10) **Course ID:011101** **2015-01-19**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Philosophy

PHIL 1(2 - 4) **Course ID:010820** **2015-01-19**
Philosophy Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

PHIL 2(2 - 4) **Course ID:010816** **2015-01-19**
Philosophy Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

PHIL 200(3) **Course ID:008617** **2015-02-20**
Philosophy and Contemporary Issues
This course introduces students to philosophy and philosophizing by using philosophical concepts and methods to examine contemporary issues. For example, a society's practices regarding crime and punishment rest on its beliefs about human freedom and responsibility, and philosophical discussions of determinism provide a vantage point from which to critically evaluate these beliefs. Other issues -- such as the possibility and implications of artificial intelligence, the legitimacy of religious beliefs, the morality of torture, and the paradoxes of democracy (for example, people who are rational managers of their time may not spend the time necessary to be informed citizens) -- can be evaluated on the basis of philosophical accounts about knowledge, religion, the basis of morality, and the nature of the state.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Offered Fall Term
Req. Designation: Technology

PHIL 220(3) **Course ID:012842** **2017-10-11**
Philosophy and Shakespeare
This course is an introduction to ethics through a study of Shakespeare. The course pairs different moral theories with specific plays to examine their strengths and weakness and it attempts to understand Shakespeare's views on ethics. Along the way, the course examines the relationship between philosophy and art.
Components: Lecture
Attributes: Imaginative Arts, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

PHIL 222(3) **Course ID:012119** **2015-09-29**
Philosophy for Life
[Cross-Listed as LIT 222] In this course, we will learn to think philosophically (which is to say: critically, rigorously, and reflectively) about complex and difficult questions. We will study practical life philosophies from both the Eastern and Western traditions, from the Tao Te Ching to Marcus Aurelius, and from Plato to the Dalai Lama. We will reflect on the ontological, epistemological, rhetorical, and ethical perspectives of each of these philosophers and schools of thought. We will note striking similarities and important distinctions between them. Ultimately, we will reflect on our own life philosophies as well—each of us refining our personal life philosophy through reading, reflection, and discussion of these classic texts from the wisdom literature tradition.
Components: Lecture
Course Equivalents: LIT 222
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

PHIL 241(3) **Course ID:008621** **2015-03-05**
Medical Ethics
[Formerly LP241] The practice of modern medicine has created a number of moral dilemmas for health-care providers, their patients, and society as a whole. This course will explore the roots and nature of these various dilemmas and examine the moral theories and principles used to resolve them.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Offered Odd Springs
Req. Designation: Technology

Business - Humanities & Social Sciences - Subject: Philosophy

PHIL 243(3) **Course ID:010382** **2021-05-21**
Business Ethics
[Formerly LP243] This course introduces students to ethical issues in business and the ethical concepts, theories, and methods they can apply to them. There are numerous examples of unethical behavior on the part of individual businesspersons, departments, and entire business organizations. Some of these are big enough to make the news media, but most are ethical missteps that negatively impact managers, employees, and customers without making the headlines. This course explores the causes and characteristics of ethical issues and problems in business, as well as ways to resolve them. Topics will include: Foundational theories about what makes an ethical decision correct. The role of such ethical theories in business. A decision procedure for thinking about and resolving ethical issues in business. Practice in applying the ethical theories and decision procedure to cases about issues such as honesty in business, fair and equitable treatment of employees, the environmental responsibilities of business, product safety, doing business in other countries,

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Philosophy

PHIL 245(3) **Course ID:013034** **2020-02-21**
Philosophy of Mind
Most things don't have minds. Mountains, molecules, suns, and apples are some of the many things that lack consciousness and thought. Yet, somehow, in a universe in which barely anything can think, you have a mind. How is this possible, and what does this mean? Are there other sorts of things with minds? What about pigs, or spiders, or computers? Is the mind just the brain? This course introduces students to classic and contemporary debates in the philosophy of mind. We will investigate the nature of the human mind from a philosophical perspective and try to make progress in one of the most mysterious fields of human inquiry.
Components: Lecture
Attributes: Individual and Group Behavior, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

PHIL 325(3) **Course ID:013159** **2022-03-18**
Philosophy and Ethics of Sport
This course introduces students to thinking philosophically about sport. Students will learn to apply philosophical methods, concepts, and theories in analyzing the nature of sports, as well as particular ethical questions that arise from current practices in a variety of sports.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

PHIL 330(3) **Course ID:011668** **2022-02-11**
Logic for Critical Thinking
This course helps students develop practical reasoning ability, i.e., the ability to analyze the arguments that they encounter every day (for example, editorials, political speeches, memos and reports at work, and their roommate's, friends', and parents' infuriating, but apparently irrefutable, arguments) and decide whether or not these arguments really support the conclusions, as well as to construct sound arguments of their own.
Components: Lecture
Attributes: Individual and Group Behavior, Given When Needed
Requirement Group: Prerequisites: UNIV 190 and one additional course within the humanities and social sciences.
Req. Designation: Technology

PHIL 350(3) **Course ID:013085** **2022-02-11**
Philosophy of Artificial Intelligence
This course investigates ethical and metaphysical questions that are prompted by artificial intelligence and machine learning. The ethical questions concern the best way to integrate artificial intelligence into society. How much of our critical infrastructure should we leave up to artificial intelligence? When is it wrong to replace human labor with machines? Can AI show prejudice? The metaphysical questions concern the possibility of computer minds. Is a conscious AI possible? How do the processes of current AI differ from human cognition? Can computers be creative? Throughout this course, students will discover what the development of AI has revealed about individual and group behavior, and will learn how these innovations in science and technology promise to impact society.
Components: Lecture
Attributes: Individual and Group Behavior, Science, Technology and Society, University Course, Given When Needed
Req. Designation: Technology

PHIL 485(3) **Course ID:011833** **2013-03-11** **Instructor Consent Required**
Advanced Topics
An advanced topics seminar open to students with at least 12 credit hours in the discipline or permission from the instructor. Limited to 12 students. Topics to be covered will be selected to conform to the mutual interests and needs of students and faculty. Additional prerequisites may be required depending on the topic. Graduate students will be required to perform additional work.
Components: Lecture
Req. Designation: Technology

PHIL 490(1 - 10) **Course ID:008646** **2015-02-09** **Department Consent Required**
Independent Study
[Formerly LP490] Designed primarily for an advanced student who wishes to pursue special interests in philosophy for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Philosophy

PHIL 491(1 - 10) **Course ID:008647** **2015-02-09** **Department Consent Required**
Independent Study
[Formerly LP491] Designed primarily for an advanced student who wishes to pursue special interests in philosophy for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

PHIL 499(0) **Course ID:008654** **2015-02-09**
Minor Portfolio
In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Credit basis.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

PHIL 590(1 - 10) **Course ID:012777** **2016-12-06** **Instructor Consent Required**
Independent Study
Working under the direction of a faculty member, this course allows a graduate student to pursue topics of interest in philosophy.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Educational Physics

PHY 580(3) **Course ID:012672** **2021-10-08**
MAT Project in Physics (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?

Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 1(2 - 4) **Course ID:008614** **2015-01-19**
POL Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

POL 2(2 - 4) **Course ID:008615** **2015-01-19**
POL Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

POL 220(3) **Course ID:008622** **2015-03-03**
American Politics
[Formerly LP250] An introduction to the approaches to political inquiry, and the use of these to acquire an understanding of: the social and economic environment and purposes of the American political system; the political behavior of Americans; the patterns of decision-making within the American political system, and the consequences of public policy.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Offered Each Term
Req. Designation: Technology

POL 230(3) **Course ID:012014** **2015-03-05**
Introduction to Global Politics
This course introduces students to key concepts, theories, and patterns for understanding politics in the international arena and within states. It aims to expose students to a broad spectrum of ideas and theories in international relations and comparative politics, and it does so by examining some enduring questions in the study of politics. Topics include the structure of the international system, causes of war and peace, economic globalization, international organizations, democratic processes and democratization, economic and political development, political institutions, civil society, and other issues and processes within and across national borders. Cases from different parts of the world are examined to provide grounding in comparative analysis. In addition to simply learning more about world politics, the course will equip students with key political science concepts, theories and explanations, through which they can improve their capacity to critically interpret current events. By the end of the course, students should have a strong
Components: Lecture
Attributes: Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

POL 240(3) **Course ID:011488** **2022-02-11**
Politics, Decisions and War
The main objective of this course is to inquire into the causes of war. Following critical engagement with traditional theoretical approaches to the question of conflict and cooperation in international politics, students will be introduced to systemic, group, and individual-level explanations of war, as well as to case study discussions regarding the influence of these factors. The course provides students with a set of tools for the analysis of classic and contemporary civil and international conflicts and strives to show how evidence and theory can be effectively used in understanding peace and conflict. The course draws on a wide range of disciplines, including international relations, political theory, social psychology, economics, and environmental studies. By the end of the term, students should be able to understand the main factors that drive war, as well as to outline solutions for preventing them.
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 250(3) **Course ID:008623** **2020-02-18**
Government & Politics around the World
[Formerly LP260] This course introduces students to the study of political development and constitutionalism. By studying at least four countries, course participants will learn to develop and test explanations intended to account both for common patterns of modernization and for the unique features of social and political evolution in each nation-state. Countries to be studied represent developed Western democracies (France and Germany), post-communist regimes (Russia), and `third world' political systems (Mexico).
Components: Lecture
Attributes: Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 251(3) **Course ID:010960** **2022-02-11**
Introduction to International Politics
This course introduces students to the prevailing explanations of international relations, and how they are used and misused in the analysis of contemporary policy issues. The main topics to be discussed include the definition and distribution of power in the international system, the role of individual leadership, the influence of international institutions, the impact of globalization and the future of international governance. Policy issues will include: national security strategy, the rise of China, democracy promotion, the role of the United Nations, terrorism and energy security.
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 260(3) **Course ID:012071** **2015-03-27**
Introduction to Public Policy
This is an introductory course to policy analysis. Policy analysts are responsible for defining and framing public problems, identifying and evaluating possible strategies for addressing problems, and recommending solutions that make the most sense. The goals of this course are to provide students with an understanding of the role that analysis plays in the policymaking process, and to make students critical consumers of policy analysis
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Offered Fall Term
Req. Designation: Technology

POL 301(3) **Course ID:008624** **2015-02-20**
Political Theory
[Formerly LP301] An historical and topical consideration of some prominent yet divergent conceptions of 'justice' and 'community' within the Western political tradition. Theorists to be considered include: Plato, Aristotle, Hobbes, Locke, Rousseau, Mill and Marx.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Offered Fall Term
Req. Designation: Technology

POL 302(3) **Course ID:008625** **2015-01-28**
Contemporary Political Theory
[Formerly LP302] This course will begin by examining contemporary versions of liberalism, the still-dominant paradigm of political thought in the United States. Students will then read and discuss various critical perspectives on liberalism, such as communitarianism, 'civil society' theory, postmodernism, multiculturalism, and 'green' political thought. We shall try to decide whether liberalism has outlived its usefulness as a model of justice and/or political organization, or whether it can renew itself by responding to the countercurrents noted above.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

POL 303(3) **Course ID:012982** **2019-10-21**
Foreign Policy Analysis
The course seeks to introduce the ways in which scholars of foreign policy analysis have understood the nature of decision-making processes prevalent within governments and their agencies. It seeks to understand the intentions of actors and the complex global contexts and challenges they face in pursuing their goals. Foreign policy analysis, a distinct subfield within international relations has adopted research from several other subfields such as American politics, comparative politics, political psychology and cultural studies. To that end the course covers two knowledge areas, 1) Contemporary/Global Issues and 2) Cultures and Societies.
Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 330(3) **Course ID:012890** **2018-10-08**
Politics in the Americas
This class is an introduction to the politics and governments of the countries that comprise the American continents and the Caribbean. It will focus predominantly on the Spanish & Portuguese-speaking countries in Mexico, Central & South America, and the Caribbean. It also may address relationships between or among Latin American countries and the United States and Canada. The course will address the region's political history, including periods of authoritarian rule, revolution and democratization. It also will examine the causes and consequences of these countries' institutional design, as well as the challenges to economic and political development they face, such as crime and corruption. Additionally the course will evaluate policy failures and successes from agrarian and land reform to economic development and wealth redistribution.
Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Offered Odd Springs
Req. Designation: Technology

POL 333(3) **Course ID:012935** **2019-03-08**
Latin American politics & Society through Cinema
This class is a course about Latin American politics and society through the use of film and literature. It is neither a critical film course, nor a course about the use of film in politics.

This course does not offer a broad overview of the politics of Latin America, but rather explores in greater depth particular political and social issues that popular films from around the world have brought to light. As many of these films have made their way to the United States (several have been entrants or winners in the Best Foreign Language Film category of the Academy Awards), they have raised global awareness of these issues. However, films that achieve success, particularly at an international level, often focus on very dramatic issues. As such, please be conscious that this course does not offer a comprehensive portrayal of Latin America. Nevertheless, we deal with very important and influential issues in Latin American political
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Cultures and Societies, University Course, Given When Needed
Req. Designation: Technology

POL 334(3) **Course ID:013094** **2022-02-11**
War-Making and World Order
A relatively small number of states have been responsible for an overwhelming number of wars over the last century. States that are engaged in security competitions and are active in the security sphere tend to shape the conflict space based on innovation in technology, the type of adversaries they are facing, and the nature of their regional and global ambitions. In this class a set of complex questions are address. The questions include: 1) how security competitions between states affects states’ war-making capacity which includes technological innovation and institutional efficiency and its polity; 2) how changes in state capacity affects the probability of major and minor wars; and 3) how such wars along with escalating tensions changes regional and world orders. The course draws on scholarship in conflict processes and international relations theory and also considers major case studies that include the rise of China and the global response to the same. To understand global security competitions and conflict, it is important for students to be able to
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 335(3) **Course ID:011934** **2022-02-11**
Violence and Reconciliation
[Cross-listed with LIT 335] While scholars have labeled the 20th century 'the century of genocide,' the past two decades have catalyzed global changes in the ways we think about peace-building and reconciliation. But reconciliation after mass conflict remains a difficult process. Can you forgive someone who has done irreparable harm to you or your loved ones? Can you reconcile -literally, return to a previous state of harmony- with someone if you never shared a harmonious relationship with that person? Is reconciling with a whole community the same as reconciling with an individual? This course examines the challenges to reconciliation after political trauma and assesses the strengths and weaknesses of major reconciliation mechanisms. Through the lens of two case studies, South Africa and Northern Ireland, and the disciplines of film, fiction, and political theory, students will compare the consequences of criminal trials, truth commissions, and informal efforts at communal healing. As a final project, the class will participate in a
Components: Lecture
Course Equivalents: LIT 335
Attributes: One communication unit, Contemporary and Global Issues, Imaginative Arts, University Course, Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 337(3) **Course ID:012978** **2019-10-21**
Dictatorships and Democracies
In this class students learn about differences among political regimes, not only between dictatorships and democracies, but also among subtypes within those broad categories. The focus of the course will be on political transitions from one regime type to another, examining revolutions, military and constitutional coups, bottom-up and top-down processes of democratization as well as the latest trend of democratic backsliding that has taken place in several countries around the world. Students will learn what distinguishes democracies from dictatorships in order to understand the various types of political transitions. The course material compares different paths countries have taken to democratize in order for students to understand the benefits and drawbacks of each path for the long-term health and survival of democracies. Students will read about a number of specific country cases to learn about regime changes around the world—including the causes and consequences of these political changes. Additionally, some of the
Components: Lecture
Attributes: Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

POL 340(3) **Course ID:012980** **2021-08-26**
Lawmaking in the United States: How the Sausage is Made
There are two things that you don't want to see made: laws and sausages. This course examines the institutions responsible for producing laws and public policy in the United States, especially the president, Congress, the federal bureaucracy, interest groups, and elections. The course makes extensive use of active learning through in-class simulations and games, including an immersive multi-week digitized simulation of lawmaking in American government. Students will also produce advertisements from the perspective of a given interest group.
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 342(3) **Course ID:012981** **2019-10-21**
The American Nightmare? American Political Ideas in Literature and Film
This course explores the nature of political ideas in contemporary America through analyzing films and books. Through classroom discussion and close engagement with source material, we will consider topics such as America's place in the world, the benefits and costs of capitalism, scapegoating, race relations, and the necessity of government. Our intent is neither to defend nor attack America; rather, our objective is to think critically about the society in which we live.
Components: Lecture
Attributes: Contemporary and Global Issues, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

POL 345(3) **Course ID:012983** **2020-01-15**
Happiness: Politics, Policy, and More
[Cross-listed with POL545] The U.S. Constitution argues for the rights of “life, liberty, and the pursuit of happiness.” What makes us happy? Should we be happy? Why might happiness be critical to democracy? How do political decisions make us happy? Should happiness be a political goal? That said, this course will go well beyond politics and political science. It is explicitly multi-disciplinary in nature: we will study the question of happiness from disciplines based in the sciences, humanities, and social sciences, and we will study material informed by psychology, public policy, economics, biology, medicine, philosophy, literature, and film.
Components: Lecture
Course Equivalents: POL 545
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 350(3) **Course ID:010204** **2018-10-23**
Political Economy of Development
[Cross-listed with SOC 350] [Formerly LP370] Explanations of social change and development in an international context are covered. The course moves from a starting point of the presentation of theories and explanations of how nations have historically attempted to modernize themselves and develop their economies, and concludes with a brief introduction to current discussions of the global economy and globalization. Students are introduced to competing explanations of the modernization process and the movement of nations from less industrialized to industrialized status. Other topics covered are the causes and consequences of poverty and famine and hunger, and policies to alleviate these social ills. This course is recommended for students interested in taking POL351: Globalization.
Components: Lecture
Attributes: Economics and Organizations, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 351(3) **Course ID:010205** **2020-09-22**
Globalization
[Cross-listed with SOC 351] [Formerly LP 371] This seminar style class addresses the economic, political and social change collectively referred to as 'globalization.' The concept of globalization will be analyzed from a number of perspectives. Macro-level changes are addressed as are local adaptation strategies of individuals, communities and organized groups. Special attention is paid to the role of institutions, such as corporations, national and subnational governments and non-governmental and multilateral organizations, in the globalization process. The class will work through and discuss books critical of, and sympathetic to, the globalization process.
Components: Lecture
Course Equivalents: SOC 351
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

POL 353(3) **Course ID:012975** **2019-10-21**
Politics of Protest
To protest means to express strong disapproval or objection to something. With regard to the politics of protest, individuals or groups express their dissent or disapproval to a particular audience—usually local, national or even international governments, but also corporations, school administrations, etc. and the broader public—with the objective to change the behavior or policies that provoked their protest or to force a leadership or regime change. Protestors use myriad tactics to assert and publicize their dissent such as provocative art, cyber-attacks, street demonstrations and even violent rebellion. When protestors organize and carry out campaigns toward a common goal, we refer to the protesters as social movements. Social movements, however, do not monopolize protest. People also engage in less systematic protest. In this course, we study who engages in protest and to whom they protest. We study a variety of theories about social movements, collective organization and collective action. In this course, students examine why various people
Components: Lecture
Attributes: Individual and Group Behavior, Given When Needed
Req. Designation: Technology

POL 355(3) **Course ID:011757** **2017-09-28**
Sex, Gender and Power
This course addresses the political, social, and economic circumstances of women in global perspective. Topics include: theories of gender and politics; intersectionality; the public / private divide; the construction and maintenance of gendered political interests; friction between feminism and multiculturalism in both the developed and developing worlds; issues surrounding the promotion of women's rights; women as political candidates; and women as office-holders.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

POL 360(3) **Course ID:013063** **2020-10-15**
Politics of Pandemics
Pandemics act as major shocks to regional and international system(s) and have the potential to change global power distribution, initiate new technological advancements and reshape domestic politics. In other words, pandemics can shape politics and the course of history. Likewise, politics and public policies affect pandemics from their geographic scope to their social and political costs. This course delves into the relationships between domestic and global institutions and politics and pandemics. Students will study how pandemics affect political behavior at different levels of analyses. Students learn about how national and subnational politics evolve in different countries on account of global shocks from pandemics, such as HIV/AIDs, H1N1 (Swine Flu), and COVID-19. Students also will explore how pandemics shape international aid programs and investigate who benefits from such programs. During the course, students will read and analyze literature on why states act through international organizations, such as the World Health Organization, and
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 362(3) **Course ID:010738** **2022-02-11**
Human Rights Law and Politics
The politics and law framed around various conceptions of Human Rights are primarily responses to perceived crimes against people based on their ethnicity, religion, gender and/or age. This course is a historical, institutional, and political inquiry, therefore, on how we go about protecting and improving the lot of the most vulnerable populations throughout the world. The first half of the semester will examine the institutional responses to Human Rights (the formation of the Declaration of Human Rights, various international aid agencies, and war crimes tribunals). The second half of the semester will involve investigation into legal and political responses to torture, political repression, war crimes and genocide, the status of refuges, women s rights, children s rights, and humanitarian intervention.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Political Science

POL 370(3) **Course ID:011997** **2015-01-28**
Close and Contested Elections
Course material includes the study of electoral rules worldwide, including social and political consequences of these rules. The first section of this course examines the role of elections in both democratic and non-democratic systems. What are elections intended to accomplish? How do they work? The second, longer, section of the course turns to a series of case studies of contemporary close and contested elections in a number of different contexts, including cases ranging from the United States (2000) to Iran (2009). This latter portion of the course addresses such questions as (1) the tools and procedures that various kinds of states/regimes have for dealing with such contestation, (2) the extent to which such contested elections may de-legitimize the entire political system, and (3) the role of the media. The final week addresses international election monitoring bodies.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 374(3) **Course ID:011606** **2015-03-05**
Environmental Political Theory
This course is designed for students with interests in environmental science and policy, and political theory, or both. We will examine the relationship between nature, politics, and the political economy. We will also examine a wide spectrum of ideas on political, economic, social and scientific matters expressed by contemporary environmental thinkers, though we will also discuss thinkers from the past (Thoreau, Muir, Leopold, Carson). In particular, we will focus our discussions on the relationship between environmental concerns and dominant ideas in liberal capitalism and democracy. We will also study feminist, socialist, communitarian, authoritarian, and anarchist perspectives.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Odd Springs
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Political Science

POL 375(3) **Course ID:010517** **2015-03-05**
Environmental Law
In this course we will be examining the relationship between the Courts and various policies, laws, and regulations pertaining to the restoration and management of the environment. The central issues in the cases we will be examining emerge from the tension between property rights and what has been conceived as a constitutional right to a clean, healthy environment. Areas where this tension plays out include: the Clean Air Act, the Clean Water Act, The Superfund Law, and the National Environmental Policy Act. In general, the course is designed to help students assess whether environmental laws provide us with a route for attaining ecological goals, and to think critically about the role of the Courts as a defender of the environment.

