Clarkson University is a nationally-ranked research university and the institution of choice for more than 3,800 enterprising, high-ability scholars from diverse backgrounds who embrace challenge and thrive in a rigorous, highly collaborative learning environment. We add value to our students’ education by partnering with leading businesses, industries and thought leaders to bring relevance to the challenges and needs of a modern world in which the boundaries of knowledge, discipline, nations, and cultures blur. We encourage students to question the status quo, push the limits of what is known, and to apply their ingenuity to develop fresh solutions to real-world challenges. For more than 100 years, our graduates have achieved extraordinary professional success, risen to societal challenges, and advanced the global economy ethically and responsibly. Among our 38,000 alumni, one in five is a CEO, senior executive or owner of a company.

Founded in 1896 to honor Thomas S. Clarkson, the University's main campus is located in the “college town” of Potsdam, NY on a historic 640-acre wooded homestead in the foothills of the Adirondack Park. With three other universities nearby, Clarkson community members enjoy a constantly changing social and intellectual quality of life largely influenced by our proximity to the north slope of the Adirondacks; easy drives to Lake Placid as well as Ottawa and Montreal, Canada; and a high level of regional camaraderie to encourage innovative partnerships in small business development, arts, tourism, recreation, agriculture and green energy.

The University also includes a campus for graduate education and environmental research at the Beacon Institute for Rivers and Estuaries, in Beacon, New York.

Clarkson’s educational strengths include:

• rigorous professional preparation
• dynamic, real-world learning
• highly collaborative community
• teamwork that spans disciplines

QUESTIONS regarding undergraduate admission and requests for information about Clarkson may be directed to the Office of Undergraduate Admissions. For graduate programs, direct inquiries as indicated below.
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UNDERGRADUATE ADMISSIONS
First Year (Domestic & International)
Clarkson University
Box 5605, 8 Clarkson Avenue
Potsdam, NY 13699
800-527-6577
315-268-6480
Fax 315-268-7647
E-mail admission@clarkson.edu

CLARKSON SCHOOL ADMISSIONS
The Clarkson School
Clarkson University
PO Box 5650
Potsdam, NY 13699-5650
1-800-574-4425
315-268-4425
Email tcs@clarkson.edu

TRANSFER ADMISSIONS (Domestic & International)
Clarkson University
Box 5610, 8 Clarkson Avenue
Potsdam, NY 13699
800-527-6577
315-268-2125
Fax 315-268-7647
E-mail tradmission@clarkson.edu

GRADUATE ADMISSIONS
Arts & Sciences
315-268-3802
E-mail sciencegrad@clarkson.edu

Business
315-268-6613
E-mail busgrad@clarkson.edu

Engineering
315-268-7929
E-mail enggrad@clarkson.edu

Institute for a Sustainable Environment
315-268-2315
E-mail ise@clarkson.edu

Department of Physician Assistant Studies
315-268-7942
E-mail PA@clarkson.edu

Department of Physical Therapy
315-268-3786
E-mail pthealth@clarkson.edu

Department of Occupational Therapy
315-268-4412
E-mail ot@clarkson.edu
THE CLARKSON EDUCATION

Clarkson academic programs span boundaries and vary widely in content. However, at the heart of the institution’s educational process are fundamental goals and values that define a common learning experience and shape the growth of every Clarkson student. The University has articulated its mission, vision, and values as follows:

Mission of Clarkson University
Clarkson University is an independent, nationally recognized technological university whose faculty of teacher/scholars aspires to offer superior instruction and engage in high-quality research and scholarship in engineering, business, science, health, and liberal arts. Our primary mission is to educate talented and motivated men and women to become successful professionals through quality pre-collegiate, undergraduate, graduate, and professional continuing education programs, with particular emphasis on the undergraduate experience. Our community and campus settings enhance the quality of student life and afford students access to and interaction with their faculty. We value the diversity of our University community, and we strive to attune ourselves and our programs to our global, pluralistic society. We share the belief that humane and environmentally sound economic and social development derive from the expansion, diffusion, and application of knowledge.

Vision of a Clarkson Education
The Clarkson University educational experience is designed to provide talented and ambitious students with the knowledge and skills necessary to achieve positions of leadership within their chosen profession. The combination of Clarkson’s strong technologically rich curricula and state-of-the-art teaching and research facilities, coupled with an unparalleled commitment to a friendly learning environment and to students’ personal development, uniquely prepares Clarkson graduates to excel in their chosen professions and to lead rewarding and creative lives.

In addition to attaining mastery of the core knowledge within his or her field, a Clarkson education is designed to enable students to:

- solve real-world, open-ended problems with creativity and risk taking to obtain solutions that are practical and sustainable, including those they encounter in state-of-the-art research under the direction of distinguished faculty;
- develop and refine exceptional communication skills with an awareness of potential cultural differences;
- lead effectively and work productively within and disciplinary and multidisciplinary teams composed of members with diverse interests and backgrounds;
- excel in using computing and information technologies;
- learn through instruction and guidance by nationally recognized faculty whose commitment to both teaching and research has made Clarkson a nationally ranked university.
A Clarkson student’s education is greatly enhanced by a personal and friendly learning environment, within a small, residential, nationally recognized University, which:

- places students at the center of the educational process and where all employees have a commitment to creating an environment that contributes positively to students’ overall educational experience;
- draws undergraduates, graduate students, faculty and staff together into a cohesive and stimulating learning community, wherein an atmosphere of scholarship and spirit of research is cultivated;
- uses our campus as a living laboratory to improve learning, and uses the wider region to broaden and extend Clarkson's outreach and service;
- provides personal advising and interaction with faculty and staff as well as supportive relationships among students;
- offers many leadership opportunities through co-curricular groups and activities;
- respects and learns from its community of diverse people, backgrounds, and cultures.

Together, these provide a unique educational experience that is directed toward developing the whole person.

Major Values of the Clarkson Community
"Lead By Example and Others Will Follow"

- **Caring:** A positive and friendly atmosphere is created when we care about each other, when we are open to constructive criticism, and when we show appreciation for a job well done.

- **Diligence:** "A workman that needeth not to be ashamed." Initiative and hard work are key ingredients in getting the task done.

- **Diversity:** The mutual appreciation of differences and a plurality of opinions, beliefs, and cultural traditions inform and enrich our lives.

- **Integrity:** Honesty and accountability in one’s actions and words form the foundation of our relationships with others.

- **Growth:** Educational experiences in and out of the classroom enliven our minds, broaden our horizons, and facilitate dialogue and consensus. Learning is a lifelong activity.

- **Service:** Offering our time and skills for the good of our fellow citizens leads to the prosperity and environmental health of the community and to the well-being and character development of the individual.

- **Teamwork:** Effective teamwork encourages creativity and self-initiative in our respective roles and partnerships. It is essential in getting the task done and in developing the skills needed to meet the challenges of ensuring sustainability of local and global economic, environmental and social systems.

- **Vision:** Having a vision of a sustainable future helps us prepare for it. Embracing the inevitable changes in our world as opportunities allow us to anticipate, promote, and facilitate change.
ABOUT CLARKSON UNIVERSITY

Clarkson is recognized among the finest universities in the nation, according to such diverse measures as U.S. News & World Report, the Association for Independent Technological Universities, and corporate recruiters. Clarkson focuses on providing a rigorous professional experience, connecting discovery and engineering innovation with enterprise, and developing a collaborative community for students, faculty and staff.

Graduates are known for their innovative thinking and problem-solving skills as well as their ability to create, adapt and manage technology for the benefit of society. One Clarkson graduate in five is a president, CEO, vice president or senior executive of a company.

The University was founded in 1896 as a memorial to Thomas S. Clarkson, a northern New York businessman with a deep concern for humanity. Today, the University continues to reflect his fundamental values: a commitment to professional skill and competence coupled with personal integrity and human understanding. The University is known as a friendly school where students benefit from personal attention and close interaction with our distinguished faculty of teacher/scholars.

Clarkson is located on a 640-acre wooded campus in the historic village of Potsdam (pop. 9,500), where the rolling foothills of the Adirondack Mountains meet the St. Lawrence River Valley. The school attracts high-ability students who seek a rigorous comprehensive education in a scenic, friendly environment. Outdoor enthusiasts enjoy recreational opportunities in the nearby Adirondack Park (six million acres) and Thousand Islands region. Lake Placid and international attractions in Ottawa and Montreal are a short drive away.

Clarkson is recognized for both teaching and research. Undergraduate programs provide excellent preparation for advanced degrees and for immediate career opportunities. Placement rates are consistently high and an active alumni network fosters success.

Admission is highly selective and most entering first-year students have graduated in the top 20 percent of their high school classes. The Honors Program annually accepts approximately 40 or so exceptionally talented students who enrich their degree programs through a sequence of seminars focused on technological issues and challenges confronting contemporary society.

Students develop skills in teamwork, communication, leadership and creative problem solving, in addition to mastery of fundamentals and evolving technologies. Open-ended, hands-on projects connect business, engineering, and arts and sciences through an emphasis on boundary-spanning solutions and practical applications.

The University offers degrees in traditional academic fields, along with majors that cut across and combine disciplines such as biomolecular science, environmental science and policy, information technology, software engineering, and digital arts and sciences.
National recognition of educational quality at Clarkson includes:

- Clarkson graduates have some of the highest salaries in the nation, 2015 College Salary Report, PayScale Inc.
- Top 10: Universities that increase salaries the most. A Clarkson degree will increase your earnings by 42 percent, on average. Brookings Institution, 2015.

- #34 Best Values (Great Schools, Great Prices), U.S. News & World Report, America’s Best Colleges 2015.

- Among the top 15 entrepreneurship undergraduate programs in the nation, Entrepreneur magazine and The Princeton Review 2015.


- Ranked as a Top 15% College in the outcome-based 2015 Educate to Career (ETC) College Rankings Index.


- #12 Best Master’s Degree Programs by Salary Potential, 2015 College Salary Report, PayScale Inc.


- One of the Top-100 Values in Private Universities, Kiplinger’s Best College Values 2015.

- Among the top 100 Graduate Business Schools in the nation, U.S. News & World Report 2014.

- School of Business supply chain management program ranks in the top 20 nationally, U.S. News & World Report, America’s Best Colleges 2014.
• Top 50 America’s Most Entrepreneurial Universities, *Forbes 2014*.

• A top-ranked military friendly school, *Victory Media 2015* and *Military Advanced Education (MAE) 2014*.

• Ranks #37 for faculty receiving significant research awards in the national universities category, *Washington Monthly 2014*.

• ROTC service ranked #2 in the nation, *Washington Monthly 2014*.

• #1 in the nation for grads with most internship experience, *U.S. News & World Report 2013*.

• Top 30 Private Colleges with Million-Dollar Returns on Investment, *Affordable Colleges Online 2013*.

• Clarkson ranks #7 in New York state for colleges and universities that provide the highest return on investment (ROI), *Affordable Colleges Online 2013*.

• Clarkson’s online graduate business programs #12 in the nation, *U.S. News & World Report 2013*.

  Ranks #37 for faculty receiving significant research awards in the national universities category, *Washington Monthly 2014*.

• Clarkson is one of 12 schools whose new graduates earn more than Harvard’s, *ABC News & PayScale 2012*.

• Among the Top 100 best undergraduate business schools in the nation, *Bloomberg BusinessWeek 2011*.

• Top 20 on the Fifty Most Affordable Colleges with a Return on Investment list, *Bloomberg BusinessWeek 2011*.

• Engineering & Management program is only the second program in the world to be accredited by both AACSB International and the Engineering Accreditation Commission of ABET.

• Money magazine has ranked Clarkson as one of the most affordable colleges whose undergraduate alumni report earning more than $100,000 a year.

• U.S. News has ranked Clarkson University in Tier One, the top tier of national universities of “Best Colleges” for 2016.
Collaborative projects to solve real-world problems prepare students in all majors for the team-oriented global workplace. Some 400 undergraduates a year perform faculty-mentored research or participate in national academic team competitions through Clarkson’s award-winning program called SPEED (Student Projects for Engineering Experience and Design). Competition projects range from environmental problem solving to Mini-Baja vehicle racing to FIRST Robotics. All business students work on entrepreneurial teams that create and run actual companies. More than 40 study abroad programs in 21 countries, as well as internships, workplace co-ops, and research fellowships, broaden the undergraduate educational experience.

Clarkson’s major organizational units are the School of Arts & Sciences, the School of Business, the Wallace H. Coulter School of Engineering, the Institute for a Sustainable Environment, the Graduate School, the Division of Research, and The Clarkson School, a unique program in which talented high school age students can begin college early.

Clarkson’s campus includes several academic research centers that leverage the University’s scholarly strengths. The Center for Advanced Materials Processing (CAMP), which is also a New York State Center for Advanced Technology, contains more than 70 state-of-the-art research laboratories. Such facilities enable faculty to pursue cutting-edge research and are also accessible to undergraduates and graduate students for collaborative projects.

The Clarkson Institute for a Sustainable Environment (ISE) facilitates boundary-spanning environmental research and educational activities within the University and through partnerships with other universities, organizations and industry. Undergraduates can take advantage of ISE’s degree and minor programs in Environmental Science and Policy and Environmental Health Sciences, attending seminars or getting involved in research activities or spend a semester immersed in the social, environmental and economic issues of the Adirondack Park as a part of the ISE Adirondack Semester. In addition to the Institute’s core faculty, Institute-associated faculty come from all schools on campus and also receive millions of dollars in research and educational grants that translates into opportunities for students to get involved in funded research projects. ISE also houses the Center for Sustainable Energy Systems (CSES) and the Center for Air Resources Engineering and Science (CARES).

The Center for Rehabilitation Engineering, Science and Technology (CREST) serves to integrate biomedical engineering and science with assistive and adaptive technologies and physical therapy to improve lives affected by disease or injury.

The Cora and Bayard Clarkson Science Center is home to mathematics, computer science, biology, biomolecular science, chemistry, physics, psychology and statistics. It also houses the President’s Office.

Bertrand H. Snell Hall houses the School of Business, the administrative offices of the School of Arts & Sciences, Department of Humanities and Social Sciences, Department of Communication & Media and the Digital Arts & Sciences program. Fully networked classrooms and study spaces, collaborative centers for team projects, and videoconferencing capabilities are among state-of-the-art features that enhance student learning. The building includes three academic centers available to students in all majors: the Shipley Center for Innovation, the Center for Innovation and Entrepreneurship, and the Eastman Kodak Center for Excellence in Communication. Bertrand H. Snell Hall is connected to the Cora and Bayard Clarkson Science Center by the third story Petersen Passageway.
Clarkson Hall houses Clarkson’s entry level Doctor of Physical Therapy program and the Master of Science in both Physician Assistant Studies and Occupational Therapy.

Clarkson’s physical facilities are valued at $269.4 million. They comprise approximately 1,324,053 square feet of assignable space, of which almost 90 percent has been built since 1970. More than 339,410 sq. ft. are dedicated exclusively to academic programs, including 51,559 sq. ft. in traditional classrooms and 162,941 sq. ft. assigned in laboratory areas.