Components: Lecture
Course Equivalents: POL 575
Attributes: Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 380(3) **Course ID:010800** **2015-01-21**
The Law and Bioethics
This course explores the relation between law, ethics, and new technologies. In particular, we will be exploring issues of the right to privacy, abortion, state sterilization programs, cloning, rights of surrogate parents, doctor/patient confidentiality, the right to die, new definitions of death, the human genome project and intellectual property rights, and organ transplantation. This inquiry will be guided by the question: 'Who Owns Life?' There is no definitive answer to this question offered by the American court system. Through readings and discussions students will gain political and ethical perspective on how legal standards are formed in response to new demands by the public and government, and how new ethical questions are inspired by innovations in germline bioengineering, medical and rehabilitative technology, robotics, virtual reality, and nanotechnology. The material for the course will be case law and articles by leading scientists, physicians, ethicists, and legal scholars in this young field.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Spring Term
Req. Designation: Technology

POL 388(3) **Course ID:012040** **2020-02-18**
Terrorism and Insurgencies
This course will focus on terrorism as political violence carried out by non-state actors, although we will also explore the topic of state sponsorship of terrorist groups. The purpose of the course is to familiarize students with the theoretical approaches to and contemporary challenges in the study of terror and terrorism. Topics will include the nuances involved in defining terrorism; the political context in which terrorist groups emerge; the ideologies, motivations, organizational structure, and decision-making processes of important terrorist groups; the effectiveness of various counter-terrorism tools; and the role of technology in the evolution of terror and terrorism. The course will provide a basis for discussing and analyzing contemporary terror/terrorist events and related security issues.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

POL 391(3) **Course ID:011037** **2017-10-11**
Special Topic: American Politics in Comparative Perspective
In what ways is the United States an outlier among western democracies, and in what ways does the United States resemble other democratic nations? To the extent that the United States is distinctive, what explains the differences between the United States and other advanced industrial societies? What do the structural differences of the American political system mean for democratic performance? Is the American way more or less effective than comparably developed states in Asia, Latin America, North America, or Europe? In order to explore these questions, this class examines major features of American democracy – political culture and public opinion, electoral institutions and behavior, interest groups, political parties, and social movements, the division of power between state and federal governments – from a comparative perspective. Understanding American politics in the twenty-first century requires moving beyond national boundaries and situating the United States and its interventions in the world.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

POL 400(3) **Course ID:008644** **2019-09-02**
Constitutional Law
[Formerly LP400] [Cross-listed with POL500] An introduction to American Constitutional law and jurisprudence. Using a case study approach that focuses upon Supreme Court decision making, the course will pay particular attention to the evolution of discourse on 'rights' in the United States.
Components: Lecture
Course Equivalents: POL 500
Attributes: Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 470(3) **Course ID:010203** **2015-03-05**
Environmental Policy
[Cross-listed with SOC 470] [Formerly LP360] Public policy is developed in response to problems or issues in society that are presumed, for whatever reasons, not to be resolvable by the private sector. In theory, public policy as it relates to environmental issues is used to intervene to alleviate problems, such as industrial pollution, that threaten the integrity of the natural resource base and the natural and built environments on which our lives and livelihoods depend. However, public policy development and implementation in general, and environmental policy in particular, are not immune to political forces and influences. Even scientific institutions that often provide the empirical basis for environmental policy are potentially influenced and shaped by the political process and political and economic interests. This course introduces students to the distinctive features or characteristics of environmental policy development and implementation. The course primarily focuses on the United States but includes international environmental
Components: Lecture
Attributes: One communication unit, Science, Technology and Society, Given When Needed
Req. Designation: Technology

POL 471(3) **Course ID:011489** **2015-03-05**
Energy Policy
Energy policy is a critical component of state and national public policy. Issues surrounding the reliability and security of energy supplies directly affect national domestic and foreign policy, as well as state level environmental, economic development, and land use concerns. Via emphasis on specific issues unique to North American energy policy (US and Canada), the class will introduce students to the major theoretical frameworks used by political scientists, sociologists, economists, and other intellectual disciplines to understand how societies design and implement public policies related to energy, and how the energy industry responds. Topics covered will include theories of the state, monopoly and regulation, public choice, organizational behavior, international agreements, and innovation. The class will apply these theories to major current and historical issues in energy policy, such as ethanol, climate change, and renewable energy systems, nuclear power, energy efficiency, energy security, the world oil market, and OPEC, electricity production and markets
Components: Lecture
Course Equivalents: POL 571
Attributes: One communication unit, Economics and Organizations, Science, Technology and Society, University Course, Offered Spring Term
Req. Designation: Technology

POL 490(1 - 10) **Course ID:010775** **2015-02-09** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in political science for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

POL 499(0) **Course ID:010793** **2015-02-09**
Minor Portfolio
In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Entry basis.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

POL 500(3) **Course ID:012968** **2019-09-02**
Constitutional Law
[Cross-listed with POL400] This course will cover the same subject area and topics as POL 400. Additional materials at the graduate level will be expected of those who register under this catalog number. (The attached syllabus includes the additional requirements for graduate students.)
Components: Lecture
Course Equivalents: POL 400
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Political Science

POL 545(3) **Course ID:013026** **2020-01-15**
Happiness: Politics, Policy and More
[Cross-listed with POL345] This course will cover the same subject area and topics as POL 345. Additional materials at the graduate level will be expected of those who register under this catalog number.
Components: Lecture
Course Equivalents: POL 345
Attributes: Given When Needed
Req. Designation: Technology

POL 570(3) **Course ID:011653** **2011-09-19**
Environmental Policy
A course description has not been provided for this course. Please check with the Humanities & Social Science department for a description.
Components: Lecture
Req. Designation: Technology

POL 571(3) **Course ID:011490** **2015-03-05**
Energy Policy
Energy policy is a critical component of state and national public policy. Issues surrounding the reliability and security of energy supplies directly affect national domestic and foreign policy, as well as state level environmental, economic development, and land use concerns. Via emphasis on specific issues unique to North American energy policy (US and Canada), the class will introduce students to the major theoretical frameworks used by political scientists, sociologists, economists, and other intellectual disciplines to understand how societies design and implement public policies related to energy, and how the energy industry responds. Topics covered will include theories of the state, monopoly and regulation, public choice, organizational behavior, international agreements, and innovation. The class will apply these theories to major current and historical issues in energy policy, such as ethanol, climate change, and renewable energy systems, nuclear power, energy efficiency, energy security, the world oil market, and OPEC, electricity production and markets
Components: Lecture
Course Equivalents: POL 471
Attributes: Offered Spring Term
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Political Science

POL 575(3) **Course ID:011766** **2020-08-01**
Environmental Law
[Cross-listed with EV 575] In this course we will be examining the relationship between the Courts and various policies, laws, and regulations pertaining to the restoration and management of the environment. The central issues in the cases we will be examining emerge from the tension between property rights and what has been conceived as a constitutional right to a clean, healthy environment. Areas where this tension plays out include: the Clean Air Act, the Clean Water Act, The Superfund Law, and the National Environmental Policy Act. In general, the course is designed to help students assess whether environmental laws provide us with a route for attaining ecological goals, and to think critically about the role of the Courts as a defender of the environment. Graduate students are required to perform additional assignments above those required by undergraduates.

Components: Lecture
Course Equivalents: POL 375
Attributes: Offered Spring Term
Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 1(1 - 4) **Course ID:009414** **2015-01-19**
PT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PT 2(1 - 4) **Course ID:009415** **2015-01-19**
PT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PT 105(1) **Course ID:011759** **2016-04-04**
Introduction to Physical Therapy I
Introduction to the profession of physical therapy, the pre-physical therapy and DPT programs at Clarkson, the problem-based learning (PBL) mode of curriculum, and the concept of the medical model and team in the U.S.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

PT 300(1 - 3) **Course ID:009419** **2016-01-11** **Instructor Consent Required**
Independent Study
An opportunity for Pre-PT students to undertake a research project or clinical observation with approval by a PT faculty member. A portfolio or written report must be handed in at the end of the semester.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

PT 305(1) **Course ID:011758** **2016-04-04**
Introduction to Physical Therapy II
Introduction to the requirements and process of graduate physical therapy education, participation in the (PBL) mode of curriculum, and issues of professionalism in physical therapy practice.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT105 or Permission of Instructor.
Req. Designation: Technology

PT 505(9) **Course ID:010620** **2015-02-20**
Foundation Sciences for Physical Therapy
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, gross anatomy lab, inquiry seminars, and self-directed learning students will develop the early cognitive, psychomotor, and affective skills necessary to be physical therapists. Cases related to the foundation sciences of anatomy (musculoskeletal and neurological) and kinesiology are covered in the different learning environments. Students will gain an appreciation for, and ability to implement physical therapy professional practice core values, in addition to skills in communication, cultural competence, clinical reasoning, evidence-based practice, and education. Students also will gain inductor clinical skills that relate to patients with all types of movement disorders who require physical therapy services.
Components: Clinical, Discussion, Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisites: PT506 and PT508.
Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 506(2) **Course ID:010621** **2015-02-20**
Professional Foundation for Physical Therapy
This course assists the student in an exploration of the structure of the health care system and the evolving role of the physical therapy profession as a primary participant. The course integrates topics such as history, ethics, politics, sociology, and economics, using seminal articles from a variety of healthcare fields to broaden the learning experience. Utilizing a largely discussion-based format, each student and faculty member will have the opportunity to facilitate interaction by drawing from assigned readings, clinical examples, and students' life experiences. This course will be integrated with case discussions in PT 505 and will provide the foundation for growth as a professional throughout the physical therapy curriculum and beyond.
Prerequisite: Admission to graduate physical therapy professional curriculum (DPT).
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisites: PT505 and PT508.
Req. Designation: Technology

PT 508(1) **Course ID:010622** **2019-06-07**
Literature Critique and Review
This course provides students with foundational concepts of evidence-based practice (EBP), and skills for critical evaluation of physical therapy research literature related to both background questions (e.g., risk factors) and foreground questions (e.g., interventions). Students will contrast and critique different types of intervention research and relate to levels of evidence. Students learn how to search for, identify, obtain, analyze and summarize appropriate literature using appropriate tools such as PubMed, PEDro, PTNow, and clinical practice guidelines. The capstone project is a literature review poster presentation.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisites: PT505 and PT506.
Req. Designation: Technology

PT 515(9) **Course ID:010623** **2021-09-10**
Cardiopulmonary-Exercise Science
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, anatomy lab using cadavers, inquiry seminars and self-directed learning students will develop the cognitive, psychomotor and affective skills necessary to be physical therapists and provide services to individuals with cardiorespiratory disorders, acute conditions found in hospital settings, and exercise and fitness environments. Foundational sciences, behavioral sciences, and clinical science related to cardiorespiratory disorders are covered in different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice core values, in addition to skills in communication, cultural competence, clinical reasoning, evidence-based practice, and education. In the different learning environments, the skills and knowledge related to the management (screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention and outcomes assessment) of patients/clients with
Components: Clinical, Discussion, Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT505, PT506, PT508. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 517(2) **Course ID:010624** **2021-09-10**
Professional Practice I
Participation in planned small group part time professional practice experiences. Observation and participation in Phase II and III cardiac rehabilitation, pulmonary rehabilitation, and acute care, with emphasis on examination and intervention for patients with cardiac and pulmonary illness or disease. Emphasis on addressing administrative and professional issues inherent to such clinical environments. Integration of these professional practice experiences with the case studies used in PT 515 Cardiopulmonary-Exercise Science.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT505, PT506, PT508. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 518(1) **Course ID:010625** **2021-09-10**
Principles of Tests and Measures
Students will participate in discussions and activities focused on understanding principles of measurement and concepts related to measurement error, reliability, validity, sensitivity, specificity, minimal detectable change, minimal clinically important difference, likelihood ratios, odds/risk ratios, and clinical prediction rules. Practical interpretation of the psychometric properties for standardized tests and measures in physical therapist practice will occur through critical analysis of research articles, discussion, practice and comprehensive review of commonly utilized standardized measures in physical therapist practice.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT505, PT506, PT508. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 525(9) **Course ID:010626** **2015-01-21**
Musculoskeletal Physical Therapy
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, musculoskeletal lab, inquiry seminars and self-directed learning students will develop the cognitive, psychomotor and affective skills necessary to be physical therapists and provide services to individuals with musculoskeletal disorders. Foundational sciences, behavioral sciences, and clinical science related to musculoskeletal disorders are covered in the different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice core values, in addition to skills in communication, cultural competence, clinical reasoning, evidence-based practice, and education. In the different learning environments, the skills and knowledge related to the management (screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention and outcomes assessment) of patients/clients with musculoskeletal disorders are covered. Students also will gain skills in practice management for
Components: Discussion, Laboratory, Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: PT515, PT517, PT518. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 527(2) **Course ID:010627** **2015-01-21**
Professional Practice Preparation
PT527 is the capstone course for preparation of upcoming internship courses throughout the curriculum. This course includes both scheduled course and individual meeting sessions. Students will discuss clinical education objectives, professional issues, select upcoming clinical internship sites, develop interview and daily organization skills, and learn how to utlizie the full-time PT CPI website.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Corequisites: PT515, PT517 and PT518
Req. Designation: Technology

PT 528(1) **Course ID:010628** **2019-04-24**
Analytical Methods for Evidence Based Practice
Students will learn about various analytical methods used in evidence based practice, with an emphasis on statistical methods. Students will learn to select, apply, and interpret statistical methods commonly used in physical therapy research, and will critique analytical methods used in research.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: PT515, PT517 and PT518 Corequisites: PT525, PT527 and PT528
Req. Designation: Technology

PT 537(6) **Course ID:010629** **2021-05-10**
Professional Practice II
The first full-time internship course within the DPT curriculum, students participate in eight weeks of full-time internship at an orthopedic or acute care/cardiopulmonary setting following the third semester. Students synthesize their knowledge of musculoskeletal and/or cardiopulmonary disorders and gain an appreciation for managing multiple patients and responsibilities. The focus of this internship is on the patient/client management process-examination, evaluation, diagnosis, prognosis, intervention, and outcomes -- for patients within these settings with a variety of impairments leading to activity and participation limitations.
Components: Lecture
Attributes: Offered Fall and Summer
Requirement Group: Prerequisites: PT525, PT527, PT528. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 604(5) **Course ID:010634** **2021-03-19**
Physical Therapy for Multiple System Disorders I
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, neuroantomy lab, inquiry seminars, and self-directed learning students will develop the cognitive, psychomotor, and affective skills necessary to be physical therapists and provide services to individuals with disorders of multiple systems. Foundational sciences, behavioral sciences, and clinical science related to disorders of multiple system disorders are covered in the different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice, and education. In the different learning environments, the skills and knowledge related to the management (screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention and outcome assessment) of patients/clients with multiple system disorders are covered. Students also will gain skills in practice management for individuals with multiple systems disorders who require physical therapy services.
Components: Clinical, Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT525, PT527, PT528, PT537. Good standing in the graduate physical therapy professional

Req. Designation: Technology

PT 605(4) **Course ID:010630** **2015-08-01**
Neuromuscular Physical Therapy I
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, neuroanatomy lab, inquiry seminars and self-directed learning, students will develop the cognitive, psychomotor, and affective skills necessary to be physical therapists and provide services to individuals with neuromuscular disorders. Foundational sciences, behavioral sciences, and clinical science related to neuromuscular disorders are covered in the different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice core values, in addition to skills in communication, cultural competence, clinical reasoning, evidence-based practice, and education. In the different learning environments, the skills and knowledge related to the management (screening, examination, evaluation, diagnosis and prognosis, plan of care, intervention, and outcomes assessment) of patients/clients with neuromuscular disorders are covered. Students will also gain skills in practice management for individuals
Components: Clinical, Discussion, Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT537, PT604, PT608. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 607A(1) **Course ID:010631** **2019-02-13**
Professional Practice III-A
Students will participate in the first 8 weeks of a part-time clinical experience integrating clinical skills and practice management related to individuals with neurological impairments and disorders. Students will have the opportunity to practice patient interaction and management skills, clinical skills, and increase their knowledge of this complex patient population. Students will work with patients similar in diagnosis as discussed within tutorial cases and study concepts related to case management and policies that govern the clinical setting. The clinic portion of this course is highly integrated with PT 605 and PT 606, Neuromuscular Physical Therapy.
Components: Clinical
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT537, PT604, PT608. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 608(1) **Course ID:010632** **2021-05-07**
Research Methods
Students will examine and contrast a variety of research methods, including both primary and secondary research (i.e. original data collection vs. systematic review/meta-analysis). Students will learn to integrate critique of multiple research articles and apply to clinical situations. This course will address a variety of ethical issues associated with research. By the end of the semester, students will have selected and developed a plan for their capstone research project.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT525, PT527, PT528, and good standing in the graduate physical therapy professional cu

Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 613(2) **Course ID:009439** **2021-05-10**
Professional Practice III
Students will participate in a part-time clinical education experience integrating clinical skills and practice management related to individuals with neurological impairments and disorders. Students will have the opportunity to practice patient interaction and management skills, clinical skills, and increase their knowledge of this complex patient population. Students will work with patients similar in diagnosis as discussed within tutorial cases and study concepts related to case management and policies that govern the clinical setting. The clinic portion of this course is highly integrated with PT 614 Neuromuscular Physical Therapy.
Components: Clinical
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT537, PT604, PT608. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 616(6) **Course ID:010637** **2021-05-07**
Physical Therapy for Multiple System Disorders II
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, neuroantomy lab, inquiry seminars, and self-directed learning students will develop the cognitive, psychomotor, and affective skills necessary to be physical therapists and provide services to individuals with disorders of multiple systems. Foundational sciences, behavioral sciences, and clinical science related to disorders of multiple system disorders are covered in the different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice, and education. In the different learning environments, the skills and knowledge related to the management (screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention and outcome assessment) of patients/clients with multiple system disorders are covered. Students also will gain skills in practice management for individuals with multiple systems disorders who require physical therapy services.
Components: Clinical, Discussion, Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisites: PT613, PT614, PT617, PT618. Good standing in the graduate physical therapy professional

Req. Designation: Technology

PT 617A(1) **Course ID:010635** **2021-05-10**
Professional Practice IV-A
Students will develop and implement a community-based health and wellness project during PT 617A, with continuation in PT 617B. Each student will participate in at least six hours of wellness/prevention activities and/or education by developing and implementing a project selected by the faculty (4-6 hours estimated per session based on preparation, performance, analysis of outcomes, and program changes for future sessions). Throughout the project, each student will need to attend to his or her established program goals in order to prepare and implement an effective wellness session. The students, working with peers, are also expected to assess outcomes on an ongoing basis in order to modify methodologies to most effectively obtain the desired behavioral response from the participants. Through this project, it is expected that students will develop independent thinking and problem solving skills by utilizing available resources to meet the needs of their assigned facility and through continuous self-reflection. The format of this course is
Components: Seminar
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT537, PT604, PT608. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 617B(1) **Course ID:012042** **2021-05-10**
Professional Practice IV-B
Students will develop and implement a community-based health and wellness project during PT 617A, with continuation in PT 617B. Each student will participate in at least six hours of wellness/prevention activities and/or education by developing and implementing a project selected by the faculty (4-6 hours estimated per session based on preparation, performance, analysis of outcomes, and program changes for future sessions). Throughout the project, each student will need to attend to his or her established program goals in order to prepare and implement an effective wellness session. The students, working with peers, are also expected to assess outcomes on an ongoing basis in order to modify methodologies to most effectively obtain the desired behavioral response from the participants. Through this project, it is expected that students will develop independent thinking and problem solving skills by utilizing available resources to meet the needs of their assigned facility and through continuous self-reflection. The format of this course is
Components: Seminar
Attributes: Offered Summer Term
Requirement Group: Prerequisites: PT 537, PT 605, PT 607A, PT613, PT614, PT 617A and good standing in the graduate physi

Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 618(1) **Course ID:010636** **2021-05-10**
Research Practicum
Students work in small groups to implement their research plans from the previous semester. Students will either collaborate with faculty on primary research, or conduct a systematic review of literature related to a clinical question. By the end of this semester, students should have completed most or all components of their projects except for writing.
Components: Independent Study
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PT537, PT604, PT608. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 627A(5) **Course ID:010638** **2021-05-10**
Professional Practice V-A
PT627A is the second full-time internship course within the curriculum. Students will participate in the first 7 weeks of a total 10 weeks of full-time clinical internship (remaining 3 weeks through PT627B). This is scheduled during the summer semester of their second year at designated clinical education sites. Prior to this internship, students have completed five semesters of academic coursework covering the cardiopulmonary, musculoskeletal, neurologic, and integumentary systems throughout the lifespan, a 10-week full-time clinical internship, and multiple part-time clinical experiences. The focus of this internship will be on the examination, evaluation, diagnosis, prognosis, intervention, and outcomes for complex patients with a variety of impairments leading to activity and participation limitations. The financial aspects of patient care, supervision of support personnel, communication and education of patients, their families, peers, and interdisciplinary team members, and professional behavior development will be emphasized and progressed
Components: Clinical
Attributes: Offered Summer Term
Requirement Group: Prerequisites: PT613, PT614, PT617, PT618. Good standing in the graduate physical therapy professional

Req. Designation: Technology

PT 627B(2) **Course ID:012043** **2016-01-01**
Professional Practice V-B
PT627B is the second full-time internship course within the curriculum. Students will participate in the final 3 weeks of a total 10 weeks of full-time clinical internship (first seven weeks in PT627A). This is scheduled during the fall semester of their second year at designated clinical education sites. Prior to this internship, students have completed five semesters of academic coursework covering the cardiopulmonary, musculoskeletal, neurologic, and integumentary systems throughout the lifespan, an eight week full-time clinical internship, and multiple part-time clinical experiences. The focus of this internship will be on the examination, evaluation, diagnosis, prognosis, intervention, and outcomes for complex patients with a variety of impairments leading to activity and participation limitations. The financial aspects of patient care, supervision of support personnel, communication and education of patients, their families, peers, and interdisciplinary team members, and professional behavior development will be emphasized and progressed
Components: Clinical
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT 627A
Req. Designation: Technology

PT 645(8) **Course ID:010639** **2015-02-20**
Practice Management in the Autonomous Environment
Using a Problem-Based Learning (PBL) format in small tutorial groups, clinical lab, administrative workshops, inquiry seminars and self-directed learning students will develop the cognitive, psychomotor, and affective skills necessary to be physical therapists and provide services to individuals with varied complex disorders. Foundational sciences, behavioral sciences, and clinical science related to neuromuscular, musculoskeletal, cardiopulmonary, practice management, and women’s health are covered in the different learning environments. Students will gain an appreciation for and ability to implement physical therapy professional practice core values, in addition to skills in communication, cultural competence, clinical reasoning, evidence-based practice, and education. In the different learning environments screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention and outcomes assessment are covered.
Components: Clinical, Discussion, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT616, PT627. Good standing in the graduate physical therapy professional curriculum (D

Req. Designation: Technology

Health Sciences - Physical Therapy - Subject: Physical Therapy

PT 648(2) **Course ID:010640** **2019-06-07**
Writing and Presenting Research
Students work in small groups to write up their systematic review or primary research as an abstract and full manuscript and will give a platform presentation. During the process, students will participate in a peer review process within the class to improve their scientific writing and to become familiar with the publication process.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: Good standing in the graduate physical therapy professional curriculum (DPT). Corequis

Req. Designation: Technology

PT 657(2) **Course ID:010641** **2015-02-20**
Advanced Clinical Skills
Emphasis is placed on advanced clinical skills that progress, refine, and expand skills previously acquired. Includes topics such as: pediatrics, geriatrics, neurological treatment, exercise progression, post-surgical care, alternative modalities, manual therapy. Didactic presentations of evidence-based practice literature and clinical laboratory skills. Presentations by students who have had the opportunity to develop advanced clinical skills under mentorship during their clinical experiences. Application of principles of professional practice education through planning, supervising and assessing peers clinical skills practice. Integration of professional practice experiences with case studies used in PT 645 Practice Management in the Autonomous Environment.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PT616, PT627. Good standing in the graduate physical therapy professional curriculum (D

Req. Designation: Technology

PT 667(8) **Course ID:010643** **2015-04-24**
Professional Practice VI
The third full-time internship course within the curriculum, students will participate in a 10-week, full-time clinical internship scheduled during the first half of the final spring semester at selected clinical education sites. The focus of this internship is on the application and refinement of the PT patient/client management process for complex patients with a variety of impairments leading to activity and participation limitations. The administrative and financial aspects of patient care; consultation; communication and education of patients, their families, peers and interdisciplinary team members; and continued professional development will be emphasized and progressed during this experience.
Components: Clinical
Requirement Group: Prerequisites: PT645, PT648, PT657. Good standing in the graduate physical therapy professional curric

Req. Designation: Technology

PT 677(8) **Course ID:010644** **2015-04-24**
Professional Practice VII
The fourth and final full-time internship course within the curriculum, students will participate in a 10-week, clinical internship scheduled during the second half of the final spring semester at selected clinical education sites. The focus of this internship is on the application and refinement o the PT patient/client management process for complex patients with a variety of impairments leading to activity and participation limitations. Continued professional development, administrative and financial aspects of patient care; promotion of the profession, pro bono opportunities, and communication and education of petiens, their families, peers and interdisciplinary team members will be emphasized and progressed during this experience.
Components: Clinical
Attributes: Offered Spring Term
Requirement Group: Corequisites: PT667. Good standing in the graduate physical therapy professional curriculum (DPT).
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 1(2 - 4) **Course ID:009466** **2015-01-19**
Psychology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PY 2(2 - 4) **Course ID:009467** **2015-01-19**
Psychology Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Social Science Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

PY 151(3) **Course ID:009469** **2015-02-12**
Introduction to Psychology
Emphasizes the scientific study of the human mind. Appropriate research methods and philosophical questions will be considered. Topics include the brain, memory, perception, development, personality, social behavior, emotion, motivation, psychological disorders, stress, and states of consciousness.
Components: Lecture
Attributes: Individual and Group Behavior, Offered Fall, Spring, and Summer
Req. Designation: Technology

PY 246(3) **Course ID:012748** **2016-09-16**
Educational Psychology
This course will examine the ways in which theories of child development and learning inform classroom teaching methods, assessment, behavioral interventions, and student motivation.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PY151 or permission of the instructor
Req. Designation: Technology

PY 253(3) **Course ID:009485** **2015-01-21**
Social Psychology
Emphasis on the relative influences of society and other people on the individual. Topics include persuasion, attitude formation and change, group decision making, prejudice, social influence, altruism and aggression. Fundamental to the discussion of each topic is the scientific research that underlies it. A focus of the course is the means by which the individual can influence and be influenced by the organizations that play a major role in our lives
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: PY151.
Req. Designation: Technology

PY 255(3) **Course ID:009487** **2015-01-21**
Cognitive Psychology
Cognitive psychology is the study of how the mind perceives, attends to, remembers, and interacts with the world. The mental processes that will be examined include perception, attention, memory, language, decision-making, and problem solving. During this course, each topic will be explored by investigating theories and results from laboratory experiments, computer simulations and work in artificial intelligence.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: PY151.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 268(3) **Course ID:013119** **2021-08-26**
Diversity Science
This course introduces the links between diversity and psychological processes at individual and interpersonal levels. The study of diversity in this course includes an understanding of the presence of, as well as the problems and issues associated with social and cultural differences in our society. The topics of this course cover concept and processes for understanding topics such as categorization, stereotyping, prejudice, and social stigma. This course is designed to be an active learning experience, providing students an opportunity to identify and reflect on their own cultures, values and preferences, and how this impacts their individual sphere of influence and the various contexts in which they interface.

Requisites: PY151 recommended, but not required.

Components:	Lecture
Attributes:	Contemporary and Global Issues, Cultures and Societies, University Course, Offered Spring Term
Req. Designation:	Technology

Business - School of Business - Subject: Psychology

PY 286(3) **Course ID:009496** **2015-07-06**
Organizational Behavior I
[Cross-listed with EM 286, OS 286] (May be used to satisfy a CUSB MBA or MS foundation requirement.) An introduction to the processes required to manage contemporary organizations with a focus on individual behaviors as they relate to the functions of planning, organizing, controlling, and leading. The most recent concepts of behavioral science in the practice of management are presented to assist the student in gaining understanding of the pervasiveness of the discipline in all types of organizations and processes. Topics include motivation, leadership, perceptions, personality theory, learning theory, personnel issues, stress management, organizational culture, and decision making.

Components: Lecture
Course Equivalents: OS 286, EM 286
Attributes: Individual and Group Behavior, Offered Each Term
Requirement Group: Prerequisites: sophomore standing or the permission of the instructor.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 310(3) **Course ID:009476** **2021-12-06**
Human Sexuality
The course objective is to provide an informed perspective on human sexual behavior. Topics include anatomy and physiology, contraception, sexually transmitted diseases, sexual development and identity, varieties of sexual behavior across cultures and species, disorders and difficulties of sexual expression, therapeutic issues on the treatment of sexual disorders and the role of sex in interpersonal relationships.
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

PY 311(3) **Course ID:012722** **2016-09-06**
Cyberpsychology
Cyberpsychology is the branch of psychology that examines human behavior in the context of interaction with modern technologies. The research in this field is primarily focused on the use of Internet, particularly social media sites, but other technologies, such as gaming, mobile device applications, artificial intelligence and virtual reality are also within the scope of this area of psychological research and practice. The goal of this course is to provide students with an in-depth understanding of the psychological factors associated with using technologies and interacting in on-line environment.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: PY151
Req. Designation: Technology

PY 317(3) **Course ID:009479** **2021-12-06**
Psyc of Psychoactive Drugs
The Psychology of Psychoactive Drugs will examine a number of medicinal and so-called recreational drugs that affect consciousness, including cocaine, morphine, LSD, marijuana, alcohol, nicotine and caffeine. The course will include a description of the drugs, their pharmacological action, and side-effects. Psychological, physiological, and pharmacological theories of tolerance and addiction, and addiction treatment programs will also be covered.
Components: Lecture
Attributes: Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Psychology

PY 319(1) **Course ID:011493** **2014-11-19**
Current Readings in Animal Behavior
[Cross-listed with BY 319] The field of animal behavior is a rapidly advancing one, especially at the interface of neurobiology and cognition, and the interface of cognition and functional analysis of behavior (behavioral ecology and sociobiology). This one credit hour course is designed as a 'journal club' with a focus on the latest developments in theory and empirical research on animal behavior. The course is intended for any student who has a sincere interest in integrative animal behavior.
Components: Lecture
Course Equivalents: BY 319
Requirement Group: Prerequisites: BY222 or PY151
Req. Designation: Technology

Business - School of Business - Subject: Psychology

PY 321(3) **Course ID:009480** **2015-07-06**
Consumer Behavior
[Cross-listed with MK 321] Extensive coverage of selected consumer behavior theories and models. Special emphasis given to the most recent research along with marketing mix applications. Topics include classic and operant conditioning, motivation and attribution theories and the elaboration likelihood model. Students are required to complete a term project.
Components: Lecture
Course Equivalents: MK 321
Requirement Group: Prerequisite: MK320.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 335(3) **Course ID:009482** **2015-01-28**
Personality
Examines research evidence that treats various features of personality. Includes introversion-extroversion, authoritarian personality, the psychoanalysis, aggression, sexuality, dream interpretation, self-monitoring, locus of control, defense mechanisms, and unconscious motivation.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 340(3) **Course ID:009483** **2015-03-05**
Behavioral Ecology and Sociobiology
[Cross-listed with BY 340] This course is concerned with the adaptive functions of animal behavior, emphasizing ecological and evolutionary perspectives. Topics covered include foraging behavior, sexual selection, social systems, parental care, and cooperation and conflict. One major focus will be on evaluating the arguments of proponents and critics of sociobiology on whether the fields is useful at explaining human behavior.
Components: Lecture
Course Equivalents: BY 340
Attributes: Individual and Group Behavior, Offered Odd Springs
Requirement Group: Prerequisites: BY140 or PY151 or consent of instructor.
Req. Designation: Technology

PY 357(3) **Course ID:011326** **2014-11-19**
Human Cognitive Evolution
[Cross-listed with BY 357] Evolutionary psychology is concerned with the adaptive problems and selective pressures our ancestors encountered in their environments, the psychological mechanisms that evolved to help them solve those problems, and the way those evolved mechanisms function in current environments. This way of thinking about the brain, mind, and behavior is changing how scientists approach old topics, and is opening up new ones. This course will focus on current developments and selected topics in evolutionary psychology (e.g., foraging, mate choice, parental investment, cooperation and culture) and explore the evolution of cognition from a broad comparative perspective.
Components: Lecture
Course Equivalents: BY 357
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 358(3) **Course ID:009489** **2014-11-20**
Animal Learning and Cognition
[Cross-listed with BY 358] This course focuses upon how animals acquire, process, store and recall information about their environment and social partners. Topics that will be examined include how animals perceive and classify stimuli; how they learn and remember; how they orient and navigate; how they measure time, number, and amount; how they acquire abstract concepts; how they perceive social relationships; and how they communicate. A diversity of invertebrate and vertebrate organisms will be included (sea slugs to primates!), and there will be an emphasis on understanding taxon-specific specializations as well as general patterns across animals.
Components: Lecture
Course Equivalents: BY 358
Requirement Group: Prerequisites: BY140 or PY151 or consent of the instructor.
Req. Designation: Technology

PY 359(3) **Course ID:009490** **2022-06-07**
Perception
Perception deals with our conscious experience of the world, ourselves and each other. This course will examine how perceptions are measured (psychophysics); how visual, auditory, touch and pain sensory stimulation is actively organized into conscious perceptions; developmental aspects of perception; the role of cognitive factors, such as attention; and how altered conscious states (e.g., achieved through meditation, hallucinogenic drugs) affect perception. Fundamental principles of perception discussed in this course will be used to explain how we experience the world, ourselves, and each other.
Components: Lecture
Course Equivalents: BY 359
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 360(3) **Course ID:009491** **2015-02-20**
Learning and Memory
The basic principles, major theories, and practical applications of learning and memory processes will be explored in humans and animals. Topics will include how knowledge is acquired (learning), how it is represented, stored and accessed (memory), and how these learning and memory principles can be applied in education and in clinical settings. The course will take a multidisciplinary approach that will allow examining the processes underlying learning and memory at the behavioral, cognitive, neurobiological, and genetic levels.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 361(3) **Course ID:009492** **2015-02-20**
Motivation and Emotion
This course examines the forces of personality, environment, and culture that lead people to want what they want, and do what they do. Motivation will be explored in the contexts of education, work, therapy, sports, and relationships. Topics include: self-efficacy, self-regulation, earned helplessness, intrinsic and extrinsic motivation, achievement motivation, goal-setting, implementation intentions, self-determination, and emotion. Recent developments in the field of motivation will be applied to the practice of motivating others.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 363(3) **Course ID:010050** **2015-08-06**
Judgment and Decision Making for the Biomedical Sciences
Decision making is using information (and in some cases emotion) to guide behavior among multiple possible courses of action—for example, which foods to choose, which stocks to invest in, who to select for a romantic partner, or which products to buy. These choices determine our success in meeting the challenges of life. This course will cover a wide variety of topics regarding how individuals and groups form judgments and make decisions, by drawing on findings from psychology, economics, and biology. We will investigate the various techniques used to study and assess human judgment and decision making, explore how people reason under risk and uncertainty and apply the research addressed in class to real-world problems and issues. Particular focus will be given to judgment and decision-making in applied health contexts that are of high relevance for students with career goals in the biomedical sciences.
Components: Lecture
Attributes: Offered Odd Falls
Requirement Group: Enrollment is limited to students participating in the Trudeau Semester.
Req. Designation: Technology

PY 366(3) **Course ID:013101** **2021-04-08**
Cultural Psychology
This course introduces the field of cross-cultural psychology and intricate connections between cultural experiences and psychological processes. With critical examinations of the study of culture within the field of psychology, the focus will be on developing an understanding of recent cultural theory, research methods, and critical interpretation of research results. This course includes topics such as cross-cultural psychology’s contributions to human development and socialization, identity and personality, emotions and cognition, motivation, and behaviors.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or Junior or Senior standing
Req. Designation: Technology

PY 370(3) **Course ID:009495** **2015-02-20**
Developmental Psychology
This course will examine normal development from conception through old age and will cover theories of development and current developmental research. Consideration will be given to interaction of physical, social and cognitive aspects. Topics include the development of self, identity, moral beliefs, language, friendship, attachment, sexuality, and death/dying.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 372(3) **Course ID:013052** **2020-09-04**
Community Psychology
This course is designed to introduce students to the field of Community Psychology, which aims to improve community mental health through research and social intervention programs such as prevention, citizen participation, environmental change, and influence of public policy. This course will introduce the background and content of community mental health and community psychology, present the key concepts involved, and engage students in practical applications of the methods used by community psychologists.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisite: PY151, or Junior or Senior standing.
Req. Designation: Technology