Retention studies of independent institutions in New York State show on average that 68.9 percent of students who enter as freshmen complete their degrees within six years, and 56.1 percent in four years. At these same schools, the sampling of transfer students shows 63.5 percent completing their degrees in four years and 67.6 percent in six years.

At Clarkson the retention rate is well above the norm: averaged among those completing degrees over the past three years, 73.2 percent of freshmen completed their studies for a bachelor’s degree within six years; 72.1 percent in five years; and 55.8 percent in four years or less. *Among transfer students, 45.7 percent complete their bachelor’s degrees in two years and 83.5 percent in four years.

*Under the Student Right to Know Act, the federal government requires the University to publish the six-year graduation rate for students who have enrolled as first-time freshmen. Clarkson operates a unique program known as The Clarkson School, which allows students to begin their college career one year early (see Undergraduate Admission). This program attracts some students who may not intend to remain at Clarkson for four years and inclusion of these students in the total has the effect of making that published rate misleading. The inclusion of Clarkson School students makes the University’s six-year graduation rate 71.1 percent.
A BRIEF HISTORY OF CLARKSON
(The following summary has been excerpted largely from *A Clarkson Mosaic*, a history written by Professor Emeritus Bradford B. Broughton in conjunction with the institution’s 1996 Centennial.)

Two months after a highly successful Potsdam businessman, Thomas Streatfeild Clarkson, was crushed to death while trying to save one of his workers in his sandstone quarry on August 17, 1894, his family began planning a memorial to him: a school.

Choosing as their rationale a phrase which his sisters and nieces felt aptly described their brother — Thomas’ favorite Biblical quotation, A workman that needeth not to be ashamed — the family opened the Thomas S. Clarkson Memorial School of Technology in September 1896, in The Main Building (“Old Main”) which they commissioned to be built on Main Street.

To the five young men in the preparatory class, eight men and four women in the freshman class, six courses of instruction were offered: electrical engineering, domestic science, art, machine work and smithing, woodworking and pattern making, and normal manual training. By 1907 the school was offering additional bachelor’s degrees in mechanical, civil and chemical engineering.

Recognizing the need for a gymnasium, the students began a fund-raising campaign for the $11,000 needed to build one in town, spurred on by a $5,000 gift from the Clarkson family. By 1912, this second School building had been erected. That building became the library in 1956 after the new Alumni Gymnasium opened. When the library moved to the Educational Resources Center in 1978, the original building became the Liberal Studies Center.

When the New York State Board of Regents offered scholarships to qualified students attending college within the state in 1913, Clarkson’s Board of Trustees voted to change the school’s name to The Thomas S. Clarkson Memorial College of Technology; the head of the college became president instead of director; and John Pascal Brooks, a Dartmouth graduate, and one of the men on Walter Camp’s first All-American football team, became the first Clarkson director to bear the title of president.

Hockey began in 1921 on a rink behind Old Main, and soon moved to a bigger rink built by the students in Ives Park. Not until the hockey arena was completed on land across the river in 1938 did the team have a building in which to play. That facility was later named for the founding force behind Clarkson hockey, Murray Walker, owner of Weston’s Bookstore. Walker Arena provided home ice for Clarkson teams, which have frequently achieved national ranking, until Chee1 Arena was completed in 1991.

Thomas Clarkson’s nieces, Miss Annie Clarkson and Miss Emily Moore, tried to have the entire school moved to a new campus on a hill outside of Potsdam (hence the nickname, the “hill campus”), with a gift of $1.5 million in 1929. However, because that money shrank to half a million within a year due to the stock market crash, the plans for the move had to be shelved for over 30 years. Since then, the campus has moved almost entirely to the hill, although some administrative offices and the programs in health sciences remain on the original downtown Potsdam campus.
Responding to a plea from New York Governor Thomas Dewey after World War II, Clarkson admitted hundreds of returning veterans. Having no space to house or teach them by 1946, Clarkson rented the New York State School for the Deaf in Malone, N.Y., 40 miles east of Potsdam. For the next five years, freshmen and many sophomores spent their first two years in Malone before moving to the Potsdam campus for the remainder of their Clarkson education. That branch closed in 1951.

With that flood of veterans came the Trustees’ realization that the College would have to expand its facilities, and expand them it did over the next 20 years, adding not only facilities but graduate programs in engineering, science, and management, including Ph.D. programs in most.

During that post-war period, and through the mid-1980s, Clarkson expanded both of its campuses, with many new residence halls on the hill campus, including Hamlin-Powers, the Quad, Moore House, Price and Graham Halls, Woodstock (originally planned for married student housing only), and the Townhouses. Beside them, it built the Educational Resources Center in 1978 and the added recreational facilities of the Indoor Recreation Center in 1980. The downtown campus also witnessed expansion during those years; Peyton Hall for chemical engineering, Damon Hall for civil, Clarkson Hall for electrical, and Lewis House for a student union. Clarkson also gradually took over Snell Hall from SUNY Potsdam for classrooms and office space.

In the fall of 1991, two significant developments occurred on the hill campus. Clarkson opened the CAMP (Center for Advanced Materials Processing) building, a research and teaching complex with 70 state-of-the-art laboratories, designated a New York State Center of Advanced Technology. The building was connected to the existing Rowley Laboratories and, in the fall of 1996, all engineering departments were consolidated in the CAMP-Rowley complex.

Also in 1991, the University opened the Cheel Campus Center, a combination student union and hockey arena that includes dining areas, student government and activities rooms and offices, and a post office. In the fall of 1998, the University also completed a new Fitness Center, which connects the Indoor Recreation Center and Alumni Gymnasium.

In the spring of 1999, Clarkson Hall was renovated and rededicated as the Center for Health Sciences. This downtown facility now houses the University’s programs in Occupational Therapy, Physical Therapy, and Physician Assistant Studies. The newest academic building, Bertrand H. Snell Hall, opened on the hill campus for the fall 2000 semester. A wing of biochemistry laboratories was added to the Cora and Bayard Clarkson Science Center and opened in fall 2005. The Technology Advancement Center (TAC), an 18,000-square-foot addition connecting the Schuler Educational Resources Center and the Cora and Bayard Clarkson Science Center, was completed in fall 2008. A new Student Center was completed in August 2010 and connects all academic buildings.
DEGREE PROGRAMS

Bachelor’s Degree Majors
All bachelors’ degree programs at Clarkson require completion of 120 credit hours and the learning expectations of the Clarkson Common Experience. In addition to traditional discipline-specific degrees, Clarkson offers majors that combine work from at least two different fields so that students can broaden their areas of expertise.

A description of each degree program and its requirements can be found below. The Higher Education General Information Survey (HEGIS) code designated by the New York State Education Department for classifying these academic programs can be found in the list of degree programs and HEGIS Codes near the end of the catalog. Clarkson offers the Bachelor of Science (B.S.) degree in the following majors:

Arts & Sciences
- Applied Mathematics & Statistics
- Biology
- Biomolecular Science
- Chemistry
- Communication
- Computer Science
- Digital Arts & Sciences
- History
- Humanities
- Interdisciplinary Liberal Arts
- Interdisciplinary Social Sciences
- Mathematics
- Physics
- Political Science
- Psychology

Business
- Financial Information & Analysis
- Global Supply Chain Management
- Information Systems & Business Processes
- Innovation & Entrepreneurship
- Engineering & Management

Engineering
- Aeronautical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Environmental Engineering
- Mechanical Engineering

Interdisciplinary Programs
- Liberal Arts & Communication Double Major (Social Documentation)
- Software Engineering
Bachelor of Professional Studies (BPS)
In addition to the Bachelor of Science (B.S.) degree, Clarkson offers a Bachelor of Professional Studies degree program to provide flexibility and interdisciplinary study. The BPS enables a student to design and pursue an individual curriculum that meets personal career objectives. Programs may be designed in any discipline or by combining disciplines offered at Clarkson.

Double Majors and Second Clarkson Degrees
Undergraduates may also enhance an academic major by combining it with a second major. This may lead to a single bachelor’s degree with a double major or to two Clarkson bachelor’s degrees.

Minors
To complement and enrich bachelor’s degree programs, Clarkson also enables students to assemble coursework in designated minor programs. Such minors provide students with another area of specialization outside their major. Minors require 15 or more credit hours of specified coursework. Completion of an approved minor is indicated on a student’s transcript.

Humanities and Social Sciences also offer disciplinary minors and student-designed minors not in the above list. See Minors in Humanities and Social Sciences in the School of Arts & Sciences section of the Catalog or contact the chair of the Department of Humanities and Social Sciences at 315-268-6410.

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Professional Concentrations
Undergraduate students may build an area of specialized expertise termed a professional concentration within — or closely related to — their degree program major. Such concentrations require at least 15 credit hours of coursework. Successful completion of a faculty-approved concentration is indicated on a student’s transcript. Course requirements vary and interested students should consult with academic advisers. The following professional concentrations have been designated.

Arts & Sciences
Gender & Sexuality Studies (in the BS in Interdisciplinary Liberal Studies & BS in Interdisciplinary Social Sciences)

Engineering
Architectural Engineering
Biomolecular Engineering
Construction Engineering Management
Electric Power Engineering
Environmental Engineering
Materials Engineering
Structural Engineering

Engineering and Management
Global Supply Chain Management

Graduate Degree Programs
For information regarding admission requirements, the application process, or financial assistance, including fellowships, research assistantships, and teaching assistantships, see the Graduate School section of this catalog (p. 306). For information about specific programs, contact schools through the addresses shown on p. 4 of this catalog. The Higher Education General Information Survey (HEGIS) code designated by the New York State Education Department for classifying these academic programs can be found in the list of degree programs and HEGIS Codes near the end of the catalog. Clarkson University offers the following graduate degrees:

Master of Business Administration
Master of Business Administration – Online
Master of Business Administration – Global
Master of Business Administration/Master of Engineering (Dual Degree)
Master of Business Administration/Master of Science in Environmental Politics and Governance (Dual Degree)
Master of Engineering
    Chemical Engineering
    Civil Engineering
    Electrical Engineering
Mechanical Engineering

**Master of Science**
- Basic Science
- Chemical Engineering
- Chemistry
- Civil and Environmental Engineering
- Computer Science
- Data Analytics
- Electrical Engineering
- Engineering Management
- Engineering Science
- Environmental Politics and Governance
- Environmental Science and Engineering
- Environmental Science and Engineering/Masters International (MI)
- Information Technology
- Mathematics
- Mechanical Engineering
- Physics

**Master of Science in Occupational Therapy**

**Master of Science in Physician Assistant Studies**

**Doctor of Philosophy**
- Bioscience and Biotechnology
- Chemical Engineering
- Chemistry
- Civil and Environmental Engineering
- Computer Science
- Electrical and Computer Engineering
- Engineering Science
- Environmental Science and Engineering
- Mathematics
- Mechanical Engineering
- Materials Science and Engineering
- Physics

**Doctor of Physical Therapy**
Accreditation
Clarkson is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market St., Philadelphia, PA 19104-2680, 215-662-5606. The undergraduate programs in aeronautical, chemical, civil, computer, electrical, environmental, mechanical, and software engineering are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. Students who have completed at least three years towards a bachelor’s degree in engineering are eligible to take the Fundamentals of Engineering examination toward licensure as professional engineers. The School of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB). The undergraduate engineering and management program in the School of Business is also accredited by the Engineering Accreditation Commission of ABET, Inc., http://www.abet.org. The entry level doctor of physical therapy program is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE) of the American Physical Therapy Association (APTA). The Accreditation Review Committee (ARC-PA) on Education for the Physician Assistant has granted continuing Accreditation to the Physician Assistant Studies Program. The Occupational Therapy Program has been granted Candidacy Status by The Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA). In addition, the University is accredited by the United States Civil Service Commission, and its curricula are approved by the New York State Board of Regents. All Clarkson degree programs are approved by the New York State Division of Veterans Affairs for the training of veterans and other eligible persons.
ACADEMIC PROGRAM OPTIONS

UNIVERSITY STUDIES
Catherine Avadikian, Director
The University Studies Program was designed to serve those individuals who are ready to enter into their freshman year of college without making an initial commitment to a major field of study. It enables students to more fully investigate the full range of academic offerings relating to their specific academic and career interests. Note: Students registered under the University Studies umbrella are full-time matriculated undergraduates who have yet to designate a specific major area of study. In all cases, a selection of an academic major will occur prior to the end of the sophomore year.

Many students begin their studies without declaring a major. Frequently, their interests span over several disciplines and they need time to explore their choices. Students who enroll in the University Studies Program work with the Program Director to develop an individualized course schedule for the first year designed to facilitate exploration and keep all options open. This first-year program allows students the freedom to experience and familiarize themselves with degree programs and departments of study based on their individual interests and career goals.

The program is structured and designed to assist students in making a sound, educated, and well thought-out decision about an appropriate major. In the first year, students are placed in courses based on their interests and recommendation of their advisor so that within two semesters, they will be able to enroll in a major of their choice and still earn a bachelor’s degree in four years.

Additionally, students are encouraged to participate in professional societies and counseling activities that can help them define their academic goals and career-related objectives. Personalized academic advising is emphasized and students are directed to take full advantage of related services available to them at Clarkson.

For further information, try our undecided quiz, call the program office at 315-268-3948 or visit http://www.clarkson.edu/exploring.

PRE-HEALTH PROFESSIONS
Carolyn Zanta, Pre-Health Professions Advisor
Students may prepare for further professional study in medical (including Occupational Therapy, Physician Assistant, and Physical Therapy), dental and veterinary schools through any major at Clarkson. The University’s Health Professions Advisory Committee meets with students individually as they progress through their courses of study, providing guidance and advice in meeting University and departmental requirements and ensuring preparation for entrance into professional schools. For more information, contact the Chair of the Health Professions Advisory Committee at 315-268-3968 (see Degree Programs).

Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should contact the Department of Physical Therapy at 315-268-3786. Students interested in preparing for entrance into graduate Physician Assistant programs should contact the Department of Physician Assistant Studies at 315-268-7942. Students interested in preparing for entrance into graduate Occupational Therapy program should contact the Department of Occupational Therapy at 315-268-2161.
PRE-LAW
Joseph Andriano, and Christopher Robinson, Advisors

Students from many degree programs at Clarkson have entered law school. Educators agree that success in a law career depends more upon the development of skills and habits conducive to legal reasoning than a student’s specific major. Students planning to seek admission to law school should use elective courses to develop a broad cultural background; intellectual curiosity; and reading, writing and speaking skills. Students interested in law school may consider completing the Law Studies Minor.

Courses in business, engineering, and science help develop analytical skills and the technical background often helpful in understanding potential legal problems. Liberal Arts courses in the humanities and social sciences provide broad cultural background and the opportunity to develop analytical and verbal skills, since they entail a wide range of reading assignments, emphasize class discussion, and offer students the opportunity to prepare and criticize oral and written work.