PY 400(3) **Course ID:012936** **2019-03-25**
Internship - Professional Experience (Class Structure)
This course entails completing a professional experience (90 – 120 hours) through volunteer or work activities associated with psychology and writing an APA style paper that integrates the professional experience with relevant psychological literature. Examples of professional experiences include, but are not limited to, St. Lawrence Psychiatric Facility, Reach Out Crisis Hotline, Renewal House, Canton-Potsdam Hospital Chemical Dependency Unit, working in Human Resources or marketing/advertising departments, Hospice, patient advocacy, counseling, or mental health diagnoses. Note that the professional experience must be approved BEFORE the student begins the experience; please contact the Psychology Front Office for details.
Components: Independent Study
Attributes: Two communication units, Offered Fall Term
Requirement Group: PY400 Requirements: Junior or Senior standing.
Req. Designation: Technology

PY 401(3) **Course ID:009497** **2022-06-07** **Instructor Consent Required**
Internship - Clinical/Counseling Psychology (individual study format)
This course entails completing a professional experience (90 – 120 hours) through volunteer or work activities associated in clinical/counseling psychology and writing an APA style paper that integrates the professional experience with relevant psychological literature. Note that the professional experience must be approved BEFORE the student begins the experience; please contact the Psychology Front Office for details. This class is taught in an individual study format and can replace, if needed, the PY400 Internship - Professional Experience class.
Components: Independent Study
Attributes: Two communication units, Given When Needed
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

PY 402(3) **Course ID:009498** **2022-06-07** **Instructor Consent Required**
Internship: Personnel Relations (individual study format)
This course entails completing a professional experience (90 – 120 hours) through volunteer or work activities associated in relevant organizations and writing an APA style paper that integrates the professional experience with relevant psychological literature. Note that the professional experience must be approved BEFORE the student begins the experience; please contact the Psychology Front Office for details. This class is taught in an individual study format and can replace, if needed, the PY400 Internship - Professional Experience class.
Components: Independent Study
Attributes: Two communication units, Given When Needed
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

PY 403(3) **Course ID:009499** **2022-06-07** **Instructor Consent Required**
Internship - Psychology in Health Care Environments (individual study format)
This course entails completing a professional experience (90 – 120 hours) through volunteer or work activities associated in health care environments and writing an APA style paper that integrates the professional experience with relevant psychological literature. Note that the professional experience must be approved BEFORE the student begins the experience; please contact the Psychology Front Office for details. This class is taught in an individual study format and can replace, if needed, the PY400 Internship - Professional Experience class.
Components: Independent Study
Attributes: Two communication units, Given When Needed
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 411(3) **Course ID:011045** **2021-12-06**
Counseling Psychology:Theory and Practice
This course builds a foundation of clinical knowledge and skills for those who may pursue work in counseling or psychotherapy. It surveys the most widely accepted theories of counseling and provides experiential opportunities to learn and practice facilitative communication skills. Students explore basic concepts for integrating diagnosis, evaluative testing, treatment planning, and appropriate referral into the counseling process. The various types of counseling professions and the ethical issues surrounding counseling are also discussed.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: Psychology major with Senior or Junior standing, or consent of the instructor.
Req. Designation: Technology

PY 412(6) **Course ID:012135** **2016-02-22** **Instructor Consent Required**
Psychiatric Center Professional Experience
Students will spend one full day per week working with and observing Clinical Psychologists at the St. Lawrence Psychiatric Center in Ogdensburg, NY. The experience may include rounds at the Sex Offenders Treatment Program, Child and Youth Program, and the Adult Services Program. Activities include observing group therapy, developing a lesson plan for and delivering a therapy session under the supervision of a staff Psychologist, and observing treatment team meetings. This course is only open to Psychology majors. Prerequisites: PY151 and permission of the instructor. Acceptance into the course will be based on GPA and a short essay describing how this course will advance his/her personal and professional goals.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: PY151
Req. Designation: Technology

PY 453(3) **Course ID:011752** **2015-03-05**
Advanced Topics in Social Psychology
In this course students will receive an intensive treatment of several classic and cutting-edge topics in social psychology, including social motivation, self-esteem, social identity and intergroup relations, the psychology of meaning, embodied social cognition and social neuroscience. Students will develop their understanding and communication of social psychological concepts, theories, and research by engaging in class debate and discussion, giving oral presentations, and writing scientific literature reviews.
Components: Lecture
Attributes: Two communication units, Offered Spring Term
Requirement Group: Prerequisite: PY151 and PY253 or consent of the instructor.
Req. Designation: Technology

PY 454(3) **Course ID:009501** **2021-02-18**
Biological Psychology
[Cross-listed with BY 454] A comprehensive investigation of the neuroanatomical and neurophysiological foundations of behavior. Topics include, but are not limited to: perception, motivation, emotion, states of consciousness, learning, memory and mental illness.
Components: Lecture
Course Equivalents: BY 454
Attributes: Offered Odd Falls
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 456(3) **Course ID:009502** **2016-03-08**
Experimental Psychology
This course involves research design, hypothesis testing, measurement and analysis, and includes the application and interpretation of statistics. The research methodologies covered will include experimental and quasi-experimental designs.
Components: Laboratory, Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: Must be a Psychology major with at least Junior standing. PY151, and one of: STAT282, S
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 457(2) **Course ID:012140** **2016-03-07**
Experimental Psychology Laboratory
Students will work in teams to design and conduct an experiment, analyze the results and write up their findings in the American Psychological Association format.
Components: Laboratory
Attributes: Two communication units, Offered Fall Term
Requirement Group: Corequisite: PY456
Req. Designation: Technology

PY 458(3) **Course ID:009503** **2021-02-18**
Cognitive Neuroscience
[Cross-listed with BY 458] This course introduces a sampling of the theories and research concerning how various mental processes are accomplished within the brain. Emphasis will be placed on developing an understanding of both the physiological bases of the techniques and the issues involved in relating measures of brain activity to cognitive functioning. Students will be exposed to current topics of study in a number of areas of cognition: perception, language, memory, among others. In this course we will study a number of different techniques for studying the brain, including electrophysiological recording techniques, functional imaging techniques, and methods that involve brain lesions and disrupting neural activity.
Components: Lecture
Course Equivalents: BY 458
Attributes: Individual and Group Behavior, Science, Technology and Society, University Course, Offered Even Falls
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Psychology

PY 459(3) **Course ID:011215** **2015-03-05** **Instructor Consent Required**
Neuroscience and Society
[Cross-listed with HIST 459] The word 'neuroscience' is of recent origin. Yet we can trace neuroscientific ideas back to Rene Descartes. Since Decartes, social understanding of madness, the relationship between mind and brain, and the nature of sensation and perception has changed frequently. Beginning in the Age of Mechanical Man, and ending in the Age of Prozac, this course examines how society has influenced neuroscientific thought and how, in turn, neuroscience has influenced society.

Components: Lecture
Course Equivalents: HIST 459
Attributes: One communication unit, Science, Technology and Society, Offered Spring Term
Requirement Group: Restriction: Junior or senior standing, and permission of the instructor
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: Psychology

PY 460(3) **Course ID:009504** **2014-11-20**
Neurobiology
[Cross-listed with BY 460] Neurons are electrically excitable cells that initiate and control many complex functions such as sensory perception, locomotion, memory, and learning. This course introduces the study of neuronal mechanisms at the cellular and molecular level. Topics include: membrane biophysics, ion channels, electrical signaling, synaptic transmission, glia, sensory transduction, neuromodulation, and neuronal plasticity.

Components: Lecture
Course Equivalents: BY 460, BY 561
Requirement Group: Prerequisites: BY160 or BY360 or consent of instructor.
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 461(3) **Course ID:011656** **2015-01-21**
Judgment and Decision Making
Decision making is using information (and in some cases, emotion) to guide behavior among multiple possible courses of action - which foods to choose, who to select for a romantic partner, or which products to buy. These choices determine our success in meeting the challenges of life. This course will cover a wide variety of topics regarding how people form judgments and make decisions by drawing on findings from psychology, economics, and biology. We will investigate the various techniques used to study and assess human judgment and decision making, explore how people reason under risk and uncertainty and apply the research addressed in class to real-world problems and issues.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PY 151 and Junior or Senior standing
Req. Designation: Technology

PY 462(3) **Course ID:009505** **2015-02-20**
Abnormal Psychology
This course surveys the major syndromes of psychopathology, including schizophrenia, depression and manic-depression, anxiety disorders, and psychopathic personality. Reviews know causes, symptomatology, and both pharmacological and psychological modes of intervention.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisites: PY151 or junior or senior standing.
Req. Designation: Technology

PY 463(3) **Course ID:009506** **2015-02-20**
Health Psychology
This course will provide an introduction to the field of health psychology, which is concerned with the role of psychological and social factors in health and illness. The course will address three general subject areas: 1) attitudes, behavior, and lifestyle factors affecting disease prevention and development, 2) stress and the related personality and social processes associated with disease development and progression, and 3) the psychological and social consequences of physical illness.
Components: Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Prerequisites: PY151 or permission of the instructor.
Req. Designation: Technology

PY 464(3) **Course ID:012885** **2018-09-17**
Clinical Psychology
This course is designed to introduce students to the theoretical, empirical, and ethical foundations of clinical psychology. We will focus on the major roles of clinical psychologists, particularly psychotherapy, assessment, and issues in education and training. Students will also be asked to engage in self-reflection throughout the course, as the ongoing development of self-awareness and self-knowledge are essential to effective and ethical practice. Contemporary issues and controversies that are currently shaping the field of clinical psychology will also be addressed. Prior enrollment in PY462 (Abnormal Psychology) is recommended.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: PY151 or Junior or Senior standing.
Req. Designation: Technology

PY 480(1 - 6) **Course ID:009508** **2022-06-07**
Directed Study in Psychology
This is a directed reading course that will allow the student the opportunity to pursue special interests in the general psychology.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PY 481(1 - 6) **Course ID:009509** **2022-06-07**
Directed Study in Social Psychology
This is a directed reading course that will allow the student the opportunity to pursue special interests in social psychology.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 482(1 - 6) **Course ID:009510** **2022-06-07**
Directed Study in Physiological Psychology
This is a directed study course that will allow the student the opportunity to pursue special interests in physiological psychology.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PY 483(1 - 6) **Course ID:009511** **2022-06-07** **Instructor Consent Required**
Directed Study in Cognitive Psychology
This is a directed reading course that will allow the student the opportunity to pursue special interests in cognitive psychology.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

PY 490(1 - 6) **Course ID:013141** **2021-10-29** **Instructor Consent Required**
Directed Research in Cultural Psychology
The student works on-on-one with a faculty member on a cultural psychology research project. The Student will learn about the major theories related to the research topic, and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

PY 491(1 - 6) **Course ID:009513** **2017-01-13** **Instructor Consent Required**
Directed Research in Health Psychology
The student works one-on-one with a faculty member on a health psychology research project. The student will learn about the major theories related to the research topic and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major. Instructor consent required to enroll.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

PY 492(1 - 6) **Course ID:009514** **2017-01-13** **Instructor Consent Required**
Directed Research in Psychophysiology
The student works one-on-one with a faculty member on a psychophysiological research project. The student will learn about the major theories related to the research topic and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major. Instructor consent required to enroll.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

PY 493(1 - 6) **Course ID:009515** **2017-01-13** **Instructor Consent Required**
Directed Research in Cognitive Psychology
The student works one-on-one with a faculty member on a cognitive psychology research project. The student will learn about the major theories related to the research topic and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major. Instructor consent required to enroll.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

PY 494(1 - 6) **Course ID:009516** **2017-01-13** **Instructor Consent Required**
Directed Research in Social Psychology
The student works one-on-one with a faculty member on a social psychology research project. The student will learn about the major theories related to the research topic and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major.Prerequisite: consent of the instructor.
Components: Research
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Psychology - Subject: Psychology

PY 495(1 - 6) **Course ID:009517** **2018-10-23**
Directed Research in Clinical Psychology
The student works on-on-one with a faculty member on a clinical psychology research project. The student will learn about the major theories related to the research topic, and gain first-hand experience with research methodology issues, data collection, and analysis. Does not count towards the directed research requirement for the psychology major.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

PY 496(1 - 6) **Course ID:009518** **2017-01-13** **Instructor Consent Required**
Directed Research in Psychology
The student works one-on-one with a faculty member on a cognitive psychology research project. The student will learn about the major theories related to the research topic and gain first-hand experience with research methodology issues, data collection, and analysis. The student will write an APA style research paper. Can be used to satisfy the directed research requirement for the psychology major. Instructor consent required to enroll.
Components: Research
Attributes: One communication unit, Offered Each Term
Req. Designation: Technology

PY 498(1 - 10) **Course ID:009520** **2022-06-07** **Instructor Consent Required**
Senior Thesis
Research under the direction of a faculty sponsor, who assists the student in the choice of a problem and in the planning and execution of the research.
Components: Research
Attributes: One communication unit, Given When Needed
Requirement Group: Prerequisites: senior psychology major and consent of the department faculty.
Req. Designation: Technology

PY 499(1 - 10) **Course ID:009521** **2022-06-07**
Senior Thesis
Continuation of the research from PY498 leading to a written due at the end of the course. Can be used to satisfy the directed research requirement for the psychology major.
Components: Research
Attributes: One communication unit, Given When Needed
Requirement Group: Prerequisite: PY498.
Req. Designation: Technology

PY 900(1 - 15) **Course ID:011970** **2015-02-09**
Thesis, Dissertation or Special Project in Psychology
Student performs research toward a masters degree under the guidance of a faculty thesis advisor. A graduate thesis committee monitors student progress and provides guidance toward completion of the project. Work done in satisfaction of the requirements for a degree will be assigned a grade when the thesis is submitted and approved.
Components: Thesis Research
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - School of Arts & Sciences - Subject: School of Arts and Sciences

SA&S 1(2 - 4) **Course ID:013002** **2019-05-01**
School of Arts and Science Elective
A college level course for which there is no comparable Clarkson course. used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SA&S 2(2 - 4) **Course ID:011807** **2015-01-19**
School of Arts and Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SA&S 3(2 - 4) **Course ID:013003** **2019-05-01**
School of Arts and Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SA&S 4(2 - 4) **Course ID:011808** **2015-01-19**
School of Arts and Science Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SA&S 100(1) **Course ID:011737** **2015-02-20**
Co-Writing
A writing workshop to be taken concurrently with UNIV190, Clarkson Seminar. Provides supplementary instruction and practice in critical analysis and in writing and editing techniques. Each week students have a group session and also meet one-to-one with the course instructor about work in progress in their UNIV190 classes.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Corequisite: UNIV190
Req. Designation: Technology

SA&S 300(1) **Course ID:011435** **2015-02-09**
Arts and Sciences Seminar
Students attend seminars by alumni, faculty, and guest speakers. Students will attend one seminar per week. The School of Arts and Sciences will typically sponsor most of these seminars. Students may also attend seminars sponsored by the various Departments comprising Arts and Sciences. Students will write responses to at least three of the colloquia they attend over the semester.
Components: Seminar
Attributes: Offered Each Term
Requirement Group: Prerequisites: Major in the School of Arts and Sciences, and at least Sophomore standing
Req. Designation: Technology

SA&S 399(1) **Course ID:012931** **2019-03-01**
The Adirondack Speaker Series
In this weekly seminar, students will learn about our region. The purpose of the series is to give Clarkson students a sense of place. The weekly seminar will feature talks by researchers, community members, and storytellers who will discuss all things Adirondack, including geology, economy, history, agriculture, rivers, parks, animals, art, politics, and social issues. This seminar is open to all - students, faculty, and community members.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - School of Arts & Sciences - Subject: School of Arts and Sciences

SA&S 400(1 - 3) **Course ID:011942** **2019-05-20** **Instructor Consent Required**
Internship
Students gain practical work experience by working with a professional outside their department on issues, problems, or projects that draw on concepts and methods from multiple fields. Students also prepare a report about their learning experiences in the internships.
This course may be repeated for credit.
Components: Independent Study
Req. Designation: Technology

SA&S 410(0) **Course ID:012756** **2016-09-23** **Department Consent Required**
Professional Experience
This course number is used to matriculate the Professional Experience requirement of the Clarkson Common Experience curriculum. The student must participate in a project-based professional experience such as a co-op, internship, other professional-level work experience, directed research, significant responsibility in an appropriate team project, or a community project clearly related to the student's professional goals. Enrollment requires approval by the Associate Dean or Dean of Arts and Sciences.
Requirement: Pre-approval of the experience (contact the Office of the School of Arts & Sciences for details).
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

School of Arts and Sciences - Biology - Subject: School of Arts and Sciences

SA&S 499(1) **Course ID:011772** **2022-03-18** **Instructor Consent Required**
Biology, Behavior and Society Minor Portfolio
The student will provide a portfolio based on (a) term papers or equivalent products from the three major required courses in the BiBS minor, (b) representative course material that shows mastery of subject matter area, and (c) will use the portfolio and materials from other courses taken for the BiBS minor to prepare a 10 page self-reflective essay on what the student has learned about the biological, psychological, and socio-cultural influences on human behavior, human cultural evolution, and human social organization.

Components: Independent Study
Requirement Group: Prerequisites: HIST270, BY/PY340, and BY/PY357
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 1(2 - 4) **Course ID:009526** **2015-01-19**
Business Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SB 2(2 - 4) **Course ID:009527** **2015-01-19**
Business Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Management/Business Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SB 100(1 - 3) **Course ID:009528** **2016-09-09** **Instructor Consent Required**
Quantitative Methods of Business and Economics
This course is restricted to the HEOP Summer Program for incoming students. It is designed to prepare students for the required courses in the School of Business at Clarkson, and will emphasize the understanding of mathematical methods and their application to the fundamentals of business and economics. Topics will include algebraic and functional interpretation, geometry, creating and using graphs to understand and communicate data, marginal analysis, and other mathematical concepts as they are used in selected topics in business and economics. This course may not be used to satisfy business major requirements.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisite: For HEOP students only.
Req. Designation: Technology

SB 113(3) **Course ID:009529** **2015-02-20**
Entrepreneurship and Business Innovation I
(CUSB Freshmen Only) SB113 provides you with exposure to a range of business theories and skills by applying and reinforcing this knowledge through actual management and entrepreneurial experience. This “learning-by-doing” approach is designed to provide you with a solid foundation for critical, analytical and lateral thinking about management and increase your confidence and competence as practicing managers, leaders, and entrepreneurs. Additionally, this course will serve as an introduction to familiarize you with the Clarkson University School of Business curriculum and introduce you to each of the business disciplines. You will be exposed to theories, applications, and skills relevant to creating an effective business plan. These include: innovation, decision making, leadership, team building, oral and written communication, market research, financial analysis, and working under conditions of uncertainty. Ultimately, the course is centered on helping you become aware of and able to manage risk, resources, and opportunities, while understanding the
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Fall Term
Requirement Group: Restriction: Must be a CUSB Freshmen.
Req. Designation: Technology

SB 114(3) **Course ID:009530** **2015-01-21**
Entrepreneurship & Business Innovation II
SB114 provides you with exposure to a wide range of business theory and skills. Using the experiences gained in SB113, students will learn about the various types of business structures and how individual and group behavior can positively or negatively impact an organization’s success. Students will be exposed to topics including financial analysis, asset management, human resource management, supply chain management, intellectual property, international business and group behavior. Specifically, students will study concepts associated with managing a start up venture or new product introduction, leadership, personal accountability, stress, tolerance for uncertainty, change management and organizational flexibility. This foundation of learning is also designed to support the student’s choice of emphasis in future course selection.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Prerequisite: SB113.
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 115(3) **Course ID:011673** **2021-10-20**
Foundations of Innovation and Entrepreneurship
This course will expose the student to a wide range of business theories and skills and serves as an introduction to the curriculum of the School of Business. The course will provide the student with an introduction to each of the business disciplines and an introduction to the theories, application, and skills necessary to create an effective business plan. These skills and topics include: innovation, analytically thinking, decision making, leadership, team building, oral and written communication, market research, and financial analysis. This course is offered only to second semester freshmen students who have internally transferred to the School of Business. This course cannot be taken by a student who has taken SB113. The course will serve as a substitute for SB113 for those students who internally transfer into the School of Business.
Components: Laboratory, Lecture
Attributes: One communication unit, Offered Spring Term
Requirement Group: Restriction: This course cannot be taken by any student who has taken SB113.
Req. Designation: Technology

SB 310(0) **Course ID:010988** **2015-02-09**
CUSB Professional Experience: Internship
Project-based professional internship experience in business, related to student career interests and/or field of study. Fulfills Clarkson Common Experience Professional Experience Requirement for School of Business students. Course registration requires CUSB approval of application. Completion of course requires CUSB approval of post-internship assessment by student and employer. Offered Pass/No Credit.
Components: Independent Study
Attributes: Offered Each Term
Requirement Group: Prerequisite: Sophomore standing, consent of the instructor.
Req. Designation: Technology

SB 322(3) **Course ID:009009** **2015-02-09**
Designing and Leading Innovative Ventures
This course will provide students with opportunities to understand how the shifting business environment requires innovative ventures to adapt, change and respond to ensure competitiveness. Students will explore traditional organizational structures as well as cross-functional and virtual teams and networks, and will gain an understanding of the value of rewards and incentives in helping influence innovation and structural/organizational evolution. Students will also consider benchmark techniques and approaches used to inform and advocate innovation to key internal and external stakeholders.
Components: Lecture
Attributes: Offered Each Term
Requirement Group: Prerequisite: At least Sophomore standing.
Req. Designation: Technology

SB 356(3) **Course ID:012796** **2022-02-10**
Invention Development & Protection
[Cross-listed with EM356] In this course, students learn how to develop inventions and protect them. Students will work in small teams to develop and describe their inventions in a form suitable for filing provisional patent applications with the U.S. Patent and Trademark Office. Aspects of intellectual property laws in the US and other countries will be covered to guide the student inventing process. Not open to E&M students.
Components: Lecture
Course Equivalents: EM 356
Attributes: Given When Needed
Requirement Group: SB356 Prerequisites: Junior Standing, not open to E&M majors.
Req. Designation: Technology

SB 361(3) **Course ID:010252** **2014-11-18**
Supply Chain Environmental Management
[Cross-listed with EM 361] In recent years, manufacturing organizations have increased their interest in environmental management through activities such as green purchasing, reverse logistics, product stewardship and design-for-the environment. These activities, usually involving several organizations, are often part of what is known as supply chain environment management. This course aims to gain a greater understanding of supply chain environmental management by examining: (i) the advantages and business risks of adopting and implementing environmental practices and technologies in the supply chain, (ii) the role of suppliers and customers to facilitate the adoption/ implementation of environmental practices and technologies, and (iii) the implications of such supply chain activities on an organization's operations strategy. This course consists of a mix of lectures and class discussion and relies primarily on a set of readings and a series of cases that will be analyzed in class.
Components: Lecture
Course Equivalents: EM 361
Attributes: Offered Spring Term
Requirement Group: Prerequisites: OM331.
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 381(3) **Course ID:011984** **2016-12-31**
Logistics Management
[Cross-Listed EM381]Logistics involves planning, implementation and control of the forward and reverse flow and storage of goods, services, and information in the supply chain in order to effectively meet customer demand. Primary topics covered include management and location of facilities, management of channel networks, warehousing, transportation, management and design of integrated logistics networks, distribution strategies, third-party logistics, international logistics, and vehicle routing. In addition to lectures, case studies, numerical assignments and simulation of logistics systems may be utilized.
Components: Lecture
Course Equivalents: EM 381
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MK 320 and OM/EM 331
Req. Designation: Technology

SB 396(3) **Course ID:011508** **2022-02-10**
Global Business Strategies
This course takes a transnational perspective on strategic management. It explores the integrative and cross-functional nature of organizational strategy and decision-making within a global environment. Students are exposed to a wide range of strategic problems, opportunities, challenges, dilemmas/puzzles and paradoxes involved in forming and implementing organizational strategies in an era of globalization. The aim is to develop the sophisticated, critical thinking skills and understanding necessary to manage effectively in an increasingly globalized world.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: Must have junior or senior standing.
Req. Designation: Technology

SB 437(3) **Course ID:010980** **2015-01-21**
Commercializing Innovation
This course focuses on how to successfully commercialize an innovation. While it is important to come up with an innovative idea and develop a product concept, it is equally critical to effectively design and launch the product in the market and ensure its long-term success. This is where the innovation efforts of a large number of entrepreneurs and companies fail. The course provides an exposure to various product design approaches and strategies. Understanding commercialization activities such as pre-product launch planning, market testing, actual product launch, and post-launch follow-up is a major part of the course. These commercialization activities among other things involve developing a marketing plan for the product, carefully testing the plan, modifying the plan based on test market results, and crafting a long-term strategy for the product. The course also provides an exposure to how market data is generated and analyzed during these activities.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MK436, MK332.
Req. Designation: Technology

SB 440(3) **Course ID:010981** **2015-01-21**
Innovation and Entrepreneurship Strategy
The employment of comprehensive case problems in the formulation of action programs and business policy is a major feature in this integrated course in innovation and entrepreneurship strategy. As a capstone course, it is designed to allow students to apply their knowledge in a complex case analysis environment. The hallmark of the course is the application of learned material to realistic, multifarious management issues. Thus, each case represents a complex web of managerial issues that must be resolved. The cases will cover many different content subjects that may vary from semester to semester. The course will also focus on the process of critical thinking in the context of management decision making.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: MK320, MK321, MK332, MK436, and senior standing.
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 441(3) **Course ID:010982** **2022-02-10**
Advanced Topics in Global Supply Chain Management
[Cross-listed with EM 441] This course introduces several emerging topics in supply chain management, including: demand management, revenue management, risk management, supply chain agility and flexibility, supply chain disruption management, and supply chain contracts. This course also provides students with the opportunity to gain experience dealing with complex supply chain issues by utilizing a simulation game. The simulation deals with both strategic and tactical aspects of management the supply chain.
Components: Lecture
Course Equivalents: EM 441
Attributes: Offered Fall and Spring
Requirement Group: Prerequisite: OM341.
Req. Designation: Technology

SB 487(1 - 3) **Course ID:012151** **2017-01-13** **Instructor Consent Required**
Special Project in Business
An investigation of a problem or in-depth topic undertaken by the student under the guidance of a faculty member.
Prerequisites: Permission of the instructor
Components: Research
Attributes: Given When Needed
Req. Designation: Technology

SB 490(1 - 3) **Course ID:012152** **2016-04-05** **Instructor Consent Required**
Internship
An unpaid internship that is related to the student’s professional goals.
Prerequisite: Permission of the Instructor
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

SB 500(0) **Course ID:010707** **2018-05-01**
Pre-MBA Module:Information Systems
This course provides students with a broad overview of information systems and their uses in organizations. The course will examine basic components of organizational IT infrastructure, such as standard hardware and software components, network and the Internet technologies, as well as databases and business applications. In addition, students will understand the roles these components play in an organizational information system.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 510(0) **Course ID:010708** **2018-05-01**
Pre-MBA Module:Macroeconomics
An introduction to macroeconomics including the analysis of national income determination, interest rate determination, and economic growth. Monetary and fiscal policy and selected issues in international macroeconomics are also covered.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 520(0) **Course ID:010709** **2018-05-01**
Pre-MBA Module:Microeconomics
An introduction to microeconomics covering the role of the price system in, and public policies toward, the allocation of goods and resources. Topics include supply and demand, market structures, analysis of firm behavior, household behavior, and the gains from international trade.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 530(0) **Course ID:010710** **2018-05-01**
Pre-MBA Module:Accounting
An introduction to accounting concepts necessary for an understanding of financial reporting, and managerial planning and control. Basic elements of the balance sheet, the income statement and the statement of cash flows are introduced. Cost concepts important for business decision making are also covered.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 540(0) **Course ID:010711** **2018-05-01**
Pre-MBA Module:Law and Society
A course designed to provide a basic understanding of (1) the nature, functions and limitations of law and legal systems; (2) the basic relationship among justice, ethics, legal systems and social structure; and (3) the relationship among society, law and business activity. In addition, this course is designed to enlighten with respect to rules, principles, standards and doctrines of law fundamental to a free enterprise system. The course covers the substantive areas of constitutional law, torts and contracts.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 550(0) **Course ID:010712** **2018-05-01**
Pre-MBA Module:Statistics
Introduction to statistical methodology. Topics include descriptive statistics, probability distributions, point and interval estimation, hypothesis testing, two-sample tests, comparisons, measuring and testing association, correlation, regression. Emphasis on business applications, intuitive development, and problem solving technique using a statistical software.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 560(0) **Course ID:010713** **2018-05-01**
Pre-MBA Module:Marketing
This course provides a basic understanding of management of marketing activities in contemporary organizations. The course is based on the premise that the purpose of a firm is to satisfy the needs and desires of its customers. Topics covered include: segmentation and target market selection, buyer behavior, market research, and marketing strategy (including product planning, pricing, distribution, and promotion.) the changing nature of marketing and the trends in domestic and international marketing are also examined.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 570(0) **Course ID:010714** **2018-05-01**
Pre-MBA Module:Organizational Behavior
An introduction of the fundamental theories and concepts required to manage contemporary organizations. This course focuses on individual behaviors as they relate to the functions of planning, organizing, controlling, and leading. Critical concepts and theories in behavioral science related to the practice of management are presented and discussed to assist the student in developing understanding of the pervasiveness of the discipline in all types of organizations and processes. Topics include motivation, leadership, perceptions, personality theory, team processes and group behavior, and decision making.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 580(0) **Course ID:010715** **2018-05-01**
Pre-MBA Module:Operations/Production Management
An introduction to the planning, analysis and control of production systems. Topics include, inventory management models, materials requirements planning, manufacturing process types, supply chain management, lean concepts, and quality management tools including statistical process control.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 590(0) **Course ID:010716** **2018-05-01**
Pre-MBA Module:Finance
A study of the problems associated with the financial management of business organizations. Topics include: a review of time value of money, analysis of capital investments, valuation, capital structure, short and long term financing, and business failure.
Prerequisite: graduate standing (admitted to the MBA program).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

SB 609(2) **Course ID:010718** **2014-11-19**
Corporate Ethical Decision Making
[Cross-listed with SB 610] This course provides a basis for integrating the MBA curriculum, and enable students to develop the ethical awareness and understanding needed to cope with ongoing problems and challenges in corporate and industrial contexts. Students will acquire a basic understanding of moral theories and principles, become familiar with well known case studies, understand the role of business in society (including the influences of various macro-environmental forces, such as technological, social/cultural, political, that influence corporate decision making), and become adept at applying sound ethical reasoning and decision making in their daily professional lives.
Prerequisites: completion of all CUSB MBA foundation requirements and admission to the MBA program.
Components: Lecture
Course Equivalents: SB 610
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 610(3) **Course ID:011255** **2017-07-14**
Corporate Ethical and Social Responsibility
[Cross-listed with SB 609] The central goal of the course is to give students an intellectual foundation to frame a wide range of ethical/moral issues/dilemmas facing contemporary business organizations operating within a global environment. As the business environment grows increasingly complex, managers are confronted with important questions that have ethical ramifications. These questions include: Does a company have any obligation to help solve social problems such as poverty, corruption, pollution, unemployment, and income inequality? What are the ethical responsibilities of a multinational corporation operating in foreign countries, especially those characterized as corrupt? What obligation does a manufacturer have to the consumer with respect to product defects and safety? A wide selection of case studies provides students with the opportunity to hone their skills for applying ethical principles and decision making approaches to address complex, 'real-world' business problems within the context of an evolving political, economic,

Components: Lecture
Course Equivalents: SB 609
Attributes: Offered Fall Term
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 611(1.5) **Course ID:009540** **2021-02-11**
Supply Chain Ethics
The main goal of this course is to give students an intellectual foundation to analyze and evaluate a variety of ethical issues involved in designing and implementing global supply chain systems. The course equips students with the knowledge and tools for identifying ethical dilemmas, discerning issues, and developing options for resolving those issues in order to build and manage socially and ethically responsible supply chain systems that accomplish triple bottom-line performance. Utilizing case studies, readings, and participants' personal experience, this course will outline and apply various concepts and tools to develop and gain moral insights about ethical dilemmas in supply chain systems (including sourcing/purchasing, customer-supplier relationship management, relational governance, labor relations, and stakeholder management). A wide selection of case studies provide students the opportunity to hone their skills for applying ethical principles and decision making approaches to address complex, "real-world" supply-chain
Components: Lecture
Attributes: Offered Each Term
Req. Designation: Technology

SB 613(3) **Course ID:009542** **2015-01-21**
Entrepreneurship and New Venture Creation
In this course, students will execute the 'entrepreneurial process,' a sequence of activities related to the creation of a new business venture. As such, this course is intended for students whose personal and near-term objectives involve entrepreneurship. The major components of the entrepreneurial process include idea creation and opportunity assessment, industry research and analysis, strategic and operational planning, and resource mobilization and implementation. These process components will be discussed and implemented throughout the semester; as such, this course is very experiential in nature. Fulfillment of these activities will include extensive out-of-class research, in-class peer reviews and brainstorming sessions, and the development of formal business plan proposals. Students are required to sign non-disclosure agreements, and may elect to present their finished proposals to a panel of small business executives for review.
Prerequisite: consent of the instructor.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 620(3) **Course ID:013075** **2020-12-11**
Business Process Analysis
This course introduces the fundamentals of business process analysis and its role in driving efficient and innovative organizations. Students examine business process mapping, workflow, change initiatives, process improvements with particular emphasis on effective change initiatives, and adoption of IT solutions that solve specific business needs.
Components: Lecture
Attributes: Offered Spring Term
Requirement Group: Admission to the MGMTD-MBA program
Req. Designation: Technology

SB 640(3) **Course ID:012005** **2017-07-14**
Advanced Topics in Supply Chain Management: Simulation & Analysis
[Cross-listed with SB 641] This course provides a theoretical and analytical framework for managing critical supply chain components. Topics include revenue management, dynamic pricing, supply chain risk and disruption management, supply chain agility and flexibility, supply chain network design under uncertainty, and supply chain contracts. Hands-on simulation provides an opportunity to gain experience dealing with complex strategic and tactical global supply chain issues.
Components: Lecture
Course Equivalents: SB 641
Attributes: Offered Fall Term
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 641(3) **Course ID:011064** **2015-03-05**
Advanced Topics in Supply Chain Management: Simulation & Analysis
[Cross-listed with SB 640] This course provides a theoretical and analytical framework for managing critical supply chain components. Topics include revenue management, dynamic pricing, supply chain risk and disruption management, supply chain agility and flexibility, supply chain network design under uncertainty, and supply chain contracts. Hands-on simulation provides an opportunity to gain experience dealing with complex strategic and tactical global supply chain issues.
Prerequisite: OM606 or OM607.
Components: Lecture
Course Equivalents: SB 640
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 651(3) **Course ID:012564** **2018-08-22**
Communicating Globally
[Formerly MBA 651] An increasingly global marketplace affords organizations all over the globe the opportunity to conduct business and distribute goods and services to new customer bases with unique needs and interests. At the same time, globalization presents company leaders, corporate communicators, and organizational gatekeepers with the challenges inherent in intercultural communication. The course: “Communicating Globally” introduces a way of thinking that enables students to acquire cultural competence and function effectively in diverse cultural situations. It presents essential concepts of corporate and national cultures and examines key differences in communication, decision making styles, and pattern of interactions in multi-cultural teams and cross-cultural negotiations - laying the foundation for necessary behavioral adaptations.The course begins with a discussion of the major facets of international business with the cultural aspect presented as the most challenging dimension. Students discover the reasons that cultures
Components: Lecture
Same As Offering: SB 651
Req. Designation: Technology

SB 651(3) **Course ID:012564** **2018-08-22**
Communicating Globally
[Formerly MBA 651] An increasingly global marketplace affords organizations all over the globe the opportunity to conduct business and distribute goods and services to new customer bases with unique needs and interests. At the same time, globalization presents company leaders, corporate communicators, and organizational gatekeepers with the challenges inherent in intercultural communication. The course: “Communicating Globally” introduces a way of thinking that enables students to acquire cultural competence and function effectively in diverse cultural situations. It presents essential concepts of corporate and national cultures and examines key differences in communication, decision making styles, and pattern of interactions in multi-cultural teams and cross-cultural negotiations - laying the foundation for necessary behavioral adaptations.The course begins with a discussion of the major facets of international business with the cultural aspect presented as the most challenging dimension. Students discover the reasons that cultures
Components: Lecture
Same As Offering: SB 651
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 655(3) **Course ID:013164** **2022-04-13**
Building and Managing Effective Teams
In today's global workforce and "gig economy," it is imperative that managers continually identify, organize, lead and assess the "intellectual capital" available for either short or long-term team commitments. The skillset needed to lead teams varies, depending upon organizational strengths and weaknesses. However, specific and agreed upon management behaviors assist managers in leading today's diversified teams toward attaining – and exceeding - corporate goals. This course provides an examination of several important management KSA's (Knowledge, Skills, and Abilities) for those responsible for team development and direction.
Components: Lecture
Attributes: Offered Summer Term
Requirement Group: Prerequisite: Admission to the MBA Program
Req. Designation: Technology

SB 658(3) **Course ID:012849** **2017-10-25**
Bridging the Innovation Gap
""Bridging the Innovation Gap"" is an MBA course for the Innovation and New Venture track. The ""innovation gap"" refers to the hard-to-navigate space between invention and innovation/commercialization. The course examines successful and unsuccessful ""bridging the gap"" practices across a range of industries, including communicating and translating inventions to diverse stakeholders, engaging stakeholders, gaining commitment, resourcing, and managing gaps over time and across different settings (e.g., solo startups, not-for-profits, and corporate environments). Students will become more adept at managing the various stakeholders and processes within a given invention-innovation space, and at choosing between bridging strategies for different settings. The course uses a studio-based, make-to-learn pedagogy, where learning happens through creative experimentation with live problems.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 662(3) **Course ID:012571** **2016-07-25**
International Business
[Formerly MBA 662] This course examines international business management as influenced by the important economic, political and cultural environment within which businesses must conduct international trade and investment. The problems and issues confronting international managers are evaluated related to a firm's strategy, organizational structure, manufacturing, material management, marketing, R&D, human resources and finance. Competitive strategies are examined that have been successful in leading international companies. Case studies are used extensively to illustrate the relevance of these topics in the practice of international business.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

SB 664(3) **Course ID:012572** **2018-12-06**
Entrepreneurship
[Formerly MBA 664] The primary objective of this course is to develop an awareness of the process of new venture creation, whether it is an intrapreneurial or entrepreneurial event. The skills, knowledge and attitudes important for creating new ventures, and the complex tasks faced by individuals who start and manage new and growing businesses as well as corporate ventures and franchises will be addressed. The course is designed to provide a broad overview of management and financial issues. We will pay particular attention to: entrepreneurial decision-making, techniques entrepreneurs and investors use for evaluating and testing the feasibility of business opportunities, understanding the impact of market and industry forces on start up, performance and survival of new ventures, financing a business opportunity, etc.
Components: Lecture
Same As Offering: SB 664
Attributes: Offered Fall Term
Req. Designation: Technology

SB 664(3) **Course ID:012572** **2018-12-06**
Entrepreneurship
[Formerly MBA 664] The primary objective of this course is to develop an awareness of the process of new venture creation, whether it is an intrapreneurial or entrepreneurial event. The skills, knowledge and attitudes important for creating new ventures, and the complex tasks faced by individuals who start and manage new and growing businesses as well as corporate ventures and franchises will be addressed. The course is designed to provide a broad overview of management and financial issues. We will pay particular attention to: entrepreneurial decision-making, techniques entrepreneurs and investors use for evaluating and testing the feasibility of business opportunities, understanding the impact of market and industry forces on start up, performance and survival of new ventures, financing a business opportunity, etc.
Components: Lecture
Same As Offering: SB 664
Attributes: Offered Fall Term
Req. Designation: Technology

SB 668(3) **Course ID:012575** **2016-07-25**
MBA Global Study
[Formerly MBA 668] This course includes intensive study of issues in a country or region outside of the United States followed by a one-to-two-week trip abroad to that location. Each section, centered on a unifying theme and geographic location, will include these components: case studies and research work prior to and following the trip, practitioner presentations, in-country university lectures and visits to companies, governmental agencies, and important cultural sites. Students successfully completing this course will gain a better perspective on the economic, political, cultural issues as well as the business practices prevalent in another region of the world. Students should develop cultural awareness, an understanding of economic, cultural, and political differences between the US and other countries, and the role cultural, historical and political factors play in the conduct of business in a global economy.
Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 674(3) **Course ID:012578** **2016-07-01**
Growing an Entrepreneurial Business
[Formerly MBA 674] This course will focus on the challenges in growing a small to medium size business. The issues facing an entrepreneur when starting a new venture are very different than those he/she faces when growing an existing company or business. The course focuses on the unique issues an entrepreneurial leader faces as he/she looks to grow and scale their business. We will discuss and analyze the issues surrounding effectively scaling a business, and the impact that various decisions and initiatives have on the chance of success. How issues such as strategic marketing, team building and top-grading, financing, partnerships and leadership impact the growing business will be presented and discussed from the perspective of the business leader or entrepreneur. The course will include case studies, lectures, guest speakers, and discussions.
Components: Lecture
Req. Designation: Technology

Graduate Interdisciplinary - School of Business - Subject: School of Business

SB 678(3) **Course ID:012850** **2017-10-25**
Inventive Practices
This interdisciplinary graduate course focuses on 1) the practices of exemplary inventors around the world, 2) students' current invention practices, and 3) considers how student practices might be improved via applied, in-course projects and the use of exemplary inventor's practices. Students will gain a fine-grained understanding of the strengths and weaknesses of their invention practices, acquire new invention tools, and improve their abilities to inventively tackle and reframe difficult problems across a variety of disciplines. The course is deliberately open to graduate students throughout CU, particularly Master of Science and PhD students.

Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 681(3) **Course ID:011983** **2015-01-21**
Logistics Strategies
This course will examine effective strategies to manage forward and reverse flow of goods in a supply chain. Students will develop the skills to perform logistical functions within an organization, as well as assess and design the overall logistics strategy of the organization. Primary topics covered include management and design of integrated logistics networks, supply chain distribution management, coordinating strategic alliances with distributive intermediaries, warehousing, transportation, international logistics and the current trends and impact of technology on contemporary supply chain channels. Case studies, articles, numerical assignments, and simulation exercises may be utilized.
Components: Lecture
Attributes: Offered Spring Term
Req. Designation: Technology

SB 682(3) **Course ID:013080** **2021-01-15**
Logistics Strategies
Never in the history of business, customers have found it easier to order and suppliers have found it more difficult to fulfill the order than it is today. Logistics management aims to address this critical challenge in supply chains. Specifically, it concerns with cost-effective storage and movement of goods and information. Although logistics is one of the oldest commercial activity, today, it faces numerous challenges due to continuous changes in the market and technology. Effective and efficient planning, organizing, and execution of logistic activities involve appropriate material and information flows through a vast network of warehouses, transportation fleet and routes.

This course covers strategic, tactical, and operational aspects of logistics planning and execution. The topics aim to impart decision-making skills with respect to multiple logistical operations that impact the
Components: Lecture
Req. Designation: Technology

SB 684(3) **Course ID:012765** **2016-10-18**
Venture Capital and Private Equity
The course will focus on the venture capital and private equity industries. The course will introduce students to the concepts of private equity and its various forms with a focus on venture capital. The course will explore the impact of Venture Capital and Private Equity on the US and global economy. The course will also cover the corporate and organizational structures, decision making processes, and the transactions common in the Venture Capital and Private Equity industry. The course will have examples of investment criteria, term sheets, due diligence, and investment agreements taking into account both the investor and the entrepreneurs.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Business - CRC Business - Subject: School of Business

SB 687(1 - 3) **Course ID:009543** **2018-03-07** **Instructor Consent Required**
Special Graduate Topics
An investigation of a problem undertaken by the student which is acceptable to and under the guidance of the faculty member and chairperson. The course provides an opportunity for the student to investigate and analyze a problem in depth on an independent study basis.
Requirement: Instructor and Program Chair permission

Components: Independent Study
Same As Offering: SB 687
Attributes: Given When Needed
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 687(1 - 3) **Course ID:009543** **2018-03-07** **Instructor Consent Required**
Special Graduate Topics
An investigation of a problem undertaken by the student which is acceptable to and under the guidance of the faculty member and chairperson. The course provides an opportunity for the student to investigate and analyze a problem in depth on an independent study basis.
Requirement: Instructor and Program Chair permission
Components: Independent Study
Same As Offering: SB 687
Attributes: Given When Needed
Req. Designation: Technology

SB 690(6) **Course ID:013022** **2019-11-01**
Business Analytics Capstone Project
This course is a capstone project for students who have completed a foundation business analytics education. The purpose of this course is to prepare students for a career in the quantitative analysis by developing their ability to solve complex analytical business problems in real-world settings. Primarily designed for the Master of Science in Business Analytics (MSBA) program, this course provides students with an experience that allows them to demonstrate the application of the business knowledge aimed at addressing a data-driven decision-making problem in students' chosen disciplines. This class requires both written reports and oral presentations.
Components: Independent Study
Attributes: Offered Fall and Summer
Requirement Group: Prerequisites: AC620, FN610, MK630, and OM620
Req. Designation: Technology

SB 691(6) **Course ID:013021** **2019-11-01**
Business Analytics Thesis
This course is required for the Master of Science degree in Business Analytics (MSBA), as an alternative to the capstone project. The purpose of this course is to complete a research project in students' chosen disciplines, culminating their experiences in the MSBA Program and validating them as master practitioners. This course requires individual effort that is overseen by the course instructor, the Thesis Advisor. Weekly or bi-weekly meetings will be held to discuss progress and review submitted documents. Based upon the thesis proposal and with the approval of the Thesis Committee, students should undertake the writing of the thesis, which involves the literature review, data collection and analysis, result compilation and iterative thesis chapter revisions before the document is ready for submission to the Thesis Committee. With the approval of the Thesis Committee, a defense of the thesis will be held. Following successful completion of the Defense, the manuscript is revised a final time and once approved, can be submitted officially.
Components: Thesis Research
Attributes: Offered Fall and Summer
Requirement Group: Prerequisites: AC620, FN610, MK630, and OM620
Req. Designation: Technology

SB 693(3) **Course ID:009547** **2017-03-28**
Seminar in International Business I
This course includes intensive study of business that represents an international experience for the students followed by a two-week trip to the area of study. Each section, centered on a unifying theme and geographic location, will include three components: structured classes, practitioner presentations, and visits to companies, governmental agencies, and important cultural sites. Students successfully completing this course will gain an understanding of the economic, political, cultural issues as well as the business practices prevalent in a region of the world that is foreign to them.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

SB 696(3) **Course ID:009550** **2015-08-19**
Global Business Strategies
This course attempts to familiarize and sensitize students to current issues and practices relating to the globalization of markets. Topics include global manufacturing and international competitiveness, international marketing, international finance and international management strategies. The case study approach is used to introduce a diversity of perspectives into the classroom. This course is team-taught by faculty from the Production/Operations Management, Marketing, Finance and Organizational Studies areas.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Business - School of Business - Subject: School of Business

SB 999(1 - 10) **Course ID:011188** **2015-01-19**
Special Graduate Topics
A graduate level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - School of Science - Subject: School of Science

SC 1(2 - 4) **Course ID:009551** **2015-01-19**
SC Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SC 2(2 - 4) **Course ID:009552** **2015-01-19**
SC Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Science Foundation Curriculum Requirement.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - Inst for STEM Education - Subject: School of Science

SC 31(2) **Course ID:012943** **2019-05-16**
Introduction to STEM
How do scientists and engineers think as they approach a problem? Biologists, chemists and physicists have unique approaches to problems in their respective fields and classes. Introduction to STEM provides students the basic skills and concepts they need to succeed in their first year science courses. The class is composed of three modules of Biology, Chemistry and Physics led by first year faculty in the sciences. Intended for HEOP SPREE students. Check with major department to determine whether credits count toward graduation.

Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Science - School of Science - Subject: School of Science

SC 110(4) **Course ID:011456** **2015-01-19**
Environmental Science Elective with a Lab
Credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP Environmental Science Exam or 2) satisfactory completion of an approved college-level introductory environmental science course with a laboratory component. Biology, Bimolecular Science, and Environmental Science (EHS and ES&P) majors may not use credit for SC110 as one of their required biology or professional science electives.

Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - School of Science - Subject: School of Science

SC 141(4) **Course ID:011632** **2015-01-19**
Introduction to Physics I
College-level non-calculus based physics course with lab that covers topics in mechanics. Transfer credit for this course is awarded only in the following cases: 1) receipt of a score of 4 or 5 on the AP Physics B Exam, 2) receipt of a score of 5, 6, or 7 on the International Baccalaureate Physics Higher-Level Examination, or 3) satisfactory completion of an approved college-level non-calculus based physics course.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SC 142(4) **Course ID:011633** **2015-01-19**
Intro to Physics II
College-level non-calculus based physics course with lab that covers topics in electricity, magnetism, heat, and/or optics. Transfer credit for this course is awarded only in the following cases: 1) receipt of a score of 5 on the AP Physics B Exam, 2) receipt of a score of 7 on the International Baccalaureate Physics Higher-Level Examination, or 3) satisfactory completion of an approved college-level non-calculus based physics course.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Civil & Environmental Eng - Subject: School of Science

SC 301(3) **Course ID:011428** **2020-08-18**
Introduction to Geospatial Analysis and Geographic Information Systems
[Cross-listed with CE 301] An introductory course in the concepts and uses of Geographic Information Systems (GIS) including analysis of GIS-based local and global geographic datasets. Provides basic knowledge of GIS theory and applications using existing state-of-the-art GIS software and current spatial data resources. Applications include: overlay analysis, spatial data query, map generation and terrain surface analysis. Students will also learn the basics of GPS data collection, remote sensing, 3D visualization, probability, statistics, and error analysis.

Components: Laboratory, Lecture
Course Equivalents: CE 301
Attributes: Offered Each Term
Req. Designation: Technology

Engineering - Civil & Environmental Eng - Subject: School of Science

SC 502(3) **Course ID:013049** **2022-06-06**
Applications in Geospatial Analytics, Science, and Engineering
[Cross-listed with CE 502, EV 502] This course will use techniques in geospatial analytics, science, and engineering to address applied challenges in various contextual situations. Geotagging, network analysis, spatial visualization, geospatial data manipulation, cartographic presentations, and other similar methods will be studied and applied to real-world or research applications. Students will develop a set of tools that enable completion of projects in the major field using geospatial capabilities.
Prerequisites: Graduate standing, CE 301, or consent of the instructor
Components: Laboratory, Lecture
Course Equivalents: CE 502, EV 502
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - CRC Education Program - Subject: School of Science

SC 575(3) **Course ID:012834** **2021-10-08**
Science Demonstrations
Science is more than just a body of knowledge, it is way of thinking and a process to be experienced. Students best learn science by engaging in its practices as they investigate observable phenomena. They must also think deeply about the concepts that cross science disciplines in order to explain those phenomena. This is the premise of the Next Generation Science Standards and the New York State Science Learning Standards modeled from them. Yet many traditional secondary science courses focus mainly on the topics or core ideas without adequately addressing the other dimensions of the course. The design of this 3-credit course is to meet the needs of students currently conducting their internship or anticipating an internship as they prepare to teach three dimensionally. Students will research publications and internet sites in order to compile a usable resource binder of activities that promote a deep understanding of science for themselves and for their adolescent students. The activities they investigate will relate to all conceptual

Components: Seminar
Attributes: Offered Spring Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Social Documentation

SD 200(3) **Course ID:011481** **2015-03-05**
History of Social Documentation
This course will survey the history and ethics of photographic and time-based media in the representation of factual material commonly described as documentary media. From the earliest photographs of battles and other spectacles of the 19th century to the first documentary films of differing cultures of the early 20th century through the socially-charged and the propagandistic photography and films of the Soviet Union, the US Depression, and World War II and onto the networked and interactive social documentaries of today's new media, this course will attempt to define the ever-moving boundaries of terms such as reality, nonfiction, documentary, and social action. Students will study the history of documentary media across cultures, view and analyze notable examples, do research on particular types and movements, present their findings to the class and develop documents that help explain the new, digitally-mediated documentaries.

Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Offered Odd Springs
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Social Documentation

SD 332(4) **Course ID:012900** **2018-10-22** **Instructor Consent Required**
Documenting Social Activism
The course explores social movements in Untied States after World War II and allows students to describe and interpret the complex nature of cultures and societies in historical context. The movements will focus on issues of racial civil rights, workers' rights, the women's movement, the gay rights movement, the American Indian Movement and the Students' Movements. Ranging from 1945 until the present day the course illustrates the process of social, cultural, and geopolitical change over time. This is a team taught course in which students will be required to create a documentary film. Therefore students will split their time between history lectures, seminar style discussion and documentary film production. The course has 3 hours of class and 3 hours of lab per week, and students should expect to do extensive out-of-class work. Limit of 20 students. Permission of one of the instructors required.

Components: Lecture
Attributes: One communication unit, Cultures and Societies, Imaginative Arts, University Course, Given When Needed
Req. Designation: Technology

SD 480(3) **Course ID:011514** **2015-02-09** **Instructor Consent Required**
Major Research Seminar
Student will confer with the client to pick a topic and direction for her/his research, and coordinate this with the instructors for SD 480 and SD 490; students will do research and complete bibliographic assignments, working with both the instructor and client; each will produce a written proposal beginning with a review of research, and then outlining the project's theoretical perspective and rhetorical strategy, concluding with an outline of how this project will translate into images (if relevant) as well as words; produce a practical plan of action for the project and present it to both client and instructor; and present the developing project in a professional context to faculty and majors from both departments.

Components: Seminar
Attributes: Two communication units, Offered Each Term
Requirement Group: Prerequisites: Must be a social documentation major, and at least junior standing
Req. Designation: Technology

SD 490(3) **Course ID:011677** **2015-02-09** **Department Consent Required**
Major Research Project
Using the proposal and plan of action developed in SD 480, student will work with her/his client and the course instructor to complete the project. As part of this process, student will document her/his ongoing work to keep both client and instructor informed of her/his progress, filing periodic reports and drafts of the project as required by the instructor . The semester should conclude with a presentation of the completed project to the client and to the instructor.

Components: Independent Study
Attributes: Two communication units, Offered Each Term
Req. Designation: Technology

Other - Student Affairs - Subject: Semester in Industry

SI 300(1 - 9) **Course ID:010530** **2018-01-16** **Instructor Consent Required**
Professional Internship
Practical, hands-on experience that focuses on an area directly related to the student's field of study, the internship course is an integral part of the curriculum. The student must develop all details for the internship under the supervision of the instructor and within the established course objectives; the latter will include a project that carries the course credit and is due after completion of the internship. Prerequisites: Permission from the course instructor/student's academic advisor, the Career Center, and the International Student Advisor (if applicable.)
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

SI 333(0) **Course ID:011665** **2015-05-05** **Department Consent Required**
Research for International Students
Practical, hands-on experience that focuses on an area directly related to the student's field of study. The student must develop all details for the research under the supervision of the instructor. Consent by the International Education Office is required.
Components: Independent Study
Course Equivalents: SI 533
Req. Designation: Technology

SI 500(1 - 9) **Course ID:010531** **2018-01-16** **Instructor Consent Required**
Professional Internship
Practical, hands-on experience that focuses on an area directly related to the student's field of study, the internship course is an integral part of the curriculum. The student must develop all details for the internship under the supervision of the instructor and within the established course objectives; the latter will include a project that carries the course credit and is due after completion of the internship. Prerequisites: Permission from the course instructor/student's academic advisor, the Career Center, and the International Student Advisor (if applicable.)
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

SI 533(0) **Course ID:011666** **2014-11-20** **Department Consent Required**
Research for International Students
Practical, hands-on experience that focuses on an area directly related to the student's field of study. The student must develop all details for the research under the supervision of the instructor. Consent by the International Education Office is required.
Components: Independent Study
Course Equivalents: SI 333
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Sociology

SOC 1(2 - 4) **Course ID:010822** **2015-01-19**
SOC Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SOC 2(2 - 4) **Course ID:010818** **2015-01-19**
SOC Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy a Humanities or Social Science Foundation Curriculum Requirement, depending on the specific designator.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

SOC 201(3) **Course ID:011801** **2016-09-12**
Introduction to Society
This course is intended to introduce students to the basic principles, concepts, and perspectives used as 'tools' in sociology to develop a more scientific approach to understanding human society. Major theoretical perspectives and concepts are presented, including sociological imagination, culture, social inequality, social change, and social structure. Students also explore the influence of social class and social institutions, such as churches, education, healthcare, government, economy, and environment. The family as a social structure is also examined. Students will investigate the origin and design of political, economic and social institutions, such as religion, the family, class and caste, education, urban and rural life styles, values, norms, roles, and sociocultural change. Students will learn to analyze, evaluate and critique social structures.
Components: Lecture
Attributes: Cultures and Societies, Individual and Group Behavior, University Course, Offered Fall and Spring
Req. Designation: Technology

SOC 210(3) **Course ID:012833** **2022-02-11**
Sociology of the Family
This course will provide an opportunity to look at something familiar (the family) in a new way. We will focus on the family as a social institution—a set of structured social arrangements for meeting certain human needs—and we will examine the larger social forces that shape those structures. We will use a comparative approach to families, emphasizing their diversity both across time and space and within present-day U.S. society— paying particular attention to how social inequality shapes family experiences. By the end of the semester, you should be able to place your own personal experience of families in a larger social, cultural, and historical context
STUDENT LEARNING OUTCOMES: 1. Understand the causes of social inequities in family experiences. Students will learn how systems of privilege organized around gender, race, class, and sexual orientation structure family life. 2. Think critically about how family shapes social life at both individual and structural levels. 3.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Offered Even Springs
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Sociology

SOC 230(3) **Course ID:010084** **2022-02-11**
Introduction to Race and Ethnicity
[Cross-Listed with ANTH230]Variations in phenotype--skin color--have always existed, but has 'race'? What are the bases of racial identity in the contemporary United States? How have they changed? How are 'race' and 'ethnicity' related? In this course we will address broader questions about race by focusing on contemporary racial and ethnic divisions and by examining the history of these concepts in the Western Hemisphere.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Sociology

SOC 310(3) **Course ID:011755** **2022-02-11**
Women and Religion
This course will examine the position of women in the major religious traditions of the world, with a special concentration on Christianity. Historically and cross-culturally women have largely been relegated to the status of the profane and passive other in the domain of the religious. This religious alienation has profound implications not only for the spiritual lives of women but for the personal, social, political, and economic aspects of their existence as well. This course will explore andocentric patterns of domination as they are grounded in and legitimated by religious systems of meaning. We will also explore transformative alternatives that exit within the worlds' religious traditions themselves in an effort to identify sources of empowerment, mutuality and justice for women and men.
Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Cultures and Societies, University Course, Offered Odd Falls
Req. Designation: Technology

SOC 320(3) **Course ID:012839** **2022-02-11**
Medical Sociology
This course provides an introduction to the sociological study of health and the institution of medicine. This includes exploring questions such as: How is social inequality connected to our health? Is healthcare enough to remedy any health inequalities that might exist? Why is it that so many things are being classified as diseases these days, when we used to just think of them as eccentricities? Nowadays, people often think of themselves as customers as well as patients- how is this change related to broader social changes about the role of medicine? Through this course, you will develop a strong understanding of the contributions that sociology has made to the study of health and illness, as well as a mature perspective on many of our society's pressing health issues.