Clarkson University and University of New Hampshire School of Law, Franklin Pierce Law Center, Concord, New Hampshire, have signed an articulation agreement for students interested in pursuing a law degree specializing in intellectual property law. Franklin Pierce Law Center is an internationally known school training specialists in patent law and other intellectual property fields.

Students admitted to Clarkson as first-year students can file a joint admission application with Franklin Pierce. When they complete their baccalaureate degree from Clarkson, they will be fully admitted to the Franklin Pierce Law Center providing they have a final undergraduate grade-point average of at least 3.25, an LSAT (Law School Admissions Test) score at or above the 75th percentile, and that they have not engaged in any intentional academic misconduct or criminal activity.

Pre-law advising is available for students in all majors to help them develop academic programs that will serve as a strong foundation for future legal studies. A list of pre-law advisors is available through the Dean’s Office in the School of Business at 315-268-2300. The advisors provide counseling and information about law schools and careers in law.

MULTIDISCIPLINARY PROJECT (MP) AND MULTIDISCIPLINARY TEAM (MT) COURSES
Clarkson has developed courses to provide students with the opportunity to solve real-world design problems in a team-based multidisciplinary atmosphere. Often these courses culminate in national competitions. Such multidisciplinary project experience has been increasingly valued by recruiters in the corporate marketplace. MP courses provide course credit, while MT courses carry no credit, but participation is recorded on the student’s transcript.

TEACHER CERTIFICATION
Students sometimes wish to pursue studies preparing them for teacher certification while completing their major at Clarkson. Although Clarkson does not have an education department, the necessary courses are available via cross-registration through the Associated Colleges of the St. Lawrence Valley (Clarkson, St. Lawrence, SUNY Potsdam and SUNY Canton).
SUMMER SESSIONS
Clarkson offers two five-week summer sessions for undergraduates and graduate students. A well-balanced offering of courses enables students to:

- participate in programs such as Cooperative Education or Study Abroad and still graduate with their class;
- enrich their academic program with electives that do not fit into the normal semester;
- take courses required for continuation in a specific program or transfer into a new area.

THREE-YEAR BACHELOR’S DEGREE OPTION
Students who have graduated in the top 10 percent of their high school class and who enroll in a Business or Arts & Sciences major may complete a bachelor’s degree in three calendar years. To satisfy this accelerated schedule, students apply Advanced Placement credits and/or work on special research projects during the summer.

OFFICE OF EDUCATIONAL PARTNERSHIPS (OEP)
The Office of Educational Partnerships (OEP) provides structure, coordination and support for the growing number of educational outreach programs on campus. A University-level effort to support educational outreach will help to improve our outreach offerings, our relationships with area school districts, and our ability to secure external funding for both education and research activities.

The role of universities in supporting the education of children in K-12 levels is becoming increasingly important. Professional societies, corporate foundations, and federal funding agencies recognize the need for University-school district partnerships and are offering funding directly for the development of partnerships and integration of University-level research efforts into the education of K-12 students.

Examples of these activities are the inclusion of K-12 students and teachers in proposed research activities, participation in the recruitment and training of K-12 math, science and technology teachers, and development of educational materials for students at all levels. Other major funding initiatives from the National Science Foundation, New York State and NASA, among others, require K-12 outreach as part of the education plan.

Numerous faculty at Clarkson University are currently involved with or interested in increasing their efforts in educational outreach. The Office of Educational Partnerships (OEP) provides training and advice, coordinates activities and acts as the primary liaison between the University and area school districts. Institutionalization of the various current and proposed outreach activities will:
• Increase the effectiveness and coordination of Clarkson’s programs
• Provide a "clearing house" for proposed outreach activities that may be initiated at the University, or requests that may come from local schools
• Encourage more faculty members to become involved with such activities

HONORS PROGRAM
Jon Goss, Director
Clarkson offers an intensive, four-year undergraduate Honors curriculum for exceptionally talented students majoring in any of our degree programs. Applicants typically rank in the top 10% of their high school class, have excellent standardized test scores and demonstrate outstanding academic or leadership achievements. The Clarkson University Honors Program admits 30 or so new first year students and about 10 or so sophomore students per year. Students must maintain a grade-point average of 3.25.

Our Honors Program exemplifies our rich technological environment and emphasis on personal relationships. Honors courses address real-world problems. The approach is open-ended and project-based. The program offers students opportunities to engage in original research; challenges them to make the most of their intellectual gifts; and requires them to develop their creative, analytical, communication, and teamwork skills.

Honors students enjoy many benefits, including: an Honors Scholarship as part of their Clarkson financial assistance package; seminar style project-based classes; research opportunities; a residential learning community and interaction with students from a variety of academic areas.

Students typically take one course per semester in the Honors Program. Courses develop as interlocking, multidisciplinary sequences, bringing perspectives from different disciplines to bear on a contemporary, open-ended problem or challenge.

Topics focus on current and emerging problems in science, technology, and society and courses take advantage of Clarkson’s strengths in computer education and close campus ties to the natural environment.

The four-year sequence comprises the following general topics:
First year — The Implications of Research and the Tools for Problem Solving
Second Year — The Contemporary World: Its Problems and Their Origins
Third Year — Science: Problems and Possibilities
Fourth Year — Research and Modernity

The Honors Program provides summer research opportunities for all students, including a five-week “prefrosh” program for entering first year students. Students participate in cutting-edge research with faculty mentors, and the program provides board and room at no cost.

The Honors Program at Clarkson is administered by an Honors Council comprising 12 faculty and administrators who represent a broad spectrum of academic interests and expertise, and six students who are elected by their peers. Contact Honors Director Jon Goss at 315-268-2290 or 2320, or through e-mail at honors@clarkson.edu for more information.
EARLY ENTRANCE COLLEGE PROGRAM: THE CLARKSON SCHOOL

Through The Clarkson School, the University offers a unique program for talented high school age students who are ready to begin college early. The Clarkson School provides a supportive residential community and dedicated advising that facilitates the transition to college life. The Clarkson School has been bringing such academically advanced students to campus since the fall of 1978.

Students who enroll in The Clarkson School live together on campus, with specially trained house advisors. Commuting day students from St. Lawrence County may also join the community. Clarkson School students are matriculated as University students and typically earn about 32 college credit hours during the year. Courses may be selected from the University’s offerings in the Schools of Arts & Sciences, Business and Engineering. With assistance from the school staff, students design their programs of study to meet their individual needs and interests.

The low student-staff ratio of The Clarkson School ensures individualized attention. Our orientation and advising program emphasizes the time-management and study skills that are essential for success in college. Each student’s progress is carefully monitored, and individualized help is provided where necessary. Personal development is considered an integral part of the program, and there are numerous structured activities that foster a cooperative living and learning environment. Monthly dinners are held to build a sense of community amongst the Clarkson School students and they are themed to address the needs of first year students. Students will enjoy guest speakers, discussions of future educational opportunities, and meetings with faculty mentors. Field trips are also an integral part of the program and they typically combine educational and community-building activities. The University’s clubs, activities and most sports are open to Clarkson School students.

Upon satisfactory completion of the year, students may automatically continue as sophomores at Clarkson University. The staff also provides guidance and help for those who wish to continue their education at other colleges and universities. In most cases, our students have been given credit and appropriate advanced placement at other institutions.

Costs of the Clarkson School are comparable to the cost of a year at Clarkson University, and financial aid and merit-based scholarships are available. Please note that students who elect to remain concurrently enrolled in high school and The Clarkson School are not eligible for federal student aid. Credit may be given for Advanced Placement or college courses taken in high school, dependent on scores or grades achieved.

Applying to The Clarkson School

The Admission Committee evaluates each applicant’s credentials with great care. In general, applicants accepted to The Clarkson School have demonstrated high levels of achievement in their academic work, personal maturity, and engagement in extra-curricular activities. In order to determine whether a student is ready for the early college experience at The Clarkson School, we consider academic preparation as evidenced in the cumulative GPA, rank in class, standardized test scores, and the rigor of the curriculum the student has taken. A great deal of attention is given to the letters of recommendation to see if the writer feels that the student is prepared for the early college experience.
A completed application portfolio consists of: Clarkson School Application, Essay, Secondary School Report, official high school transcript, standardized test scores, and at least two letters of recommendations. There is a $50 Application Fee.

All potential Clarkson School students are strongly encouraged to visit the campus for an interview and campus tour. Students who interview with an Admission Representative for The Clarkson School will be waived the application fee.

The priority application deadline is June 1, but early application is recommended. Admission decisions are made on a rolling basis for students who have completed their Application Portfolio.

Please note that all students are admitted to the Clarkson School subject to policies and procedures set forth in the Clarkson School Admission guidelines.

To request an Application Portfolio or more information, call or write: Director of Admission, The Clarkson School, Clarkson University, PO Box 5650, Potsdam, NY 13699-5650; telephone 1-800-574-4425 or 315-268-4425; email tcs@clarkson.edu. Interested students can also visit our web site at www.clarkson.edu/tcs for additional information, as well as access to our online application.

THE ASSOCIATED COLLEGES CONSORTIUM
The Associated Colleges of the St. Lawrence Valley was chartered in 1970 to stimulate a variety of cooperative activities among Clarkson University, St. Lawrence University, SUNY Canton, and SUNY Potsdam. With only 10 miles separating the four campuses, a significant amount of social, cultural and academic cooperation is possible.

Clarkson students have ready access to most resources at the other colleges. Student’s cross-register for courses within the consortium, and some sharing of faculty takes place. Full-time students are eligible to take up to two courses not available at their home institution during the academic year on a space-available basis at one or another of the campuses. An academic year for cross-registration extends from late August through the end of summer school in the following year. Special events are publicized through joint calendars and other means. Each of the four libraries permits students from all of the colleges to draw upon the total holdings of approximately one million volumes. (See Educational Resources Center.)

There is a special form and instructions for cross-registration available online at http://www.clarkson.edu/sas/forms/cross-registration.pdf, or from the Associated Colleges office (267-3331 or acslv@potsdam.edu) or online at http://associatedcolleges.org/services/crossregistration.htm. The form requires approving signature of the student’s advisor and department chair as well as the course instructor. The completed form is returned to Student Administrative Services. All students cross-registering must abide by all appropriate regulations — such as attendance, honor systems and parking — at the host institution. Students must adhere to Clarkson’s policies, procedures and deadlines related to adding or dropping a cross-registered class, incompletes, withdrawals and election of a pass/no-credit grading basis.

As long as the cross-registered course credits do not increase the total beyond the 19 credits covered by Clarkson’s undergraduate tuition, no additional tuition costs will accrue. If cross-registration credits result in a course load requiring additional tuition charges, the student is responsible for those charges just as if the cross-registered credits were Clarkson credits.
Graduate students will be charged per credit hour for any cross-registered course. Students are responsible for any special fees, such as lab fees, fees for registration, or transcript fees.

Grades for courses taken through cross-registration will be recorded on the Clarkson transcript and will be included in the student’s overall grade-point average.

**Online and Distance Learning**

Online study is widely available in Clarkson’s graduate degree programs, as well as select undergraduate courses. Since 2010, the School of Business has delivered quality online learning experiences to hundreds of students of the Online MBA program. This, along with several other Masters programs offered by the University, is especially popular among working professionals because of its virtual modality allowing students to pursue careers and lifestyles outside the traditional on campus experience. The option for online learning is growing in popularity for undergraduates interested in summer study or for allowing the option to continue study when various reasons take them away from campus.

Clarkson employs several models of online learning across different programs. As an example, most distance learning students in the School of Engineering enroll and attend the same course as their on campus counterparts. Alternately, all students of School of Business’s Engineering Management Masters of Science program attend the same synchronous, online only classes with others in the program. The increasing number of graduate online classes each semester allows off campus PhD students to earn course credits while their residency is other than the Clarkson campus.

Online students are served by the same web based applications, like Moodle and Peoplesoft, as traditional on campus students for enrollment and file access. For class content, students may watch pre-recorded lectures, join online only sessions, or web conference with on campus classes in session. The technological experience will vary across programs based on the needs of the curriculum and the instructor’s preference. Designated classrooms are equipped with cameras, microphones, pen touch tablets, lecture capture and web conferencing applications which capture voice, video and content live from the classroom for the online student.

Students interested in online study are encouraged to inquire for more information with their department or the Office of Distance Learning. For more information on program availability, [www.clarkson.edu/distancelearning](http://www.clarkson.edu/distancelearning).
ACADEMIC REQUIREMENTS FOR UNDERGRADUATE STUDENTS

THE CLARKSON COMMON EXPERIENCE
A Clarkson education prepares each student for today’s world and tomorrow’s challenges. All Clarkson students are required to meet the learning expectations of the Clarkson Common Experience. The Clarkson Common Experience integrates each student’s learning in a major field of study with learning expectations that broaden the student’s understanding of our modern world. Each Clarkson graduate achieves objectives in fundamental academic abilities, in personal and social development, and in prescribed areas of knowledge.

LEARNING EXPECTATIONS OF THE COMMON EXPERIENCE
Each Clarkson graduate will achieve academic abilities that include:

• mastery of a major field of study,
• effective communication in oral, written, and technological forms,
• critical and imaginative thinking, and
• problem solving skills using both quantitative and qualitative reasoning where appropriate.

Each graduate is also expected to experience personal and social development that includes:

• an increased understanding of and insight into his or her own behavior,
• an appreciation of the need for self-motivated life-long learning,
• an increased social awareness and interpersonal competence, including an appreciation for the value of experiencing diversity, and
• an understanding of and recognition of the need for personal, societal, and professional ethics.

Knowledge is the essence of a university education, and each Clarkson graduate is expected to become knowledgeable beyond his or her major field in these areas:

• the nature of cultures and societies,
• contemporary and global issues,
• the imaginative arts and their role in society,
• science and technology, including their relationship to society and their impact on the environment,
• economic and organizational concepts and decision-making, and
• methods for studying and explaining individual and group behavior.

COMPONENTS OF THE CLARKSON COMMON EXPERIENCE
The Clarkson Common Experience provides a common set of learning expectations and outcomes for all Clarkson students. To achieve these outcomes, each student is required to complete a set of courses and a professional experience. Course work consists of required and elective courses both from within a student’s major field and from across the spectrum of all disciplines in the university. Embodied in the Common Experience are four components that serve as common threads through multiple courses:
learning to communicate effectively,

• developing an appreciation for diversity in both working and living environments,
• recognizing the importance of personal, societal, and professional ethics,
• understanding how technology can be used to serve humanity.

Each of these components is introduced early in the curriculum, reinforced in subsequent courses, and included in upper division courses.

**The Communication Component:** To develop excellent communication skills, Clarkson requires communication-intensive coursework, first in UNIV190, The Clarkson Seminar, then across the curriculum and in the major. Courses designated as writing intensive are assigned communication points on a scale of one or two (C1 or C2) to indicate the extent of communication experience in that course. Beyond UNIV190, The Clarkson Seminar, students must obtain six more “communication points,” at least two of them within the major at the 300/400 level. Communication points can be obtained by taking designated courses, or, with approval, through co-curricular experiences. Depending on initial abilities and background, students may also be required to enroll in a course that provides writing instruction and support for UNIV190, The Clarkson Seminar. Students for whom English is a second language must also meet the ESL requirements as described below.