NOTE: SOC201 (intro to society) or pre-health focus are recommended, but not required.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

SOC 330(3) **Course ID:011414** **2022-02-11**
Health, Wealth, Inequality and the Environment
[Cross-listed with SOC530/EV530] This course will examine how social inequality impacts the relationship of people to their environment and how it affects their physical well being. We will look at how social and political structures perpetuate conditions of injustice for low-income communities and communities of color. One emphasis of this course will be on how social inequality impacts environmental factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment. We will examine sociological and public health literature pertaining to environmental health on a global level and also address public policies that may affect health and environmental justice.
Components: Lecture
Course Equivalents: SOC 530
Attributes: One communication unit, Contemporary and Global Issues, Science, Technology and Society, University Course, Offered Odd Springs
Req. Designation: Technology

SOC 335(3) **Course ID:012989** **2019-10-24**
Poverty in the Modern USA
This discussion based course provides an introductory sociological examination of the issue of poverty as it appears in present day America. Reading both popular trade books and peer reviewed research, you will develop a deep intersectional understanding of both the causes and consequences of living below ""the line."" Prerequisites: SOC201 recommended but not required.
Components: Lecture
Attributes: One communication unit, Individual and Group Behavior, Given When Needed
Req. Designation: Technology

SOC 340(3) **Course ID:013055** **2022-02-11**
Global Advocacy for Women’s Sexual Reproductive Health & Rights
[Cross Listed as SOC540] Women are not waiting to be saved or ‘given their rights.’ They act on their own behalf, and advocate for others. In many cases, women–led movement. Victory is denied, delayed, or arrives disguised in unexpected packages. This course will examine advocacy for women’s sexual and reproductive health and rights (SRHR). Students will identify, design and implement an advocacy project to address an SRHR concern on campus. Project outcomes will be presented in class.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Sociology

SOC 351(3) **Course ID:011222** **2020-09-22**
Globalization
[Cross-listed with POL 351] [Formerly LP371] This seminar style class addresses the economic, political and social change collectively referred to as 'globalization.' The concept of globalization will be analyzed from a number of perspectives. Macro-level changes are addressed as are local adaptation strategies of individuals, communities and organized groups. Special attention is paid to the role of institutions, such as corporations, national and subnational governments and non-governmental and multilateral organizations, in the globalization process. The class will work through and discuss books critical of, and sympathetic to, the globalization process.
Components: Lecture
Course Equivalents: POL 351
Attributes: One communication unit, Contemporary and Global Issues, Given When Needed
Req. Designation: Technology

SOC 490(1 - 10) **Course ID:010745** **2015-02-09** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in sociology for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

SOC 498(1 - 3) **Course ID:010761** **2020-01-15**
Undergraduate TA
A student assists a faculty member in teaching a course. The student engages in substantial pedagogical work beyond mastery of the course material. Such activities may include mentoring students in course work, leading class discussions, designing and presenting course modules, etc. The primary objective is for the students to work with a faculty member to learn and practice pedagogical approaches in the discipline.
Components: Independent Study
Attributes: Given When Needed
Req. Designation: Technology

SOC 530(3) **Course ID:011857** **2020-01-15**
Health, Wealth, Inequality and the Environment
[Cross-listed with SOC330/EV530] This course will examine how social inequality impacts the relationship of people to their environment and how it affects their physical well being. We will look at how social and political structures perpetuate conditions of injustice for low-income communities and communities of color. One emphasis of this course will be on how social inequality impacts environmental factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment. We will examine sociological and public health literature pertaining to environmental health on a global level and also address public policies that may affect health and environmental justice. Graduate students will have additional work as stated on syllabus.
Components: Lecture
Course Equivalents: SOC 330
Attributes: Offered Spring Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Spanish Language

SPN 580(3) **Course ID:012695** **2021-10-08**
MAT Project in Spanish (Content Area)
The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

SPN 988(3) **Course ID:012702** **2017-07-01**
Independent Study in Spanish
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

SPN 989(3) **Course ID:012703** **2017-07-01**
Independent Study in Spanish
A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Social Sciences

SS 1(1 - 9) **Course ID:010087** **2015-03-09**
Social Science Elective
For transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SS 2(1 - 9) **Course ID:010088** **2015-03-09**
Social Science Elective
For transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SS 4(1 - 9) **Course ID:012944** **2019-05-17**
Social Science Elective
For transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

SS 6(1 - 9) **Course ID:012945** **2019-05-17**
Social Science Elective
For transfer credit only.
Components: Lecture
Attributes: Transfer Credit Only
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Social Sciences

SS 220(3) **Course ID:011259** **2022-02-11**
Introduction to Gender
This introductory course examines how being male or female translates into the social relationships of gender. It explores the ways gender roles, identities and institutions are constructed in relation to race, ethnicity, class, and sexuality. This course provides a general introduction to the wide array of historical, cultural, social, political, economic, and philosophical topics usually included within the boundaries of gender studies.
Instructors for this course come from various disciplinary backgrounds. Course content will vary among the sections as instructors draw on their diverse disciplinary backgrounds in order to instruct students in critical thought, intellectual empathy and global perspectives.

Components: Lecture
Attributes: One communication unit, Contemporary and Global Issues, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

SS 221(3) **Course ID:011797** **2022-02-11**
Introduction to Sexuality
This introductory course examines how sexuality is constructed from a social perspective. It explores the ways sex acts, sexual roles, identities, relationships and institutions are constructed in relation to race, ethnicity, class, and sexuality. This course provides a general introduction to the wide array of historical, cultural, social, political, economic, and philosophical topics usually included within the boundaries of sexuality studies. Students will learn how the study of sexual intercourse and sexuality differ among disciplines and how the interdisciplinary approach differs from a singular disciplinary focus.

Components: Lecture
Attributes: One communication unit, Cultures and Societies, Individual and Group Behavior, University Course, Given When Needed
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: Social Sciences

SS 320(3) **Course ID:011946** **2022-03-17** **Instructor Consent Required**
Social and Political Issues in the Adirondacks
[Cross-listed with EV 320] The historical, social, political, and environmental factors contributing to the fabric of the Adirondack Park is an evolving social experiment. The course readings will focus upon the New York State constitutional provisions that engendered the park, the policies that shaped the park, along with the political actions that influence the park today. The Adirondack State Park is extraordinary for its history and because it is a place where human residents live and recreate in sustainable ways that conserve resources and 'forever wild' regions of the park.
Enrollment is limited to those students participating in the Adirondack Semester Program.
Components: Lecture
Course Equivalents: EV 320
Attributes: Two communication units, Cultures and Societies, Given When Needed
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Social Sciences

SS 380(3) **Course ID:011386** **2014-11-20**
Research Methods
This course provides an introductory survey of social science research methods. The course covers a variety of quantitative and qualitative methods. Course topics include sampling strategies, use of basic population statistics, testing differences between groups, conducting in-depth interviews and participate and non-participant observation. Students will understand different approaches to conducting research in the social sciences and which approaches to utilize to maximize the effectiveness and accuracy of social inquiry.
Components: Lecture
Course Equivalents: SS 580
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Social Sciences

SS 490(1 - 10) **Course ID:011226** **2015-02-09** **Department Consent Required**
Independent Study
Designed primarily for an advanced student who wishes to pursue special interests in social sciences for one or more semesters, this series allows students to design and conduct independent study projects under faculty guidance.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: Offered Each Term
Req. Designation: Technology

SS 499(0) **Course ID:011228** **2008-09-23**
Minor Portfolio
In this course, students complete their Liberal Arts Minor Portfolios under the direction of their minor advisor. The course is graded on a Pass-No Entry Basis
Components: Independent Study
Req. Designation: Technology

SS 580(3) **Course ID:011925** **2014-11-20**
Graduate Research Methods in the Social Sciences
In addition to all of the requirements of SS 380, graduate students will engage in additional readings and techniques determined by the instructor to enrich the specific research agenda and/or project of those students. These materials may include survey design, additional statistical training for Stata or other software packages, embedded approaches for mixed method design, implementation of semi-structured interviews, etc.
Components: Lecture
Course Equivalents: SS 380
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Statistics and Probability

STAT 1(2 - 4) **Course ID:011885** **2015-01-19**
STAT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

STAT 2(2 - 4) **Course ID:012751** **2017-03-23**
STAT Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

STAT 282(3) **Course ID:008747** **2017-01-11**
General Statistics
(May be used to satisfy a CUSB MBA or MS foundation requirement.) Introduction to statistical methodology. Topics include descriptive statistics, probability distributions, use of computer packages for statistical data analysis, point and interval estimation, hypothesis testing, two-sample tests, comparisons, measuring and testing association, correlation, regression, and analysis of variance (ANOVA). Emphasis on applications to life sciences, social sciences, business.
Components: Discussion, Lecture
Attributes: Offered Each Term
Requirement Group: Restriction: Not open to mathematics, applied math and statistics, or computer science majors; not ope

Req. Designation: Technology

STAT 301(3 - 4) **Course ID:012832** **2017-09-28**
Statistics Elective
An upper-division statistics or probability course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy the requirements of the Mathematics or Applied Mathematics and Statistics major or the Statistics minor.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

STAT 318(4) **Course ID:011398** **2015-03-05**
Biostatistics
[Cross-listed with BY 318] This course introduces students to descriptive statistics, fundamentals of probability, probability distributions, and methods of statistical inference. Topics include correlation, regression, Bayes theorem, estimation, hypothesis testing, nonparametric methods, and categorical data analysis. A required 2 hour lab practicum will enable students to apply statistical concepts and analytical methods to data from a wide range of biology-related fields, such as ecology, evolution, environmental science, psychology, biotechnology, and biomedical sciences. The use of statistical software is required and data interpretation is emphasized.
Components: Laboratory, Lecture
Attributes: Offered Spring Term
Requirement Group: Prerequisites: BY140 or BY160 or equivalent; MA181 or equivalent; or consent of the instructor
Req. Designation: Technology

STAT 381(3) **Course ID:011182** **2016-08-15**
Probability
[Cross-listed with MA 381] Sample spaces; axioms of probability; basic theorems; random variables (discrete and continuous); combinatorial methods; Bayes' Theorem and conditional probability; expected values and variances; distribution functions, including: binomial and multinomial, Poisson, normal and bivariate normal distributions, and others such as geometric, hypergeometric, negative binomial, exponential, gamma and beta; joint distributions; covariance and correlation; central limit theorem; geometric probability; method of transformations; introduction to stochastic processes.
Components: Lecture
Course Equivalents: MA 381, MA 581, STAT 581
Requirement Group: Prerequisite: MA231 or MA230 (MA211 Recommended)
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Statistics and Probability

STAT 382(3) **Course ID:011184** **2014-11-18**
Mathematical Statistics
[Cross-listed with MA 382] A rigorous course in statistics. Topics include random variables and their distributions, data reduction, estimation, sampling distributions, testing, optimal tests, analysis of variance and nonparametric statistics.
Components: Lecture
Requirement Group: Prerequisites: MA/STAT381
Req. Designation: Technology

STAT 383(3) **Course ID:008779** **2019-04-04**
Probability and Statistics
A calculus based introduction to topics in probability and statistics. Probability content includes events and sample spaces, the basic axioms of probability, discrete and continuous random variables (definitions and basic characterizations such as the means and variances) including binomial, Poisson, normal, exponential, student-t, and uniform distributions. Topics in statistics include the central limit theorem, statistical inference including confidence intervals and hypothesis testing for one and two sample data, and linear regression. Students will use statistical software to read data and interpret software generated output. Students may not receive credit for both STAT 383 and STAT 389.
Components: Lecture
Attributes: Offered Fall, Spring, and Summer
Requirement Group: Prerequisites: MA132
Req. Designation: Technology

STAT 384(3) **Course ID:008780** **2019-09-11**
Advanced Applied Statistics
(Continuation of STAT 383.) Review of basic concepts (estimation, testing and simple linear regression). Multiple regression, analysis of variance and experimental design. Additional topics may include nonparametric statistics, goodness of fit tests, analysis of covariance and quality control. This course will require use of statistical software. Interpretation of computer output and applications will be emphasized throughout.
Components: Lecture
Requirement Group: Prerequisites: MA230 or MA231, and STAT383 or STAT389
Req. Designation: Technology

STAT 385(3) **Course ID:011982** **2016-08-15**
Bayesian Data Analysis
This course will introduce both the principles and practice of Bayesian methods for data analysis. This is a hands-on course that will use MATLAB software. Students will learn to write their own Bayesian computer programs to solve problems relevant to engineering, biology, chemistry, physics, earth science, ecology, economics, signal processing and machine learning. Topics that will be included are parameter estimation, model selection, time series and error analysis.
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: STAT 383 or MA/STAT 381, or by instructor consent
Req. Designation: Technology

STAT 389(3) **Course ID:012934** **2019-04-04**
Probability and Statistics with Multivariate Analysis
A multivariate-calculus based introduction to probability and statistics. Probability content includes sample spaces; axioms of probability; basic theorems; random variables (discrete and continuous); Bayes' Theorem and conditional probability; expected values and variances; distribution functions, including: binomial Poisson, normal and bivariate normal distributions; joint, marginal, and conditional distributions. Optional material includes and moment generating functions, characteristic functions, and distributions of sums of RVs. Topics in statistics include sampling distributions, likelihood functions, descriptive statistics, central limit theorem, hypothesis testing and parameter estimation for normally distributed data, and maximum likelihood estimators. Optional topics include analysis of type 1 and 2 errors and statistical approaches to minimizing error. Students will use statistical software to read data and interpret software-generated output. Students may not receive credit for both STAT 383 and STAT 389.
Components: Lecture
Attributes: Offered Fall Term
Requirement Group: Prerequisite: MA230 or MA231. Students may not enroll in STAT389 if they have credit for STAT383.
Req. Designation: Technology

School of Arts and Sciences - Mathematics - Subject: Statistics and Probability

STAT 409(1 - 10) **Course ID:011346** **2014-12-04** **Instructor Consent Required**
Directed Study in Probability and Statistics
[Cross-listed with MA 409] A directed study in Probability and Statistics, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Course Equivalents: MA 409
Req. Designation: Technology

STAT 488(1 - 3) **Course ID:008819** **2015-01-29** **Instructor Consent Required**
Statistics Projects
Students engage in statistical projects under the supervision of a faculty member. The topic will be determined by student interest and faculty research programs. This course may be repeated for a maximum total of three credits.
Prerequisite: consent of the instructor.
Components: Independent Study
Attributes: One communication unit, Given When Needed
Req. Designation: Technology

STAT 581(3) **Course ID:011183** **2016-08-15**
Probability
[Cross-listed with MA 581] Sample spaces; axioms of probability; basic theorems; random variables (discrete and continuous); combinatorial methods; Bayes' Theorem and conditional probability; expected values and variances; distribution functions, including: binomial and multinomial, Poisson, normal and bivariate normal distributions, and others such as geometric, hypergeometric, negative binomial, exponential, gamma and beta; joint distributions; covariance and correlation; central limit theorem; geometric probability; method of transformations; introduction to stochastic processes.
Components: Lecture
Course Equivalents: MA 381, MA 581, STAT 381
Req. Designation: Technology

STAT 582(3) **Course ID:011185** **2014-11-18**
Mathematical Statistics I
[Cross-listed with MA 582] A rigorous course in statistics. Topics include random variables and their distributions, data reduction, estimation, sampling distributions, testing, optimal tests, analysis of variance and nonparametric statistics. A large project is required.
Prerequisites: STAT381.
Components: Lecture
Req. Designation: Technology

STAT 584(3) **Course ID:008849** **2014-12-05**
Advanced Applied Statistics
Review of basic concepts (estimation, testing and simple linear regression). Multiple regression, analysis of variance and experimental design. Additional topics may include nonparametric statistics, goodness of fit tests, analysis of covariance and quality control. This course will require use of statistical software. Interpretation of computer output and applications will be emphasized throughout.
Prerequisites: STAT383 or equivalent.
Components: Lecture
Req. Designation: Technology

STAT 585(3) **Course ID:011705** **2022-05-05**
Bayesian Data Analysis
[Cross-Listed MA585] This course will introduce both the principles and practice of Bayesian methods for data analysis. This is a hands-on course that will use MATLAB software. Students will learn to write their own Bayesian computer programs to solve problems relevant to engineering, biology, chemistry, physics, earth science, ecology, economics, signal processing and machine learning. Topics that will be included are parameter estimation, model selection, time series and error analysis.
Components: Lecture
Course Equivalents: MA 585
Req. Designation: Technology

STAT 709(1 - 10) **Course ID:011347** **2015-01-29** **Instructor Consent Required**
Directed Study in Probability and Statistics
A directed study in Probability and Statistics, intended to give a student the opportunity to further explore an area of interest to them under the supervision of a faculty member.
Components: Independent Study
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Science, Tech, Eng, Math

STEM 330(3) **Course ID:012780** **2017-07-01**
History and Philosophy of Science and Math
This course looks at teaching STEM-related content from historical and philosophical perspectives, as its title suggests. In this course you will not only assimilate the concepts presented but will also evaluate and create instructional strategies and materials that can infuse these concepts into your own secondary courses. This expectation is in many respects more demanding and time-consuming than expecting you to learn an abundance of historical detail and philosophical argument and regurgitate it back on an examination. This course will argue that historical and philosophical content can be used to enhance secondary students' understanding of the STEM concepts and methods they are expected to attain and ask you to develop or restructure lessons and materials to illustrate that enhancement. Ideally, having science, mathematics, and technology students in the course this year will enhance the general knowledge of all participants and help them distinguish between the unique elements of each enterprise.

Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Institute for STEM Education - Inst for STEM Education - Subject: Science, Tech, Eng, Math

STEM 501(4) **Course ID:012942** **2019-05-09**
STEM Pedagogy and Professionalism
STEM Pedagogy and Professionalism is designed to help graduate students, particularly graduate TAs, develop the skills necessary to be successful in their graduate programs as instructors and in their future roles as academics. The course will highlight methods for developing and enhancing the pedagogical content knowledge and instructional skill set of graduate STEM teaching assistants. Within the context of STEM learning; audience, environment, nature of science, formative assessment, models of instruction, learning theory, and reflective practice will be studied. A focus on STEM literacy, will help TAs think critically about multiple data sources in order to promote higher-order thinking skills among their students. The course also addresses intercultural communication in the classroom; providing an opportunity for students to improve their cultural and sociolinguistic competence. In particular, students will work on developing their professional communication skill set including oral comprehensibility, impromptu speaking skills and

Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Science, Tech, Eng, Math

STEM 530(3) **Course ID:012705** **2022-04-08**
Analyzing Scientific and Math Theories from Philosophical & Historical Perspectives
This 3-credit course is neither a history of STEM disciplines course nor a philosophy of STEM disciplines course. Rather, it is a course that looks at teaching STEM-related content from historical and philosophical perspectives, as its title suggests. This is an important distinction for several reasons. First, we believe that you will be best served by an introduction to history and philosophy of STEM disciplines and nature of STEM core concepts which are taught in a manner and at a level that models effective teaching. Modeling the teaching of these concepts in the course will provide you with strategies you might use with your own middle and high school students. Second, we are hoping that you will not only assimilate the concepts presented but will also evaluate and create instructional strategies and materials that can infuse these concepts into your own secondary courses. This expectation is in many respects more demanding and time-consuming than expecting you to learn an abundance of historical detail and philosophical argument and

Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Science - Humanities & Social Sciences - Subject: Science, Technology, & Society

STS 2(2 - 4) **Course ID:011276** **2015-03-09**
Science, Technology & Society Elective
A college level course for which there is no comparable Clarkson course. Used for transfer credit only. This course may be used to satisfy the Science, Technology & Society Knowledge Area requirement.