**The Diversity Component:** From the moment they arrive on campus, Clarkson students prepare for the culturally diverse environments they will inevitably experience in their future careers. FY100, First-Year Seminar, helps students “respect and learn from Clarkson’s diverse community.” In UNIV190, The Clarkson Seminar, students will be urged to question their own assumptions and to consider different worldviews. Later in their academic coursework, students will gain a deeper understanding of cultural diversity within and among societies, recognizing how it influences their own actions and affects the lives of those around them. The Professional Requirement in the major area of study will prepare students to enter the global workforce by helping them understand the importance of diversity in the workplace.

**The Ethics and Values Component:** Through a repeated emphasis on ethics and values, Clarkson promotes in its students the profound reflection necessary to sustain personal, academic, professional, and civic integrity. Students are expected to view this process not just as an academic issue, but as critical for all aspects of their lives, including community activities, sports, student organizations, and work. Issues of personal ethics and values are addressed beginning with FY100, First-Year Seminar. Social and cultural values are discussed as part of UNIV190, The Clarkson Seminar. Several courses in the knowledge sequence emphasize social and cultural values or philosophical and ethical issues. In the Professional Requirement, students identify ethical problems in situations typically encountered within their professions and analyze these issues from different ethical perspectives.

**The Technology Component:** All Clarkson students are expected to understand the basis of our modern technological society and to gain an appreciation for both the potential benefits and limitations of technology. Students will be introduced to the basic knowledge necessary for understanding technology through two courses in mathematics and two courses in the natural sciences, including at least one with a laboratory component. A Technology Course is required that reinforces this knowledge in the context of demonstrating how technology may be used to serve humanity. The interrelation of science, technology and society is studied in one of the knowledge area courses.
REQUIREMENTS OF THE CLARKSON COMMON EXPERIENCE

FY100, First-Year Seminar
First-Year Seminar treats personal and social adjustment topics as well as Clarkson values, ethics and diversity. [Fall semester] [Required only for first-year students.]

UNIV190, The Clarkson Seminar
The Clarkson Seminar welcomes first year student into a world of cultures, histories, and the global forces that will shape their personal and professional lives beyond their Clarkson education. Students will to define issues within a broad cultural context and gain experience in evaluating and interpreting texts. Seminar classes will be small and thematically structured, with an emphasis on discussion, critical reading and thinking, extensive writing, and collaborative work. [Fall Semester]

Knowledge Areas and University Courses
Students achieve learning outcomes in six broad areas of knowledge. Students are required to take at least five courses that have Knowledge Area designators, and the five courses must cover at least four of the six Knowledge Areas listed below:

- Cultures and Societies (CSO)
- Science, Technology, and Society (STS)
- Contemporary and Global Issues (CGI)
- Economics and Organizations (EC)
- Imaginative Arts (IA)
- Individual and Group Behavior (IG).

Additionally, at least one of these five courses must be a University Course that has two Knowledge Area designators. University Courses are multidisciplinary and address learning outcomes in two of the six areas of knowledge, and students observe and participate in the interaction of disciplines.

Mathematics, Science and Technology Courses
Students must achieve learning outcomes in basic mathematics, science and technology by completing five courses in these areas. Students develop quantitative literacy through the study of mathematics, including probability and statistics. Students must take two courses in mathematics as specified by the major. Students develop an understanding of the principles of science and technology through two natural science courses, at least one of which must have an integrated laboratory component. Students gain an understanding of how technology is developed through a Technology Course that addresses the theme of technology serving humanity.

Communication
Clarkson places a strong emphasis on developing students' abilities to communicate effectively in a variety of contexts using diverse forms of communication. Students must select coursework and possibly extra-curricular activities that carry a total of at least six communications points. Courses and activities with a communications component will be identified as carrying either one or two points. At least two points must come from within the student's major discipline in a course at the 300 or 400 level.
Major Field of Study
A significant characteristic of the Common Experience is the integration of requirements from both outside and within a major field of study. Each student pursues a degree program in a major field and completes a set of prescribed courses to demonstrate mastery of that field. As part of these courses, students achieve outcomes of the Common Experience.

Information Technology Expertise: Students will gain expertise in using information technology and computational software appropriate to their major field of study.

Communication: Students must complete course work in the major field at the 300 or 400 level that includes discipline-specific communication for a total of at least two communication points.

Professional Requirement: The Professional Requirement incorporates learning outcomes involving professionalism, ethics, and diversity. These outcomes include understanding the concepts of professionalism, professional responsibility, and professional ethics, and knowing how the student's professional community promotes, supports, and enforces these concepts. Students should develop an appreciation for the value of diversity in the workplace.

Professional Experience: All students participate in a project-based professional experience following the first-year such as co-op, internship, directed research, or community project clearly related to the student’s professional goals.

BACHELOR’S DEGREE GRADUATION REQUIREMENTS
1. At least 120 credit hours.
2. At least a 2.000 cumulative average.
3. At least a 2.000 cumulative average in the major field of study for the Class of 2004 or later.
4. Meet the requirements of the Clarkson Common Experience.
5. Meet the requirements for a degree program as determined by the offering department or school.
6. A student entering as a first semester freshman must have been in residence for at least four semesters, including the final undergraduate semester; or, if entering with advanced standing, have completed at least half the remaining upper-level undergraduate work in residence at Clarkson. The program must include a minimum of two semesters (30 credit hours) including the final undergraduate semester.

EAP/ESL Requirement
Students for whom English is a second language must take an English language placement examination upon entering Clarkson. Based on the outcome of this examination, a student may be required to complete one or more English for Academic Purposes (EAP, formerly ESL) courses prior to enrolling in UNIV190, The Clarkson Seminar, or any course assigned one or two communications points.

NOTE that international students who enter as first-year students and are placed in EAP course(s) may substitute another course for UNIV190, The Clarkson Seminar. The substitute course (1) must have a C1 or C2 designation and (2) must have at least one of the Knowledge Area designators (CGI, CSO, EC, IA, IG, STS) and come from the humanities and/or
social science disciplines. The substitute course must be in addition to the 5 required Knowledge Area courses.

GRADING SYSTEM

Grades are reported in accordance with the following system:

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<th>Quality Points</th>
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<td>Passed with 4.000 quality points per credit hour</td>
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<tr>
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<tr>
<td>C-</td>
<td>Passed with 1.667 quality points per credit hour</td>
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<tr>
<td>D</td>
<td>Lowest passing grade with 1.000 quality points per credit hour</td>
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<tr>
<td>F</td>
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Therefore, a student who passes a 3-hour course with an A will earn 3 x 4.000 or 12.000 quality points; an A-, 3 x 3.667 or 11.001 quality points, etc. The quality-point average is determined by dividing the total number of earned quality points by the total number of credit hours taken at Clarkson on a traditional basis (A+, A-, B+, B, ...). Selected courses may be taken on the Pass/No Credit system where P=passed, quality-point average not affected; NC (no credit) on student’s record for C-, D, or F grade in courses taken as Pass/No Credit; P=passed (certain designated graduate courses), quality-point average not affected.
ACADEMIC STANDING

1. **Academic Warning.** A full-time undergraduate student in Good Standing whose current semester Quality-Point Average (QPA) falls below 2.000 shall be placed on Academic Warning. To be removed from Academic Warning, back to Good Standing, a student needs to complete at least 12 credit hours with a current semester QPA of at least 2.000.

2. **Academic Probation.** A full-time undergraduate student on Academic Warning who fails to complete at least 12 credit hours with a current semester QPA of at least 2.000 will be placed on Academic Probation. To be removed from Academic Probation, back to Academic Warning, a student needs to complete at least 12 credit hours with a current semester QPA of at least 2.000.

3. **Academic Separation.** A full-time undergraduate student on Academic Probation who fails to complete at least 12 credit hours with a current semester QPA of at least 2.000 will be separated from the University. Any undergraduate student who fails to attain a current semester QPA of at least 1.000 shall also be Separated from the University.

4. **To be continued, if Separated,** an undergraduate must request continuance or readmission by submitting a Request for Continuance or Readmission Following Separation form (http://www.clarkson.edu/sas/forms/readmission_separation.pdf), from their Clarkson e-mail account, to the Continuance and Readmission Review Committee at the following e-mail address: registrar@clarkson.edu. The student may also send their request form to the Continuance and Readmission Review Committee, c/o Student Administrative Services, Box 5575, Clarkson University, Potsdam, NY 13699 or by fax (315-268-2321). The student needs to complete all answers on the form and provide the programs(s) of study the student wishes to be continued in. All cases of continuance require concurrent approval of the department chair or program director and the University’s Continuance and Readmission Committee. If continued, a student’s academic standing will be Academic Probation.

5. The academic standing acquired at the end of any semester shall take effect at the beginning of the next summer school or semester in which the student enrolls.

Further information may be found by contacting Student Administrative Services.

DEAN’S LIST AND PRESIDENTIAL SCHOLAR LIST

To qualify for the Dean’s List during any semester, a full-time undergraduate student must receive no failures and earn a semester quality-point average of at least 3.250. A 3.800 semester quality-point average or better qualifies a student for the Presidential Scholar List. Both lists require a student to be enrolled for at least 14 credit hours in a prescribed curriculum of which 12 or more credit hours are graded in the traditional manner (not graded on a pass/no credit basis).
DEGREE WITH DISTINCTION
At graduation, a student will receive the bachelor’s degree "with distinction" if his or her cumulative quality-point average is at least 3.250, and "with great distinction" if it is at least 3.750. A more detailed and complete explanation of all academic and graduation requirements at Clarkson appears on the Web at www.clarkson.edu/.

Double Major and Second Degree

• A single Clarkson bachelor’s degree with a double major is awarded when the student satisfies all curricular requirements for two Clarkson bachelor’s degree programs, but does not qualify for a second degree.
• A student can be awarded two Clarkson bachelor’s degrees. A student qualifies for a second Clarkson bachelor’s degree if he or she satisfies all degree requirements for two different Clarkson bachelor’s degree programs and has a minimum of 150 credit hours, including at least 30 credit hours unique to each program.

COURSES
Typical courses for each department are listed in this catalog, but not all courses are offered each year. Descriptions of courses and semesters in which specific course are offered are accessible in PeopleSoft. Viewing Clarkson’s searchable course catalog will give up-to-date course descriptions, pre- or co-requisites, course attributes, and other information pertaining to all courses offered. Clarkson’s browse course catalog can be viewed at www.clarkson.edu/sas/classes_schedules/index.html. There is no log-in required - just select the semester and year that you are interested in viewing.

Course credit is also available for Independent Study and Special Projects.
STUDENT AFFAIRS

ABOUT THE DIVISION OF STUDENT AFFAIRS
The Office of the Vice President for University Outreach and Student Affairs oversees the areas of the University that have a significant impact on student life. The staff is committed to assisting students with the many adjustments they face during their college years. The Student Affairs team works closely with student leaders, student groups, and individual students to assess student needs and develop programs and services to meet those needs. We view university life as a total educational experience, encompassing the ongoing activities and programs offered in residence halls, clubs and organizations, special campus events, and experiential programs both on and off the campus. Our students are always expected to behave in ways that are mindful of safety and civility, respecting and celebrating the many differences they find among one another. The Student Affairs staff members at Clarkson are educators in their own right and work to build bridges between the faculty and students and the outside world in new and creative ways. Clarkson students become part of a dynamic and diverse community of scholars and will grow and develop as individuals within that community as they prepare for their futures.

Mission
- Student Affairs is a catalyst for bridging diverse academic, cultural, professional and social experiences, empowering students to achieve their full potential.
- We promote intellectual, personal and professional growth through the delivery of developmental opportunities in a collaborative and respectful campus community.
- We enhance campus community interaction and facilitate co-curricular educational activities as well as provide global, pre-professional and leadership experiences.

ABOUT THE CAMPUS AND GREATER COMMUNITY
Clarkson is a residential university, with the majority of students residing on campus. Other students live in fraternity or sorority houses or apartments in the Village of Potsdam. Being a student at Clarkson means entering into “community” at several different levels. Broadly speaking, there is the learning community that encompasses the full experience of living and studying on the Clarkson campus, accompanied by the pleasures and responsibilities of being an integral part of a relatively small college town. However, small and sometimes powerful communities often develop within the floor of a residence hall; or among a group of laboratory partners; or among the members of a campus club. A Clarkson education encompasses far more than classroom and laboratory activities, studying, and grades. It is a total experience that includes building new relationships, finding out more about oneself, clarifying career and personal goals for the future, and learning how to be a participating member of a society that constantly strives to be better.

Clarkson students work hard. The University’s standards are high, the courses challenging, and the time full. Sometimes it can be quite demanding. But we also know from thousands of our alumni — as well as current students — that they take great pride in having worked hard for a quality education that pays off for them in many different ways. In addition to providing each student with a strong academic program, Clarkson is committed to helping its students develop personally and professionally. Your learning experience will reach well beyond the traditional classroom and laboratory setting. An essential part of your educational
experience will emerge through the programs and activities in which you participate. Another characteristic that we see in our students is a strong desire to make the world a better place, and we try in many different ways to encourage involvement in and service to the surrounding community. To be able to find ways of giving back to our communities is truly the mark of a responsible and independent adult.

PARENT RELATIONS
The Parent Relations area of the University is housed in the office of the Vice President for University Outreach and Student Affairs. Clarkson is committed to a parent relations program that partners with parents and educates them to the many services and programs available to their students.

The Parents Association was founded in 1977 to foster a closer relationship and to involve a greater number of parents in the affairs of the University. All parents become members of the Association upon the acceptance and enrollment of their children into the University and can remain members indefinitely.

The administration of the Association is vested in the Parents Committee, which consists of parent representatives from all four class years of students, as well as the graduate students. The Parents Committee works closely with the office of the Vice President for University Outreach and Student Affairs and the staff of the division in planning programs and events that support parent involvement and interaction. The Committee specifically helps with Family Weekend planning and activities, with the Admission Office recruitment of prospective students, and with the Career Center’s employer relations programs. The Parents Committee also has a role in the fundraising arm of the University through contributions to the Parents Fund.

The relationship between students, parents and the University is an important one. Through the Parent Relations area, communication is encouraged in order to foster a better understanding among parents, students and University staff.

NEW STUDENTS AND ORIENTATION
Students approaching their first year at Clarkson know that they have been accepted to an academically selective institution, yet the atmosphere at the University is friendly and supportive, one in which students go out of their way to help each other succeed. Our students learn the importance of an individual’s contribution to successful teamwork in the completion of any project. This gives the Clarkson graduate experience and insight into the significance of developing intellectual and interpersonal skills simultaneously.

The first year at Clarkson is structured to help students in their academic, personal, and social adjustment to college and to their future. Clarkson’s concern for new students begins even before they arrive on campus. Over the summer, the University sends first-year students an array of information about life and traditions at Clarkson, from materials concerning housing assignments and roommates, to information about arrival times and the Orientation Program.

Orientation
New Student Orientation is a comprehensive introduction to Clarkson University. The program helps students build a foundation for academic and co-curricular success. Orientation provides numerous opportunities to find out all about life at Clarkson from a personal, social, and
academic standpoint. It is a time for learning about Clarkson traditions, appreciating the value of the University’s celebrative community, and learning about ways to serve in the larger community. Clarkson’s co-curricular opportunities, resources, and services for students are highlighted, and new students are introduced to Clarkson’s academic programs through academic orientation in their departments, a book discussion of the common reading, team building activities, and plenty of entertainment. Evenings during Orientation consist of events such as screenings of the summer’s most popular blockbuster movies and variety shows like hypnotists and comedians. Through the Orientation experience, students will build relationships with other students, faculty, and administrators. Students may also choose to become involved in a pre-Orientation trip as a way of being introduced to Clarkson life before the comprehensive Orientation Program begins.

Adjusting to Life at Clarkson
To assist new students, every first-year residence hall floor is assigned a resident advisor. The upper-class student staff are trained to ease the transition from high school and home to college. If they are not able to answer a question, they know who can.

Once classes begin, campus life takes on an identity of its own. Students begin to adjust to a new and different schedule, to new academic performance expectations, and to an entirely new way of life. Some adjust more easily than others. For those who need assistance with academic, personal, or social concerns, there are a number of possible routes available. The Health and Counseling Center represent one possibility. The people there are trained to assist students in every aspect of their daily lives: stress management, interpersonal communication, personal issues, etc. The Counseling staff can help find a solution to a problem, or can find someone else to help. In addition, there are a variety of offices listed below that can help students address academic and social concerns that may arise during the transition to Clarkson.

First-Year Transition
The Office of Student Life and Engagement, Clarkson Union Board (the campus’ student programming board), Residence Life staff, and clubs and organizations take over where the First-Year Seminar ends. These offices and organizations plan and coordinate a number of activities and co-curricular programs open to all students. Activities such as a trip to Ottawa for Winterlude or opportunities to attend renowned speakers and entertainers are usually offered by one of these groups. Whatever one’s taste, there is probably a program to satisfy it. If not, each of these groups is either student-run or has student representatives to help plan and implement desired programs.

In any major, the first-year curriculum at Clarkson is challenging. All first-year students take the Clarkson seminar, which addresses important questions around a central theme. In each school, common coursework in the first year makes it easy to change majors if the academic interests change.

To assist in the transition to Clarkson’s academic program, first-year students are encouraged to live with others around a common theme interest, whether it is academic or recreational. Resident Advisors help students living in theme housing with their academic and social transitions to Clarkson. They do this by helping to identify tutoring needs and resources, helping to organize social and leadership events and just generally being available to assist students. Students living in themed housing are encouraged to study and learn together and to
develop mentoring relationships with faculty.

Students may seek help with their academic work through the Student Support Services area, their instructors, or the department in which a course is offered. Group tutoring sessions are organized for many first-year courses.

It is part of the challenge of the first year to learn to strike a healthy balance between an academic program and a social life. Clarkson is ready to help, and the University staff is experienced at supporting students in their efforts to succeed. The help is there for the asking — and is all part of the supportive environment that is the experience of being a first-year student at Clarkson.

THE STUDENT SUCCESS CENTER

The Student Success Center is designed to support all students in a proactive and supportive environment by providing structured and effective services as they persist towards their undergraduate degree. The SSC incorporates three offices: First-Year Advising and University Studies, the Office of Accommodative Services and Trio's-Student Support Services. Using a collaborative approach within and across the campus community, the SSC offers all students access to academic counseling and advisement, as well as tutoring and disability services.

Student Support Services (SSS)

The Student Support Services is a federally funded Trio program designed to maximize the academic performance of Clarkson University students who are first generation, from low income background or who have a disability. SSS provides opportunities for academic development, assists students with basic college requirements, and serves to motivate students toward the successful completion of their post-secondary education. The SSS program may also provide grant aid to current students. Student services include study skills development, tutoring, financial literacy, mentoring and financial assistance.

First-Year Advising

It is not unusual for students to experience many changes in their first year on campus, and we provide resources to help them. Academic advising is an important function of Clarkson's faculty and staff. Although all students have a faculty or professional administrative advisor within their academic programs of study, an added service offered by Clarkson is First-Year Advising for students who want extra guidance. Many students want to tailor their education to pursue multiple interests, or they are still deciding on a major or career direction.

Office of Accommodative Services

This is the initial point of contact for students with documented disabilities seeking accommodations or services. The office is responsible for maintaining disability-related documentation, certifying eligibility for receipt of services, determining reasonable accommodations, and ensuring the provision of those services. Students are asked to make contact with the Office of Accommodative Services prior to the beginning of each semester at Clarkson, in order to ensure that accommodations will be available in a timely fashion.

The student will meet with the Director or Assistant Director of the Office of Accommodative Services to review documentation and determine appropriate accommodations. The Office of Accommodative Services will assist the student with faculty and
staff notifications requesting appropriate accommodations. Appropriate accommodations will be provided to students who have followed the procedures as developed by the Office of Accommodative Services. Services may include short-term arrangements for students who have become temporarily disabled.

First-Year Seminar, FY100
The University understands that there are common areas where concerns arise and has developed a series of programs specifically for first-year students. The most comprehensive program required of freshmen is the First-Year Seminar. The course introduces students to the broad educational mission of the University. It also covers such topics as alcohol and drugs, fitness, stress management, sexuality, leadership skills, academic adjustment, and communication. The course allows for discussion and presentation with faculty and upper-class peer assistants, as well as with outside experts. It builds skills for group interaction.

CLARKSON HOUSING
Clarkson is a residential university. Single undergraduate students in cohort years 1, 2, 3, and 4 are required to live in University housing and dine in campus facilities unless they are granted an exemption to the residency requirement listed in the policies. Fifth-year students and grad students are housed on campus only as space allows. Junior and senior fraternity and sorority members who meet academic requirements may live and dine in University-recognized fraternity and sorority housing. Upper-class fraternity and sorority members living in residence halls may be permitted to take their meals at their respective fraternity or sorority houses.

University housing provides accommodations ranging from traditional rooms to suites to apartments. Most first-year students reside together in Cubley-Reynolds and Ross-Brooks (Quad). Special attention is given to the assigning of roommates to first-year students. Some of our housing units feature suite-type accommodations; these are typically 2 double rooms with interconnecting baths. Lounges and recreational areas, laundry rooms, and vending machines are located in or near each residence facility. Campus housing is staffed by live-in University employees known as Area Coordinators, who supervise and train students as resident advisors and directors to assist the students with personal issues and a variety of educational, social and recreational programs. Smoking is not permitted in any buildings on campus including the residence halls.

Students living in campus housing are required to contract for food service, eating their meals in a University dining venue of their choice (exceptions are campus apartment residents).

In addition, the University operates three on-campus apartment complexes. All units are furnished with kitchen facilities and include utilities. Students in a campus apartment are not required to contract for food service, however, they may do so. Students residing off campus have the option of contracting for University food service.

Telephone service, TV cable, and data lines are available for students in each room or apartment. A separate charge may be associated with telephone service and/or TV cable.

Students are responsible for knowing and adhering to the Residence Regulations enumerated in the University housing contract and on the University's web site.
Theme Housing
Consistent with the Residential Experience initiative of the University Outreach and Student Affairs Strategic Plan, Clarkson is striving to bring all aspects of Clarkson’s learning community together by developing innovative theme housing opportunities to complement and build on current theme housing created around projects or entrepreneurial ventures in which students from various majors live and work together. In addition, students will continue to be encouraged to develop meaningful proposals for living together in theme-related housing, thereby increasing options for people with similar interests to live together while expanding the collaborative learning atmosphere to our residences in a very intentional way.

CAMPUS SAFETY & SECURITY
The Office of Campus Safety & Security consists of a team of people working with the campus community to meet the specialized safety and security needs of the University. Responsibilities include the maintenance of public order, vehicle registration, emergency first aid treatment, issuing I.D. cards, room key distribution, educational programs (including crime prevention and fire safety), and other related programs.

Campus Safety & Security officers are responsible for the enforcement of the rules and regulations of the University. The Dean of Students staff is responsible for overseeing the judicial process. Officers do not have police jurisdiction over public streets, public property, or private property. Arrests and apprehension are referred to the Village Police. Statistics concerning campus safety and campus crime are available upon request from the Office of Campus Safety & Security or can be accessed at http://www.clarkson.edu/campussafety/.

The department’s ability to function as an independent agency enables it to preserve the tradition of Clarkson in which security, safety, and adherence to the Code of Student Conduct are both an individual responsibility and a collective behavior. In emergencies, Village Police are called as first-line, back-up support, along with appropriate University officials and the University Emergency Response Team.

CLARKSON REGULATIONS
By the time students enter the University they are considered to be adults and are expected to act accordingly. Each student is responsible for knowing the contents of Clarkson Regulations, found at www.clarkson.edu/studentaffairs/regulations. The regulations contain information on registration, class absences, the grading system, scholastic requirements, the method for removing course deficiencies, special examinations, the code of conduct, campus policies, and other information regarding University operations. Printed copies of Clarkson Regulations can also be obtained from the Office of the Vice President for University Outreach & Student Affairs.

EXTRACURRICULAR ACTIVITIES AND STUDENT LIFE
There are many opportunities to enhance the educational experience through participation in a range of extracurricular activities. The University recognizes the importance of these activities in developing qualities of leadership and personal growth. To find out when student groups are meeting and what activities are happening on campus go to http://KnightLife.clarkson.edu and check your e-mail every Thursday to see what is happening that weekend and the following week. Your college experience will be richer if you are an active participant in it.
Clarkson Union Board
The Clarkson Union Board (CUB) is the campus’s programming board. Through its dedicated student members, CUB provides cultural, social and recreational programs that complement academic life of the campus. The CUB executive committee consists of a president, vice president, secretary and treasurer. Committee chairpersons join with the executive committee to complete the Board. The Clarkson Union Board sponsors comedians, magicians, hypnotists, movies, special events, concerts and a major annual concert titled Spring Fest. Past Spring Fests have boasted performances by the Goo Goo Dolls, the All American Rejects, Panic! At the Disco, Plain White T’s, and more.

Clarkson University Student Association (CUSA)
CUSA Senate is the governing body of all clubs and organizations on campus. They are responsible for allocating the activity fee each semester to sponsored clubs and organizations. Composed of a president, vice president, comptroller, public affairs director, treasurer and secretary (the Executive Board), six Senators from each class, and a Clarkson School representative, the CUSA Senate serves as the formal representatives of the student body. The CUSA Senate is responsible for working together with the Clarkson Administration on all decisions that affect the student body. Senate meetings are held on Monday at 7 p.m. in the Student Center. Committee meetings are held at various times throughout the week. Meetings are open to all students.

Community Service
Each year, a Volunteer Fair is held on the first day of classes. Volunteering and community service can be one of the most fulfilling opportunities you'll find at Clarkson. By reaching out and offering your energy, talent and compassion, you can make a real difference in people's lives. Through service to others, you will gain a better understanding of yourself, demonstrate classroom learning, and increase leadership, teambuilding and management skills. That’s why service is a core value of Clarkson; it benefits both the students and the community. Service helps develop a sense of social responsibility and civic pride. Potsdam has a number of service institutions, agencies and organizations that welcome volunteer assistance. Some members of the Clarkson faculty are building opportunities for service learning into the structure of their courses. This enables students to receive partial academic credit for working on community needs and problems relevant to their academic fields. One of Clarkson’s fundamental values is to develop the kinds of skills in students that will enable them to make contributions toward the betterment of the local and global community. For information about volunteer opportunities on campus and information about local organizations that are seeking volunteers in Potsdam, visit http://clarkson.edu/campus_life/clubs/volunteering.html.

Service Organizations
There are special organizations dedicated specifically to community service. They are open to all undergraduate students. Alpha Phi Omega national service fraternity, consisting of over 615 chapters across the United States, is one of the largest fraternities in the country. Founded in 1925, Alpha Phi Omega was established to promote leadership by providing services to benefit the campus and the community. Alpha Phi Omega is open to all students. Clarkson also recognizes active chapters of Circle K, whose members become involved in numerous
Cultural and Recreational Opportunities
The Clarkson community has easy access to many cultural and recreational facilities in upper New York state, New England, and Canada, as well as on the campus.

Among New York State attractions are the Adirondack Museum at Blue Mountain Lake, the Remington Museum at Ogdensburg, the Thousand Islands resorts near Alexandria Bay, and the St. Lawrence Seaway area near Massena.

Skiing is available at slopes around Lake Placid, Tupper Lake, Vermont, and New Hampshire, which are easily reached by automobile, as are excellent locations and facilities for fishing, boating, hiking, tennis, and golf.

Splendid concentrations of cultural activities abound in nearby areas of Canada. Within 96 miles is the Canadian capital of Ottawa, with its National Arts Centre, National Gallery of Canada, Museum of Civilization, Museum of Science and Technology, Museum of Nature, Ottawa Senators hockey team, and the Parliament complex. Within 150 miles are Montreal’s Museum of Fine Arts, Place des Arts, several educational institutions, and a professional hockey team, the Canadians. Just across the border near Cornwall is Upper Canada Village, a reconstruction of the living style of United Empire Loyalists who sought refuge in Canada following the American Revolution.

In Potsdam itself, music lovers have excellent opportunities to hear orchestral, choral, and solo performances by teachers, students, and visiting artists at the noted Crane School of Music at SUNY Potsdam.

Fraternity-Sorority Life
About 15 percent of Clarkson’s students join fraternities and sororities. The locals, in order of their founding, are:

- Omicron Pi Omicron (1903)
- Sigma Delta (1904)
- Zeta Nu (1956)

National fraternities, with the date of their origination at Clarkson, include:

- Delta Upsilon (1922)
- Alpha Chi Rho (1956)
- Tau Kappa Epsilon (1963)
- Tau Epsilon Phi (1966)
- Delta Sigma Phi (1967)
- Phi Kappa Sigma (1981)
- Sigma Chi (1987)
- Sigma Phi Epsilon (2000)

The four national sororities at Clarkson are:

- Phi Sigma Sigma (1979)
- Delta Zeta (1986)
- Theta Phi Alpha (2006)
- Kappa Delta Chi Sorority, Inc. (2011)

Students are eligible to join fraternities and sororities according to the guidelines established by the Recognition Policy for Fraternities and Sororities. Recruitment activities typically take place during the first two weeks of each semester; however chapters may elect to hold recruitment
activities throughout the year.

Clarkson University’s Recognition Policy for Fraternities and Sororities holds that the futures of these organizations are determined by their demonstrated ability to contribute positively to high academic standards, good social behavior, and constructive extracurricular activities. Hazing and discrimination are prohibited.