Components: Independent Study
Attributes: Science, Technology and Society, Transfer Credit Only
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: Science, Technology, & Society

STS 100(2.5) **Course ID:008616** **2020-05-17** **Instructor Consent Required**
HEOP Perspectives on Science & Technology
[Formerly LP100] This course is designed to be used in the HEOP Summer Program for incoming students. It helps student develop their critical thinking and writing skills in preparation for their college courses. Offered Pass/No Credit.

Components: Lecture
Attributes: One communication unit, Science, Technology and Society, Offered Summer Term
Requirement Group: Prerequisite: For HEOP students only.
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Teaching English

TE 501(1) **Course ID:012814** **2021-10-08**
CAS Residency
The TESOL Teaching Practicum course provides an opportunity for students to apply the skills learned concurrently in Foundations of Teaching TESOL (TE540), and English Grammar (TE530) in a classroom setting. The practicum provides TESOL students with an opportunity to observe TESOL instruction and practice instructional techniques in preparations for the Fall Teaching Internship. TESOL students will be placed in local settings and will participate in this online course to share and reflect upon classroom experiences. Students will be placed in summer school ENL classes, community-based English language classes, or local community college/university English language classes as a volunteer, first observing and then assisting in instruction. The goal of the practicum is to give the TESOL student practical experience in all areas of teaching ELLs through observation and participation.
Components: Field Studies
Attributes: Given When Needed
Req. Designation: Technology

TE 502(2) **Course ID:013011** **2020-01-08**
MAT ESOL Practicum
The TESOL Teaching Practicum course (1 credit) provides an opportunity for students to apply the skills learned concurrently in Foundations of Teaching TESOL (TE540), and Curriculum and Methods of Teaching ESOL (TE513) in a classroom setting. The practicum provides TESOL students with an opportunity to observe ESOL instruction and practice instructional techniques in preparation for the first ENL Residency. TESOL students will be placed in local settings for at least 6 hours a week and will participate in this online course to share and reflect upon classroom experiences. Students will be placed in summer school ENL classes, community-based English language classes, or local community college/university English language classes as a volunteer, first observing and then assisting in instruction. The goal of the practicum is to give the TESOL student practical experience in all areas of teaching ELLS through observation and participation. 35 hours of filed experience in K-12 ENL are required in this 6 week course (6 hours per week).
Components: Practicum
Attributes: Offered Each Term
Req. Designation: Technology

TE 513(3) **Course ID:012937** **2019-03-27**
Curriculum and Methods of Teaching ESOL
This course serves as an introduction to the theory and practice of ESOL teaching. We will examine key aspects of current theories, methods of instruction, and assessment in TESOL education. This course is based on a view of teaching and learning as facilitated by social interaction and that each individual brings unique background knowledge and beliefs to their learning.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Graduate Interdisciplinary - CRC Education Program - Subject: Teaching English

TE 515(3) **Course ID:013156** **2022-03-18**
Language and Identity in the Multicultural Classroom
This asynchronous course provides a conceptual framework to examine the roles of language, culture, and identity in the multicultural classroom. We will consider the perception of language as an asset and source of conflict at home, in schools, and across communities. Candidates will study different linguistic and cultural groups representative of those across NYS, paying particular attention to attributes of collectivistic cultures that inform teaching within the local context. Additionally, we will explore classroom dynamics in a multilingual environment, including the intersectionality of race, gender, socioeconomics, and immigrant status. Candidates will develop a deeper understanding of sociolinguistic factors that contribute to a culturally responsive classroom that yields equitable achievement outcomes for linguistically diverse students. (15 hours field work required)

Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Teaching English

TE 517(3) **Course ID:012815** **2022-04-08**
Teaching & Assessment Methods for TESOL
TESOL Teaching Methods will introduce students to the NYS New Language Arts Progressions (part of the Bilingual Common Core Initiative), TESOL and WIDA National Standards, formative and summative assessments (including NYSITELL and NYSESLAT), and methodology for integrated, stand-alone, and content-based instruction for ELLs. Students will gain expertise in lesson planning, delivery and assessment; collaboration and co-teaching; state regulations; culturally relevant instruction; advocating for ELLs; and practical pedagogy for English Language Learners, pre k-12.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

Graduate Interdisciplinary - CRC Education Program - Subject: Teaching English

TE 519(3) **Course ID:013157** **2022-03-18**
Methods and Materials for Bilingual Instruction and Assessment
This asynchronous course prepares candidates to teach and assess literacy in students' home and new languages. We will approach biliteracy and translanguaging practices with the view of language as an asset, and we will analyze and evaluate course content through a lens of equity. Specifically, we will explore effective methods of instruction and assessment of ELLs' skills in English and their native language in the bilingual classroom. As we discuss theories and components of reading, candidates will deepen their knowledge of reading processes in learners' first and new languages.
Through a comparative analysis of English and the native language, we will survey and evaluate texts and instructional materials to promote native language literacy development. As we consider strategies and tools for instruction and assessment, candidates will create an annotated bibliography of resources to support native language arts and bilingual instruction. Additionally, candidates will create a series of
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

TE 521(3) **Course ID:013158** **2022-03-18**
Teaching Content in a Bilingual Context
The asynchronous course explores the role of academic language across the curriculum and the power of the native language in the bilingual classroom to increase access to grade-level content for English language learners. Through text, discussion, observation, and application, we will identify opportunities to leverage the role of ELLs' native languages to promote transfer of knowledge and skills while increasing students' membership and agency in the classroom. As we study and apply the principles of content-based instruction for ELLs, we will consider effective strategies and practical techniques for assessment in core curricular areas. Guided by the NYSED Culturally Responsive Sustaining Framework, we will approach this work with a shared vision of yielding equitable academic outcomes for ELLs.
Throughout the course, candidates will describe and evaluate culturally responsive pedagogy and materials to advance ELLs' content knowledge while differentiating instruction and assessment for diverse learners. The
Components: Lecture
Attributes: Given When Needed
Requirement Group: Prerequisites: TE513 or TE517
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Teaching English

TE 530(3) **Course ID:012816** **2018-08-02**
English Grammar for the ENL Teacher
English Grammar is a course on the structure, analysis, and methods of teaching American English grammar to English language learners. The dual purpose of this course is to develop a thorough understanding of the forms and use of English grammar systems as well as develop instructional strategies for teaching English grammar to speakers of other languages in a communicative and meaningful way.
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

TE 531(3) **Course ID:012818** **2022-04-08**
TESOL English Linguistics
English Linguistics is an introduction to linguistics for Teachers of English to Speakers of Other Languages. It presupposes little or no formal linguistic knowledge. We will study the rudiments of phonetics, phonology, syntax, morphology, semantics, sociolinguistics and language acquisition. We will study linguistics both as an end in itself and as it informs classroom teaching. This course will prepare students to teach English as a New/Second Language, with a firm knowledge of the linguistic challenges English presents to language learners. Discussions and connections between theory and practice are a significant component of this course.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

TE 540(3) **Course ID:012817** **2019-04-12**
Foundations of Teaching TESOL
Foundation of Teaching TESOL serves as an introduction to the theory and practice of second language (SL) teaching. In an intensive 6 week online format, students will be immersed in activities to create a strong foundation of knowledge on language development, standards and policy, and pedagogy. We will examine key aspects of historical and current theories of second language acquisition, as well as methods of instruction and assessment in SL education. Language modalities, language functions, content and context-based instruction will be introduced. This course is based on a view of teaching and learning as facilitated by social interaction in which each individual brings unique background knowledge and beliefs to their learning. It is expected that students will make connections between the readings and learning activities of the Foundations course to their experiences in the Teaching Practicum (TESOL501).
Components: Lecture
Attributes: Offered Summer Term
Req. Designation: Technology

TE 542(3) **Course ID:012819** **2021-10-08**
TESOL Literacy (Online and In School Settings)
TESOL Literacy introduces students to issues in reading, writing and new literacies for students who are learning a new or second language. We will review current instructional practices in light of theoretical foundations, educational policy, and culture forces that shape acquisition and development of a new/second language. In addition, we will dissect practical strategies for teaching English language learners. Your understanding of course ideas and issues will be assessed frequently through a variety of on-line discussions, assignments, activities, and a final project. This course includes 20 hours of required field experience.
Components: Seminar
Attributes: Given When Needed
Req. Designation: Technology

TE 551(5) **Course ID:012820** **2021-07-22**
TESOL Teaching Residency I
The 5-credit Residency I begins after the resident completes the New York State required Field Practicum, TE 501, during the summer semester. The Resident will first observe and co-teach with his/her Mentor at the beginning of the school year. The Resident is expected to gradually assume responsibility for two of the mentor's classes, at first co-teaching with the Mentor, but independently teaching within 5 weeks, if prepared to do so. After successful completion of the first teaching residency in the fall (either K-6 or 7-12), the Resident will complete a second residency in the spring semester to fulfill the K- 12 residency requirement. A full-year intern is in school for a minimum of half of the school day. Which half of the day depends on the schedule assigned to the Mentor by the school district. During the spring semester, the resident will complete the requirements of edTPA.
Components: Field Studies
Attributes: Offered Each Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Teaching English

TE 552(5) **Course ID:012821** **2021-07-22**
TESOL Teaching Residency II
The 5-credit residency (either grade K-6 or 7-12) begins in the second semester. The Resident is expected to gradually assume responsibility for two of the mentor's classes, at first co-teaching with the Mentor, but independently within 6 weeks, if prepared to do so. Teaching Residency II fulfills the second half of a full year K-12 experience and follows the successful completion of a fall semester residency. A full-year resident is in school for a minimum of half of the school day. Which half of the day depends on the schedule assigned to the Mentor by the school district. During the spring semester the Resident will complete the requirements of edTPA.
Components: Field Studies
Attributes: Offered Each Term
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

TE 553(5) **Course ID:013031** **2020-08-25**
TESOL: Teaching Residency for Initially Certified Teachers I
This course is open only to students matriculated in the Master of Arts in Teaching ESOL program who have been initially certified as teachers in NYS.

The 5-credit residency begins after the resident student completes the New York State required Field Practicum, TE 501. The resident will first observe and co-teach with his/her mentor teacher. The resident is expected to gradually assume responsibility for some of the mentor's classes, at first co-teaching with the mentor, and then independently teaching when prepared to do so. After successful completion of the first teaching residency (TE 553), the resident will complete a second residency (TE 554). Students will complete a minimum of 20 full days at the elementary level and 20 full days at the secondary level to reflect the NYS requirement.
Components: Field Studies
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

TE 554(5) **Course ID:013030** **2021-12-31**
TESOL: Teaching Residency for Initially Certified Teachers II
This course is open only to students matriculated in the Master of Arts in Teaching ESOL program who have been initially certified as teachers in NYS.

The 5-credit residency begins after the resident student completes TE 553 - TESOL Teaching Residency for Initially Certified Teachers I. The resident is expected to gradually assume responsibility for two of the mentor teacher's classes, at first co-teaching with the mentor, and then independently teaching when prepared to do so. This ENL residency fulfills the second half of the residency experience. Students will complete a minimum of 20 full days at the elementary level and 20 full days at the secondary level to reflect the NYS requirement.
Components: Field Studies
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

TE 580(3) **Course ID:012822** **2021-12-28**
TESOL Project
The TESOL Project is a one semester, online research project class whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in the field of TESOL. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern and their teaching setting. TESOL projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Corequisites: ED550, TE517, TE531, ED502, TE551 OR TE553
Req. Designation: Technology

Liberal Arts - Humanities & Social Sciences - Subject: Technology

TECH 100(3) **Course ID:011458** **2015-01-19**
Design Technology
Credit for this course is awarded only in the following cases: 1) receipt of a score of 5 through 7 on the International Baccalaureate Design Technology Higher-Level Examination or 2) satisfactory completion of a college-level course that meets the criteria for a Technology Course but for which there is not an appropriate Clarkson course prefix.
Components: Independent Study
Attributes: Transfer Credit Only
Req. Designation: Technology

Institute for STEM Education - CRC Education Program - Subject: Technology

TECH 575(3) **Course ID:013146** **2021-12-03**
Manufacturing Processes and Design for Manufacturing
This course will introduce the student to the fundamentals of manufacturing processes and design for manufacturing. The course will begin by examining the history and evolution of modern manufacturing technology. This section will include an examination of scientific management and modern industrial management. Modern manufacturing operations will then be examined including machining, casting, forging, welding, brazing, soldering, finishing, heat treating, assembly, and plastic materials processing. This section will also include electronics manufacturing, covering both through-hole technology and surface mount devices. For each manufacturing process, capabilities and limitations will be discussed and how they relate to part design and cost. Design for manufacturing principles will be examined, including how the designer affects manufacturing cost, lean manufacturing, six sigma, value stream analysis, manufacturing rate, the cost of quality, process flexibility, process simulation, and process economics.
Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

TECH 580(3) **Course ID:012712** **2021-10-08**
MAT Project in Technology (Content Area)
[Formerly TEC 580] The MAT Project is a one-term research project whose purpose is to allow students time and supervision to develop breadth and/or depth of knowledge to become a better teacher in their certification field. What the project will entail varies greatly from student to student. The course is intended to be custom-tailored to meet the specific needs of an individual intern. MAT projects are well-grounded in research and theory, but also include a strong and extensive applied aspect, directly addressing the question: What would this look like in the classroom?
Components: Seminar
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

TECH 988(3) **Course ID:012713** **2018-06-13**
Independent Study in Technology
[Formerly TEC 988] A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

TECH 989(3) **Course ID:012714** **2018-06-13**
Independent Study in Technology
[Formerly TEC 989] A graduate level course for which there is no comparable Clarkson course. This course may be used to satisfy course requirements for a graduate degree.
Components: Independent Study
Attributes: Given When Needed
Requirement Group: Restriction: This course is open only to students matriculated in the Master of Arts in Teaching progr

Req. Designation: Technology

Other - Student Affairs - Subject: University

UNIV 100(0) **Course ID:011564** **2022-01-21** **Department Consent Required**
The Success Seminar
This course is designed to provide strategies to help students succeed in classes and empower them to become active, responsible learners. During this course, students will learn several useful strategies regarding self-awareness, establishing goals, developing supportive relationships, identifying preferred learning styles, managing time, taking notes, and developing strategies for more effective reading of texts.
Components: Lecture
Course Equivalents: FY 100
Attributes: Offered Spring Term
Requirement Group: Restriction: Freshman &/or Sophomore Standing
Req. Designation: Technology

UNIV 102(0) **Course ID:012952** **2020-12-15**
Strategies for Becoming your Best-Balanced Self
This seminar-style course is an intentional and integrated effort to promote whole person wellness to maximize academic, professional and personal success. By exploring the areas of physical, financial, spiritual, professional, and emotional wellness, students will begin to develop an individualized definition of success. Students will learn about creating a work-life balance as their academic career becomes more rigorous with the goal of becoming better prepared for their professional job search, make confident academic major choices, and develop a greater understanding of post-graduate career options. Students will be encouraged to engage in decision making regarding curricular and co-curricular experiences from a wellness perspective. The course is a collaborative effort across multiple Clarkson University departments designed to provide a supportive mechanism., in addition to academic advising, for further soft-skill development and resilience habits.
Components: Seminar
Attributes: Offered Fall Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: University

UNIV 190(3) **Course ID:010733** **2018-03-02**
The Clarkson Seminar
The Clarkson Seminar welcomes first year students into a world of cultures, histories, and the global forces that will shape their personal and professional lives beyond Clarkson. Students will learn to define issues within a broad cultural context and gain experience evaluating and interpreting literary and nonliterary texts. Seminar classes will be a small and thematically structured, with an emphasis on discussion, critical reading and thinking, extensive writing, and collaborative work.

Components: Lecture
Attributes: Offered Fall Term
Req. Designation: Technology

Business - School of Business - Subject: University

UNIV 267(3) **Course ID:011271** **2022-02-10** **Instructor Consent Required**
Introduction to Canada
This course will introduce students to Canada and the US-Canada relationship. In particular, the course will cover a broad swath of topics across academic disciplines including: geography, history, sociology, politics/government, economics, and the arts. Particular emphasis will be placed on comparing and contrasting Canada and the United States, but will also cover important current events and other issues unique to Canada, including the Quebec question and the future of Canada. The course will be a blend of classroom lectures/discussions and experiential trips to major Canadian cities/regions, including Ottawa, Montreal, Quebec, and Toronto.

Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Given When Needed
Req. Designation: Technology

Inst for a Sustainable Environ - Inst for a Sustainable Environ - Subject: University

UNIV 299(1) **Course ID:011930** **2015-09-08**
Global Service
The focus of this course is a one-to-two week trip abroad for a service learning experience. Each section, centered on a unifying theme and geographic location, will include three components: experience, reflection and action. Through community connections and hands-on experience, students develop deeper global awareness and stronger critical thinking and problem solving skills. Students will return empowered to make positive change in their community and beyond. The travel group will spend quality time in a community, getting to know the people and their way of life. The course instructor works directly with the community to assure each group has a valuable, impactful visit. UNIV 299 is a repeatable course allowing a student to receive credit on completing two or more different Global Service experiences.

Components: Independent Study
Attributes: Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Provost - Subject: University

UNIV 349(3) **Course ID:012035** **2017-01-27**
International Service Learning
This course involves collaboration with non-governmental organization to develop appropriate technology and improve quality of life in a target community overseas. During a semester-long class that meets weekly, students develop an appreciation of the issues involved in international development and an understanding of the context of their project, while at the same time working in teams to solve technological problems according to the NGO's specifications and community's needs. Following the end of the semester, students will visit the community to present their solutions, provide necessary training, and assist in implementation of the technology. Through a combination of classroom and experiential learning in the community, students will gain global awareness, improve critical thinking and problem solving skills, and get to know a foreign place and people

Components: Lecture
Attributes: Cultures and Societies, Offered Spring Term
Req. Designation: Technology

School of Arts and Sciences - Humanities & Social Sciences - Subject: University

UNIV 359(1) **Course ID:013012** **2020-01-09**
Doctors Without Borders Global Experience
This one-credit pass/fail course is designed for students chosen for the CU Doctors Without Borders out-of-country trip that occurs each summer. This course will provide an in-depth review of ethical volunteering practices, culture of the chosen country to prepare students for competency in language, values, beliefs/religions, clothing, and food. Preparation for medical volunteering will also be incorporated into this course through training on how to take vitals, as well as through the discussion of medical terminology and medical practices of the chosen country.

Components: Lecture
Attributes: Given When Needed
Req. Designation: Technology

Business - School of Business - Subject: University

UNIV 399(3) **Course ID:011086** **2022-02-10**
Global Experience
This course includes intensive study of issues in a country or region outside of the United States followed by a two- to three-week trip abroad to that location. Each section, centered on a unifying theme and geographic location, will include three components: structured classes, practitioner presentations, and visits to companies, governmental agencies, and important cultural sites. Students successfully completing this course will gain a better perspective on the economic, political, cultural issues as well as the business practices prevalent in another region of the world. Students should develop cultural awareness, an understanding of economic, cultural, and political differences between the US and other countries, and the role cultural, historical and political factors play in the conduct of business in a global economy. UNIV399 is a repeatable course allowing a student to receive credit on completing two or more different Global Study experiences. On approval from the Dean of the School of Business, this course can satisfy global business

Components: Lecture
Attributes: Contemporary and Global Issues, Cultures and Societies, University Course, Offered Spring Term
Req. Designation: Technology