Many fraternities and sororities maintain chapter houses and serve meals. Initiatives are underway to integrate fraternities and sororities more completely into the educational and social fabric of the University through the ongoing development of on-campus housing options. Currently, there are 4 fraternities with house on the campus. Housing exemption requests to live at chapter houses are considered by the Office of Student Organizations in conjunction with Residence Life and are made according to housing policies. Costs of joining social fraternities and sororities vary. Questions may be directed to the Director of Student Organizations and Student Center at 315-268-2345.

**Honor Societies**

Upper-class students who demonstrate high scholastic achievement in a given field and possess exemplary qualities of character and leadership are eligible for membership in a number of national and local honor societies. National honor societies include Beta Gamma Sigma (business administration), Chi Epsilon (civil engineering), Eta Kappa Nu (electrical and computer engineering), Gamma Sigma Epsilon (chemistry), Omega Chi Epsilon (chemical engineering), Phi Kappa Phi (academic excellence), Phi Theta Kappa (transfer students), Pi Mu Epsilon (mathematics), Pi Tau Sigma (mechanical engineering), and Tau Beta Pi (engineering). Sigma Gamma Tau (Mechanical Engineering), Sigma Pi Sigma (physics), Psi Chi (psychology), Sigma Tau Iota is a local honor society available to Engineering and Management students, Tri-Beta (biology), Sigma Nu Tau Entrepreneurship Honor Society.

**Interfraternity Council**

The Interfraternity Council (IFC) is a body of representatives from each of the member chapters. From this body, the IFC Executive Officers are elected on an annual basis. In addition to the president, there are vice presidents who serve in various capacities, such as risk management, membership recruitment, educational programming, public relations, community involvement, etc. These students work with their Pan-Hellenic counterparts to offer programming for the Greek system and campus.

**International Student Organization (ISO)**

The ISO is an organization for both U.S. and International students. Students meet on a regular basis to celebrate holidays, take trips, socialize, and learn more about each other’s cultures. For more information, contact the International Student Advisor by mail at Clarkson University, PO Box 5645, Potsdam, NY 13699-5645, USA. Visit the ISO Web site.

**Journalism, Radio, TV**

Students interested in journalism can work on one of the University publications. The student newspaper, The Integrator, is published weekly. The Clarksonian is the University yearbook. Each is edited and managed by students.
A radio station is operated out of the Student Center. WTSC-FM operates as a broadcast station and is governed and operated by Clarkson students, as is the amateur (ham) radio club, K2CC.

Clarkson students also operate the cable television station WCKN-TV. This station provides news shows and hockey coverage, as well as syndicated broadcasting.

Music and Dramatics
Those interested in music may participate in the Pep Band or orchestra. The Pep Band plays at sports events and the orchestra at various University functions such as Recognition Day. Students with an interest in acting may join Clarkson Theatre, which presents two or three productions a year. Past performances include “Harvey,” “Joseph and the Amazing Technicolor Dreamcoat,” “Arsenic and Old Lace,” “Once Upon a Mattress,” “Our Town,” and “Dracula.”

A wide range of concerts, plays, lectures and other cultural events are available through the Office of Student Life and Engagement, Clarkson Union Board, Residence Life, and student organizations. Events are also sponsored by the Associated Colleges of the St. Lawrence Valley. Movies, both foreign and domestic, are presented throughout each term at Clarkson and other nearby colleges.

Pan-Hellenic Council
The Pan-Hellenic Council (Panhel) is composed of delegates from each of the member sorority chapters. The council positions are divided among the delegates. The President and Vice President for Recruitment rotate between chapters; other positions are determined by appointment. Recruitment activities are typically conducted during the first two weeks of each semester, however individual chapter also hold recruitment events throughout the year.

Professional Societies
Numerous national professional societies maintain student chapters at Clarkson. These include Alpha Kappa Psi (national professional business fraternity-coed); American Indian Science and Engineering Society; American Institute of Astronautics and Aeronautics; American Institute of Chemical Engineers; American Product and Inventory Control Society; American Society of Civil Engineers; American Society of Mechanical Engineers; Arnold Air Society; Association of General Contractors; Association for Computing Machinery; Association for Women in Mathematics; Engineering and Management Society; Institute of Electrical and Electronics Engineers; National Society of Black Engineers; New York Water Environment Association (NYWEA); Society of Hispanic Professional Engineers; Society for Industrial and Applied Mathematics; and Society of Women Engineers; Society of Human Resource Management; American Chemical Society.

Recognition Societies
One of the highest honors a Clarkson student can receive is to be tapped for membership in Phalanx, the senior leadership society. Students are recognized for their exceptional leadership ability, scholastic attainment, and extracurricular involvement.

The Arnold Air Society is a professional honorary service organization within the Corps of Air Force ROTC Cadets. Arnold Air provides a stimulating, service-oriented program that gives selected cadets enhanced leadership skill development opportunities while they provide service
to the campus and the community.

**Religious and Spiritual Life**
Although it is not a church-affiliated university, Clarkson is interested in the moral and spiritual development of its students. Some students pursue their spiritual development in personalized ways, while others attend services of organized religious groups. Potsdam churches include Baptist, Christian Science, Church of Jesus Christ of Latter Day Saints, Episcopal, Jehovah’s Witnesses, New Hope Community Church (unaffiliated), Methodist, Nazarene, Presbyterian, and Roman Catholic. Potsdam’s synagogue is the Congregation Beth-El. There is also a mosque in Canton, a Congregational church in Norwood, and a Lutheran church in Massena.

The Inter-Varsity Christian Fellowship (IVCF) is a nondenominational organization of Christian students who host Bible studies, weekly fellowship meetings, and other activities. There are occasional meditation, yoga, and Buddhist groups that are open to students. For more information please see http://clarkson.edu/campus_life/clubs/student_life/spiritualresources.html

**Special Interest Clubs**
Find a current listing of student organizations at: [http://knightlife.clarkson.edu](http://knightlife.clarkson.edu).

**Student Center**
The Student Center is the focal point of activities on the Hill campus. If you see your Residence Hall as a bedroom then we hope you will see the Student Center as your living room. The Student Center is a place where students can come to spend time between classes, study, and hold meetings and late night events. There are a variety of lounges and spaces with comfortable chairs and tables for studying and relaxing. In addition, meeting rooms are available for group meetings and other activities. Also available to students is the Forum, an innovate auditorium in the form of a stairwell equipped with a massive video wall (you have to see it to believe it). The space is often used for large events such as lectures, showcases, comedians, pre-released movie showings, and dances.

Besides being a great place to connect with your classmates, the Student Center is the home of many departments and services on campus. On the lowest level you can access the Mail Room and your student mailbox. You can also head over to the POD Store to pick up convenience items, listen to and watch the campus radio and TV station or write an article for the school newspaper (all of which have offices on this level). Our virtual game room is also on this level where you can play all of the newest video game hits.

On the ground level of the Student Center you will be able to visit the Student Center Info Desk, the Clarkson University Student Association (CUSA) and Student Organizations office, JAVA City, Bar 9, and even get money through our North Country Savings Bank ATM. On this level you will find the traditional game room with Pool, Darts, Foosball, Bubble Hockey and Ping Pong games all free for student usage.

The top floor of the Student Center houses our largest dining facility on campus as well as our Multipurpose Rooms (MPRs).
Cheel Arena
Cheel Campus Center boasts a 3,000 seat multipurpose arena. The Arena, home of men’s and women’s Golden Knights Hockey, is also the place to attend University Convocation, University Recognition Day, Commencement, and other large-scale events.

HEALTH & COUNSELING CENTER
Counseling Services
Counseling Services play an active role in helping Clarkson students adjust to college life and set immediate and long-range goals. The years spent in college are years of personal growth, changing relationships, exploration of values and feelings, and of learning how to be an independent adult. Development in these areas is as crucial to education as what is learned in classrooms and laboratories. Throughout the year counselors provide workshops that teach skills and provide insights important to this development process. They also teach sections of the First-Year Seminar that is required of all first-year students. The counselors approach students with a sense of caring and a sincere desire to help them find personal fulfillment and satisfaction in their University careers.

Personal counseling is also provided by full-time professional counselors who are prepared to deal with a variety of concerns including stress, alcohol abuse, eating disorders, depression and sexual issues. However, students not only seek help for specific problems, but make use of counseling to explore feelings, values and life directions. Counselors also offer a variety of personality and vocational interest tests that can help increase self-awareness and clarify goals. In addition to counseling, the staff is prepared to make appropriate medical referrals.

Alcohol and Drug Education
Clarkson’s alcohol and drug educational efforts are focused on two important messages. The first emphasizes the legal obligations of students with regard to the use of alcohol or any other substance. The University’s alcohol and drug policies are stated clearly in the Clarkson Regulations and are guided by law. A civil community is built on respect for others and respect for the law. A second major emphasis is the complicated concept of responsible and moderate use of alcohol. The use of alcohol is interwoven in many everyday settings and activities in our culture. Education and policy at Clarkson are designed to insist on legal and moderate usage among those choosing to drink, and to discourage dangerous or harmful practices involving alcohol or other substances.

Campus programming is designed to convey the messages highlighted above. Students who are interested in participating in prevention efforts can contact the counseling staff on the ground floor of the ERC. Students with special concerns or problems with alcohol or drug abuse should also contact Counseling Services at the same location.

Health Services
The University has forged a partnership with Canton-Potsdam Hospital, CPH, in which CPH provides professional staffing and services at the University’s Student Health Center. Through this partnership, students enjoy a comprehensive health care program and the broad professional capacities provided by the hospital and its highly trained staff. At the Student
Health Center (centrally located in the Educational Resources Center) CPH provides clinical services to include basic medical care, preventative care, general physicals for student-related activities and limited urgent care. Students also have access to CPH’s state-of-the-art lab services. Most visits to Health Services and many of its services are free of charge. Health Services is open weekdays from 8 a.m. – 4:30 p.m. during the academic year. After hours emergencies are handled at CPH itself which is located approximately one mile from campus. There is also an Urgent Care Center on Lawrence Avenue in Potsdam.

CPH provides comprehensive acute medical-surgical care and emergency care, and has widely recognized programs in chemical dependency treatment, cardiac care, obstetrics, and physical rehabilitation services. The Hospital operates the Warner Cancer Treatment Center. In addition, CPH is an affiliate of renowned Fletcher Allen Health Care, headquartered in Burlington, VT.

CAREER CENTER & INTERNATIONAL STUDIES PROGRAMS
The Career Center assists all Clarkson students in career preparation, with a particular focus on external experiential learning opportunities to include cooperative education, internships, and international study programs. Assistance with pursuing post-college employment and graduate study is also central to the mission of the Center. It is also a primary focus of the Center to develop relationships with business and industry that recruit or could potentially recruit our graduates, assuring that these organizations include Clarkson among their primary college relations and recruiting universities.

The International Students & Scholars Office (ISSO) informs and educates the international population as well as the University community of immigration regulations that govern international students, scholars and the University. The ISSO also coordinates services and benefits available to the international population and facilitates international cultural events within the Clarkson community. More information can be found on the International Students & Scholars website at www.clarkson.edu/isso.

Career and Job Search Services
Individual career coaching appointments are available through the Career Center to discuss concerns such as career direction and choice, skills identification, employment opportunities, and job search techniques. Staff members are available to help students discern solutions and develop strategies to address career-related concerns.

The Center facilitates a wide number of career-oriented workshops for first-year students through graduate-level students, including career exploration groups, resume preparation, interviewing techniques, and job-search techniques. The mock interview program is noted for its success in preparing students for their job interviews.

Among the many benefits of a Clarkson education is the alumni network. Alumni serve as a critical link to the Center. The Center also reaches out to the community by planning programs with any campus organization or academic program.

The Career Center provides access to internship, co-op, and permanent job opportunities through the following means: an on-campus recruiting program with business, industry and government; Career Fairs; a Web-based resume database system that enables the Center to provide students’ resumes to employers; a job-listing and networking service on the Internet called CareerShift; and a network of thousands of Clarkson alumni who can be tapped at any
time in the students’ years at the University.

Clarkson’s reputation with hundreds of companies across the country, combined with a comprehensive Career Center, has resulted in positive outcomes for the graduates consistently over the years. Specific employment statistics for recent classes are available upon request from the Center.

**Experiential Education Program: Cooperative Education & Internships**

**Cooperative Education (Co-op) Program**
The Career Center works closely with representatives of business, industry and government to place students in meaningful real-life work environments during the academic year. A Co-op experience provides students the opportunity to apply their academic knowledge and gain valuable experience while positioning them to obtain full-time professional employment upon graduation.

Typically, students participate in the Co-op Program for an academic semester and a summer. Students may choose to co-op from January through August or from May through December. However, the co-op work block timeframe is very flexible and the University makes every effort to match a student’s academic plans with a company’s work schedule. To help prepare students for the co-op experience, the Career Center provides skill-based seminars and workshops. The focus of these programs is on writing resumes, cover letters, practicing job interviews, and teaching students how to conduct a successful job search. A key decision for the student is how to make up coursework missed while in the workplace. Students can choose to attend summer school, use AP credit they have earned, overload coursework during the semester or push back their planned graduation date. Co-op students work closely with their academic advisor, Student Administrative Services representative and the Career Center staff to plan out a successful co-op experience. While away during the semester(s), a co-op student is considered a full-time student.

All University students are encouraged to consider co-op as a way to enrich their Clarkson education. Co-op positions are located across the country, though most are concentrated in the northeast. While on co-op, students are assigned a direct supervisor, paid a professional salary and are evaluated during their job assignment. Students are also encouraged to communicate with the Career Center while on co-op so that staff may monitor their progress. For more information, visit the Clarkson University Cooperative Education Web site at [http://www.clarkson.edu/career/students/exp_ed/coop_requirements/index.html](http://www.clarkson.edu/career/students/exp_ed/coop_requirements/index.html) or call 315-268-6477.

**Internship Program**
As part of the external experiential learning component, the Career Center offers an internship program. Students from all academic majors can pursue internships during any summer of their undergraduate or graduate program, as well as some unique study/internship programs that are offered during the semesters. Similar to the co-op program, special workshops are designed to prepare students for their job search and are offered throughout the year, along with individual advising. Most internships are paid; in some cases, students receive a stipend and may receive academic credit, and some internships are for credit only.

Internships are available with business and industry across the country; with local, state, and federal government agencies; and with other agencies, non-profits, and educational
institutions. Students work closely with the Center and their academic advisors to select an internship that best suits their needs. For more information, visit Clarkson’s Web site at: http://www.clarkson.edu/career/students/exp_ed/internship_requirements/index.html or call 315-268-6477.

**Study Abroad/Exchange Program**

Study Abroad provides an excellent opportunity for students to enhance their academic background and prepare for the global marketplace through exposure to another educational system and culture. The primary program open to all students offered by the Career Center is the Student Exchange Program. The program is designed for students to spend a semester or a year abroad usually during their junior year. Students go through a competitive application process during the sophomore year to be considered for the program. Clarkson University has articulated exchange agreements with over 37 colleges and universities in 20 countries. For a detailed list, please visit: http://www.clarkson.edu/career/students/study_exchange/colleges_universities.html or call the Career Center at 315-268-6477.

**Exchange Partners by Country**

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<th>Country</th>
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<td>Gold Coast</td>
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<td></td>
<td>Monash University</td>
<td>Melbourne</td>
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<td>RMIT University</td>
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<td>University of Newcastle</td>
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<td></td>
<td>University of Technology, Sydney</td>
<td>Sydney</td>
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<td>Austria</td>
<td>Upper Austria University of Applied Sciences</td>
<td>Steyr &amp; Wels</td>
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<tr>
<td>China</td>
<td>ESSCA School of Management</td>
<td>Shanghai</td>
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<td>Croatia</td>
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<td>Denmark</td>
<td>Technical University of Denmark</td>
<td>Lyngby</td>
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<td>England</td>
<td>Bader International Study Centre</td>
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<td>France</td>
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<td>Ecole de Management Strasbourg</td>
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NEOMA School of Management  
Université Catholique de Lyon  
Université de Technologie de Troyes  

Germany  
Konstanz University  
SRH Heidelberg  
Universität Potsdam*  

Hong Kong  
City University, Hong Kong  
Hong Kong Baptist University  

Hungary  
ESSCA School of Management  

India  
Indian Institute of Technology Madras  

Ireland  
National University of Ireland, Galway  

Japan  
Kyushu Institute of Technology  

Korea  
Sungkyunkwan University  

Mexico  
Universidad de Monterrey*  

New Zealand  
Auckland University of Technology  

Scotland  
University of Strathclyde Business School  

Singapore  
Nanyang Technical University  
National University of Singapore  

Spain  
Comillas Pontifical University  

Sweden  
Jönköping University  
Luleå University  

Wales  
University of South Wales  

*Fluency Required  
In addition to the semester or year-long exchange opportunities, Clarkson offers students the option to participate in short-term summer programs or faculty led trips. The short term summer programs are 3-4 weeks in duration and are ideal for those students who do not wish to be gone for a full semester or year. Faculty led trips usually occur immediately following the spring semester and are 3-4 weeks in duration.  
The Clarkson School of Business has a requirement for students to study abroad and has created the Global Business Program that along with the Student Exchange opportunities offers
students more options to meet this requirement. For more information about the Global Business Program in the School of Business visit http://www.clarkson.edu/business/gbp/

Financial Policies

Exchange Programs: Students who participate in the Study Abroad/Exchange Program through Clarkson must attend one of our exchange partner universities in order to receive financial aid. During the exchange semester(s) students pay their tuition to Clarkson; there is no tuition paid to the exchange university. Room, board, and other fees are paid directly to the exchange university by the student. The financial assistance package is applied to the participant’s account as if that student were attending Clarkson University. Any credit balance may be requested through the Director of Financial Aid in SAS after tuition is applied and all required financial aid documentation (i.e. loan promissory notes, signed summary, etc.) are processed. This credit can be used toward the room, board, and other fees at the exchange partner university. It is an important step in the application process for the student to consult with the Director of Financial Aid in order to understand how their financial assistance package will be applied to the study abroad/exchange experience.

Non-exchange Programs: Should a student decide to attend a non-exchange university, he or she must take a leave of absence from Clarkson for the semester involved. No tuition is paid to Clarkson and financial assistance may not be utilized.

Academic Policies

Exchange Programs: All courses must be pre-approved through completion of Off-Campus Coursework Permission Forms prior to leaving campus. All credit is transferred back to Clarkson for those courses that students complete satisfactorily. Course credit will be transferred as transfer credit on a pass/fail system. It should be noted that credit hour and grading systems differ from country to country and school to school. Participants should request to have their grades sent to the Study Abroad/Exchange Office at Clarkson prior to leaving their exchange program. It may take several weeks after a student returns to receive these grades.

Non-exchange Programs: The student is responsible for assuring that the courses to be taken through the non-exchange program have been pre-approved by the faculty at Clarkson using the Off-Campus Coursework Permission Forms. The Study Abroad/Exchange Office will assist these students with any questions regarding passports, visas, and travel, but non-exchange students will not be included in the official study abroad rosters. Course credit will be transferred as transfer credit on a pass/fail system.

DIVERSITY INITIATIVES

The office of Diversity Initiatives is focused upon the creation of an academic experience that supports the preparation of all students to excel in increasingly diverse work environments of the 21st century.

Today’s successful graduate will be required to navigate the issues of gender, race, sexual orientation, disability, socio-economic status, and nationality with aplomb during the course of his or her professional career. Through grants, corporate investment, and agreements with partnering institutions, the Diversity Initiatives office has a commitment to the cultural competence of a diverse campus community and the provision of cultural and intercultural development for all students on campus.
The core goals of the Diversity Initiatives office are the support and holistic development of a community of learners that are diverse and inclusive in their approaches to problem solving. The following programs and initiatives facilitate the holistic cultural development of the Clarkson student.

The Collegiate Science and Technology Entry Program (CSTEP) is funded by a New York State grant to increase the number of historically underrepresented students who enroll in and complete undergraduate or graduate programs leading to professional licensure or to careers in mathematics, science, technology, and health-related fields. Participants must be New York residents; must be from historically underrepresented populations (African-American, Hispanic, or American Indian), or demonstrate an economic disadvantage; and be enrolled in an eligible program. CSTEP students receive academic and career support, graduate school preparation, standardized test preparation, tutoring, career-related travel, and access to research experiences for undergraduates.

The Arthur O. Eve Higher Education Opportunity Program (HEOP) provides a broad range of services to New York state residents who, because of academic and economic circumstances, would otherwise be at risk of not attending a post-secondary educational institution. Students who are selected attend an intensive five-week Summer PRE-freshman Experience (SPREE) where they enroll in transitional courses to help prepare them for college-level courses. In addition, students receive supportive services such as tutoring, advising and counseling during the academic year.

The Ronald E. McNair Post-Baccalaureate Achievement Program prepares participants for graduate study through access to research and other scholarly activity. Funded by a federal TRIO grant, the ultimate goal of the program is to assist underrepresented students in the attainment of doctoral degrees. McNair participants must be economically challenged, first generation college students, or a member of a group underrepresented in graduate education. As a McNair scholar, enrollees receive paid research opportunities, advising, support in the graduate admissions search, tutoring, mentoring, conference travel, and access to seminars designed to prepare students for graduate school.

The Louis Stokes Alliance for Minority Participation (LSAMP) program is a student enrichment and support services program sponsored by the National Science Foundation (NSF) and is aimed at improving the academic performance, retention and graduation rates of historically underrepresented minority students who are pursuing degrees in the fields of Science, Technology, Engineering and Mathematics (STEM). LSAMP provides various enrichment activities and workshops throughout the academic year, such as academic skill building, career development and orientation to campus resources. LSAMP also provides assistance for textbooks, research opportunities and travel to conferences. Mentoring is also a key part of LSAMP, as students who enter the program their freshman year remain throughout their career at Clarkson and provide advice and support to the underclassmen LSAMP students. Teambuilding workshops are provided on a regular basis for all participants in LSAMP.
Recreation and Intramural Activities
All students are encouraged to participate in intramural and recreational activities. Clarkson’s location provides students with a wide array of outdoor sporting opportunities including individual and team challenges. Intramural contests include both regular leagues and weekend tournaments. Recreational activities included both outdoor and indoor activities.

The Intramural Athletic league program includes the following:
Softball, Touch Football, Field Soccer, Broomball, 3 on 3 Basketball, Ice Hockey, 5 on 5 Basketball, Volleyball, Indoor Soccer.

Weekend tournaments are also offered in Dodge ball and Racquetball as well as “Fun Runs” both semesters.

The Club programs include the following:
Aikido
Cricket
Football
Kendo
Netball
Rugby
Tennis
Baseball
Bowling
Cycling
Golf
Ice Hockey
Racquetball
Skiing
Ultimate Frisbee
Broomball
Figure Skating
Hurling
Lacrosse
Rowing (crew)
Soccer
Volleyball

The Recreational programs include the following:
Canoeing
Kayaking
Down Hill Skiing
White Water Rafting
Strength & Toning
Hiking
Mountain Biking
Rock Climbing
Aerobic Exercise
Kick Boxing
Overnight Camping
Cross Country Skiing
Ice Climbing
Yoga
Swimming

In cooperation with the University medical staff, the Physical Education Department will assist those students who are physically disabled to design a program best suited for their capabilities.

FACILITIES
The Henry R. Hodge Sports and Recreation Complex is located adjacent to the residence halls and easily accessible to all students. Facilities include The Deneka Family Fitness Center, Alumni Gymnasium, Schuler Recreation Building (which houses the Stephenson Field House and the Fuller Pool), the Denny Brown Adirondack Lodge, and the Snell Athletic Fields.

Additional facilities include Walker Center, Hantz Turf Field, Bagdad Field, Scott Field, and the Cheel Campus Center and Arena.
VARSITY SPORTS

The Clarkson Golden Knights compete in 20 intercollegiate varsity sports, at the NCAA Division I level in men's and women's hockey and with the other 18 at the NCAA Division III/USCSA level. Women's Division III varsity teams include: alpine and nordic skiing, basketball, cross country, lacrosse, softball, soccer, swimming and volleyball. The men's teams include: alpine and nordic skiing, baseball, basketball, cross country, golf, lacrosse, soccer, and swimming.

Along with earning a myriad of awards on the playing field, athletes in all our sports have been consistently honored with academic recognition such as Capital One Academic All-America, University Presidential Scholars, USCSA, Liberty League and ECAC Hockey All-Academic. We have also had some NCAA Post-Graduate Scholarship recipients.

During 2014-15, the Golden Knights’ Volleyball team reached the NCAA Tournament for the sixth straight season and advanced to the NCAA Quarterfinals as New York Regional Champion for the third straight year, capping off their best season ever with a 37-4 record.

Coming off the National Championship title in 2014, the Women’s Hockey team enjoyed another highly successful season, claiming their second straight ECAC Hockey regular season crown and made their third consecutive appearance in the NCAA playoffs to post a 24-10-3 mark.

For the second straight year the Men’s Hockey team gained a home-ice berth in the ECAC Hockey playoffs while competing against some of the top programs in the country. The Men’s Basketball team set the school-record for most wins in a season (20) and reached the championship game in the Liberty League Tournament. For the first time in more than a decade the Women’s Basketball team advanced to the conference playoffs, posting an 18-8 record.

Both the Alpine and Nordic ski teams continued to dominate in the USCSA and were once again among the top programs at the nationals.

The Baseball team enjoyed one of its best seasons ever with a 24-9 record and reached the conference tournament for the 10th time in 13 years.

In its second year as an NCAA program, the Softball team saw a massive step forward by recording 18 wins and was awarded an ECAC playoff bid.

For the third time in the past four years, the Men’s Lacrosse team participated in the Liberty League playoffs to highlight an exciting season. The Women’s Lacrosse team enjoyed one of its best seasons in the near 40-year history of the program and was in contention for a playoff berth until the final weekend of the season.

Clarkson is a member of the National Collegiate Athletic Association (NCAA), the Eastern College Athletic Conference (ECAC), the Liberty League and the United States Collegiate Ski and Snowboard Association (USCSA).
CLARKSON ALUMNI ASSOCIATION
The Clarkson Alumni Association was organized on Founder’s Day, November 30, 1904, and has existed since that time to benefit both the University and its alumni. The administration of the Association is vested in the Clarkson Alumni Council in partnership with the Alumni Office. The mission of the Clarkson Alumni Association is to engage and empower alumni as partners in the Clarkson community, nurturing their pride in their alma mater and promoting the interests of Clarkson University and its alumni. Alumni are actively involved identifying and recruiting quality high school students, and assisting the Career Center in providing career opportunities for our graduates. Alumni are also involved in supporting fund-raising efforts, mentoring undergraduates, serving as speakers on campus, serving on advisory councils, and providing opportunities to undergraduates to learn the value of being engaged alum. There is an extensive regional Clarkson alumni chapter program for alumni once they leave the University. Regional volunteers in numerous cities throughout the United States host alumni activities. Clarkson alumni stay in contact with friends and the University through various social networks including CU Online, the community for staying connected!

PARENT RELATIONS
The Parent Relations area of the University is housed in the office of the Vice President for University Outreach and Student Affairs. Clarkson is committed to a parent relations program that partners with parents and educates them to the many services and programs available to their students.

The Parents Association was founded in 1977 to foster a closer relationship and to involve a greater number of parents in the affairs of the University. All parents become members of the Association upon the acceptance and enrollment of their children into the University and can remain members indefinitely.

The administration of the Association is vested in the Parents Committee, which consists of parent representatives from all four class years of students, as well as the graduate students. The Parents Committee works closely with the office of the Vice President for University Outreach and Student Affairs and the staff of the division in planning programs and events that support parent involvement and interaction. The Committee specifically helps with Family Weekend planning and activities, with the Admission Office recruitment of prospective students, and with the Career Center’s employer relations programs.

The Parents Association through the leadership of the Parents Committee supports a campus enhancement project through contributions to the Parents Fund. These projects provide direct benefits to their students and to future students of the University.

The relationship between students, parents and the University is an important one. Through the Parent Relations area, communication is encouraged in order to foster a better understanding among parents, students and University staff.

INFORMATION TECHNOLOGY AND UNIVERSITY LIBRARIES
Office of Information Technology
Clarkson University is wholly committed to providing high-quality computer resources, services
and support to meet the diverse needs of its students and faculty. The mission of the Office of Information Technology (OIT) is to provide access to teaching, learning, research, administrative and communication technologies through a commitment to excellence in customer support and technical leadership in fulfillment of the institutional mission. This involves leveraging the University’s corporate partnerships to provide high-performance hardware and software, while employing a distributed user support structure. As a result, Clarkson students receive access to up-to-date technology, backed by direct assistance from easily accessible and highly skilled OIT support staff.

Access to OIT resources is provided by a high-speed, fiber-optic network “backbone” connecting University classrooms, laboratories, on-campus housing, and faculty offices. Students are able to access their files and resources from any computer on campus, with remote access available for most systems.

OIT operates several computer laboratories that provide high-performance PC and Linux-based workstations, servers, and software for mathematics, statistics, data analysis, graphics, engineering design, simulation/modeling, document preparation, multimedia development, and use at Clarkson: relational database management/design. The following is just a partial list of software titles in:

MAPLE   MS Office Suite Professional  
MATLAB   STAAD  
ANSYS    SAP  
AutoCAD  SPSS  
3D Studio Visual Studio  
Adobe Photoshop Oracle  
Adobe Premier MasterCam  

Clarkson’s computer labs support research and classroom instruction. One lab is equipped for high-resolution 3D graphics for use in modeling physical processes, chemical reactions, and material design in virtual reality.

OIT supports Clarkson’s commitment to integrating technology into the classroom through its user services operation. User services supports both students and faculty by providing and maintaining software, equipment and facilities for the production, dissemination, and utilization of learning resource materials. In addition to traditional audio-visual equipment, large screen computer and video projection systems are strategically placed in lecture halls throughout the campus for large group and classroom instruction. Wireless access is available in group study areas and lecture halls across campus, as well as in some residence halls.

**Student Personal Computers**

Because information technology is such an integral part of today’s marketplace, it is strongly recommended that every Clarkson undergraduate student have an appropriate personal computer. Entering students who do not already possess a PC may purchase one through the University. High-speed network access is available for all students residing on campus. In addition, students can also access the network at any one of the numerous computer labs and clusters in academic buildings.
Student PCs are linked to a broad range of resources on campus and around the world, which greatly enhances the academic experience. Students not only use their PCs for word processing, e-mail and Internet research, but also for accessing course software and library resources. Clarkson faculty makes extensive use of the Web for dissemination of instructional material and interactions with students.

Computer Assistance
Current information and answers to computer related questions are available on the OIT Web page at www.clarkson.edu/oit. For undergraduate and graduate students, OIT professional staff and assistance are available to help with all aspects of computer and network use.

The University Libraries
The University Libraries supports Clarkson University’s mission by promoting academic excellence through the implementation of programs, policies, and strategies geared towards the innovative vision of libraries in the 21st century in support of teaching and research. To achieve excellence, we provide high-level information literacy instruction, reference and research assistance, and run a robust access services model allowing our clientele to access resources both inside and outside of our collection.

The Harriet Call Burnap Memorial Library is the main library located on the hill campus in the Educational Resources Center (ERC). Its collection is comprised of more than 746,436 volumes in various formats including journals, books, audio visual materials, government documents and reports, Clarkson University dissertations, and archival materials. The Health Science Library is the University Libraries’ branch library and is located in the Center for Health Sciences (Clarkson Hall) on the downtown campus. This unique collection of more than 9,007 volumes serves the University’s allied health programs as well as the local health industry.

You may use your Clarkson ID to directly borrow library materials from any of the other Associated Colleges: St. Lawrence University, SUNY Potsdam and SUNY Canton. You may also request library materials from other libraries around the world using Interlibrary Loan. Graduate students should see the Graduate School pages of this catalog for application procedures (p. 306)

UNDERGRADUATE ADMISSION
Undergraduate Admission
Brian T. Grant, Dean of Admissions

Candidates for admission to Clarkson as first-year students are graduates, or soon-to-be graduates of a secondary school, preparatory school or equivalent educational process. In special instances, students are considered for earlier admission provided their academic records demonstrate a very high potential for academic success. In these select cases, students may be required to take an Ability to Benefit Test as prescribed by both state and federal education departments. In addition to superior scholastic achievement, consideration is given to personal qualities, participation in meaningful extracurricular or out-of-school activities, leadership and other information that may indicate the potential for successful
completion of a college career.

The Committee on Admission places particular emphasis upon the following:

1. The secondary school record.
2. The results of the SAT Reasoning Test or American College Testing Program (ACT) exams.
3. The personal statement describing a special interest, experience or achievement that is important and meaningful to you.
4. The recommendation of the principal, headmaster, or school counselor.
5. Students for whom English is not their first language are required to submit TOEFL scores.
6. SAT subject tests are optional.

A personal interview and a visit to the campus are strongly recommended. The purposes of the interview are to increase the applicant’s knowledge about Clarkson, provide an opportunity for the applicant to ask questions, and to share information about relevant personal, extracurricular and coursework preparations and backgrounds. For more information, call 800-527-6577, e-mail admission@clarkson.edu, or write the Office of Undergraduate Admission, Clarkson University, Box 5605, Potsdam, NY 13699-5605.

Candidates for admission to Clarkson as transfer students should review the transfer admission section below.

Academic Preparation
A thorough secondary school background in English, mathematics, and science is important in the academic preparation of a candidate for admission. Among the 16 units of secondary school work, the applicant’s record should include the following:

<table>
<thead>
<tr>
<th>Engineering, Science, &amp; Engineering &amp; Management Programs</th>
<th>Business and Liberal Arts</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>4 units</td>
<td>4 units</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Mathematics</td>
</tr>
<tr>
<td>4 units</td>
<td>3 units</td>
</tr>
<tr>
<td>Science, including:</td>
<td>Science</td>
</tr>
<tr>
<td>3-4 units</td>
<td>1 unit</td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>1 unit</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td></td>
</tr>
<tr>
<td>1 unit</td>
<td></td>
</tr>
</tbody>
</table>

High school mathematics preparation should emphasize the thorough mastery of fundamental definitions, concepts, principles and operations. The applicant must have sufficient preparation in algebra and trigonometry to begin the study of calculus. Courses in the sciences should stress basic principles and conceptual and quantitative understanding through classroom and laboratory work. Chemistry and physics are particularly important as background for Clarkson’s first-year science courses.

First-Year Application Procedure
Students can apply using either the Clarkson University Unconventional Application or the Common Application. Students may submit either application online or in paper format. The applications are available at www.clarkson.edu/apply. The Common Application and Supplement Information Forms are available at www.clarkson.edu/apply.

A first-year application fee of $50 is required for those who submit a paper application. This fee is nonrefundable and must accompany the application. The application fee is waived for students who submit an application online. Candidates are encouraged to submit their completed applications between October 1 and January 15 of their final year in secondary school. It is the student’s responsibility to make certain that appropriate secondary school transcripts, SAT or ACT test results, and recommendations are provided.
either with the application or promptly thereafter.

Applications submitted after January 15 are given full consideration in the order of their completion. Offers of admission continue only if space permits.

Students wishing to postpone admission for a year may do so. The procedure is to apply for admission in the senior year of secondary school and, when making the deposit reserving a place in the class, request a one-year extension. Most requests for deferred admission mention an intention to work or to travel before beginning college.

**Early Decision Plan**

Early Decision is an option for students who after careful consideration are certain that Clarkson is their number one college choice. The plan does not prohibit the student from making other applications, but it does commit the student to withdraw other applications if accepted at Clarkson. Early Decision candidates are strongly encouraged to visit the campus and meet with our students, faculty, and staff.

The Early Decision deadline is December 1 of the senior year. The high school record through grade eleven, with SAT or ACT scores, and recommendations should be received no later than December 15. If November SAT scores are sent directly to Clarkson, they will be included in the early decision review. Admission notification will occur by January 1. Students who complete the Free Application for Federal Student Aid (FAFSA) will also receive financial aid notification.

**Personal Interview**

An informal interview is very helpful to the student in formulating college plans and is strongly recommended. It provides an opportunity to ask questions and gain a direct impression of the opportunities Clarkson offers and to determine the student’s “fit” with the University. This interview should be held on the campus with an admission staff member if possible, since a personal visit to Potsdam is highly recommended, for students receiving selected scholarships the interview is required.

The Office of Admission is open on weekdays from 9 a.m. until 4 p.m. and on Saturdays by appointment only. Interviews on campus should be arranged by letter or phone at least one week prior to the intended visit. A personal interview conducted by a local alumnus/a in the student’s hometown area may also be arranged through the Admission Office. The telephone number, for use during normal business hours, is 800-527-6577 or 315-268-6480.

**Notification**

All applicants are promptly notified upon careful review of completed credentials. In the event that it is necessary to postpone action pending the receipt of final grades, or for other reasons, applicants will be notified. Notification of admission begins in January of the senior year if all materials have been received.

**Deposit**

A $300 deposit is required when the first-year candidate accepts the offer of admission; the class is filled as deposits are received. The deposit is payable any time prior to the Candidate’s Reply Date, as established by the National Association for College Admission Counseling. The reply date is May 1.

The deposit is not refundable if the student decides not to attend Clarkson, and it is not credited to the yearly University charges. The deposit is placed in a special account to provide payment for any outstanding charges for which the student is responsible at the time of graduation or upon withdrawal from the University. At this time, the unused portion is refunded.
Clarkson prides itself on the success and strength of its Transfer Program and has put in place numerous transfer articulation agreements with two-year (2+2 programs) and liberal arts institutions (3+2 engineering programs) within the United States. For a current list of institutions with which Clarkson has articulation agreements, please visit admissions.

Unlike most institutions, Clarkson has established a separate office within Undergraduate Admission dedicated to the needs of transfer students. As a result of this commitment to transfer students, Clarkson, the local community, and the campus alumni chapter of the transfer honor society, Phi Theta Kappa (PTK), welcome a large number of new transfer students each fall and spring to the campus. The quality and success of these students is constantly reflected in the praise from the faculty and those who graduate with honors.

**Application Process**

Transfer applicants are defined as those students who have graduated from secondary school and, after completing a semester or more at another university or post secondary institution, wish to continue their college education at Clarkson. Transfer applicants are admitted on a rolling basis (as their files become complete); however, the preferred deadline for completed applications is July 1 for fall admission and December 1 for spring admission. Applicants must complete the following steps:

- Submit a completed Transfer Common Application form to the Director, Office of Transfer Admission, Clarkson University, Box 5610, Potsdam, NY 13699 or electronically via our Web site www.clarkson.edu/apply.
- Arrange for official transcripts to be forwarded from each institution previously attended and/or currently attending. Course descriptions in English are required for international students, if necessary. Transfer students from outside of New York should submit a school course catalog.
- Submit the Dean of Students Recommendation, found at www.clarkson.edu/apply. This can be completed by Dean or equivalent title.
- Arrange for high school transcripts and SAT or ACT scores if applying with fewer than 24 credits, to be sent to the Transfer Office.
- Arrange for TOEFL scores to be submitted if English is not their first language. A 550 (paper based), a 213 (computer based), or 80 (internet based) score is required for admittance. Acceptance of other English testing exams or requests for waivers should be made in writing to the Director of Admission at the address above.
- Submit two Letters of Recommendation, including one from an academic professor/instructor.
- A personal statement describing a special interest, experience or achievement that is important and meaningful to you.

In addition, applicants should be aware that:
- The $50 application fee is waived by applying online or by completing an on- or off-campus interview.
- An on- or off-campus interview is optional, but strongly recommended.

Once a student’s file is complete, it will be reviewed for admission. Students who accept the offer of admission must submit a $300 deposit. (Three hundred dollars of this deposit is placed in a special account to provide payment for any outstanding charges for which the student is responsible at the time of graduation or upon withdrawal from the University. At that time, the unused portion is refunded.)

After acceptance to Clarkson, the appropriate academic department evaluates transcripts to determine the number of credits to be transferred. If needed, the faculty member may recommend courses to be taken in the final term or summer before transfer. The evaluator will also propose a tentative course schedule for the student’s first semester on campus. This evaluation is completed and mailed to the
student within approximately two weeks of acceptance.

**Financial Assistance for Transfers**
Clarkson has financial assistance opportunities available for entering transfer students. Please check the Scholarships and Financial Assistance section of this catalog.

**2+2 Transfer Student Policies**
The 2+2 Transfer Program is based on articulation agreements with two-year colleges. These agreements typically specify a program of study at the two-year institution that will prepare students to enter Clarkson with junior status (54+ credits). These agreements cover students wishing to study engineering, business, science, or other disciplines.

Students who do not attend an institution with a formal 2+2 agreement are also encouraged to apply. The lack of an agreement does not mean that a student is ineligible for transfer or will not receive transfer credit for courses. Transfer coordinators interested in establishing a formal agreement should contact the Director, Office of Transfer Admission, Clarkson University, PO Box 5610, Potsdam, NY 13699-5610.

**3+2 Engineering Transfer Program**
The 3+2 transfer programs are established with many colleges and universities in the United States. Students who participate take the first three years of the prescribed program at a four-year liberal arts institution. Subsequently, they transfer with junior standing into one of Clarkson’s four-year engineering curricula. Upon satisfactory completion of two years of engineering courses, students receive degrees from both institutions. The 3+2 program provides students with an opportunity to obtain an exceptionally broad and firm academic foundation in the arts and sciences coupled with specialized training in an engineering discipline. For further information, please contact the Director, Office of Transfer Admission, Clarkson University, Box 5610, Potsdam, NY 13699 or visit [http://www.clarkson.edu/](http://www.clarkson.edu/).

**INTERNATIONAL STUDENT ADMISSION**
As an internationally recognized institution, Clarkson has both undergraduate and graduate students and faculty from more than 44 countries. This multicultural richness is evidenced on campus in our student organizations, successful multicultural events and the number of events/trips scheduled by the International Student Organization (ISO). International students can enter Clarkson as first-year students, transfer students, graduate students, or as part of a University exchange program. For the purpose of admission, an international student is defined as a student who is studying or wants to study in the U.S. on a nonimmigrant visa. This definition does not include permanent residents or refugees who should apply using the same procedures as domestic students.

International students are a critical component of the Clarkson Community and integral to the mission and vision of the University (see The Clarkson Education). Clarkson wants all students to graduate with a firm academic understanding of their chosen field, with excellent written and oral communication and presentation skills, and knowing how to work effectively in diverse multicultural teams.

To assist international students in attending Clarkson, the institution:
- provides merit-based international scholarships to qualified applicants;
- has an International Student Advisor on campus;
- supports several international student organizations; and
- has established a special office in Undergraduate Admission to support international students.
Application Process
Clarkson University is a member of the Common Application. International students, both first-year and undergraduate transfer, need to begin the admission process very early. Completed applications are continuously accepted; however, the preferred deadlines for completed applications are as follows:

First-Year Applicants:
- January 15 (Fall Admission)
- October 15 (Spring Admission)

Transfer Applicants:
- July 1 (Fall Admission)
- December 1 (Spring Admission)

Applications received after the dates above will be reviewed as space permits. Those applications arriving too late to process will automatically be deferred and considered for the following semester.

International applicants are admitted on a rolling basis (as their files become complete). Priority is given to those who complete their file by the preferred deadlines listed above. International first-year applicants may complete the Common Application online or in paper form. Applicants will also be asked to submit a Supplement Information Form. To request a paper application, please contact the Office of Undergraduate Admission, Clarkson University, Box 5605, Potsdam, NY 13699, call 315-268-2125, or e-mail intladmission@clarkson.edu. The electronic Common Application and Supplement Form can be accessed at www.clarkson.edu/apply.

All international students are encouraged to contact the U.S. Educational Advising Center within their country to receive guidance regarding the application process. U.S. Educational Advising Centers can provide many services to support international students who are planning on studying in the U.S. To find the center nearest you, visit www.educationusa.state.gov.

Admission Requirements
To complete your file and process your application, we require the following documents:

Official Transcripts. Transcripts should include an English translation, if necessary. They should be accompanied by a school profile for all secondary schools or catalog/course descriptions from the higher institutions the applicant has attended. Mid-year and final grades also should be sent as they become available. National exam scores should also be submitted, if available.

TOEFL (Test of English as a Foreign Language) scores submitted (if English is not your primary language). For further information on the TOEFL exam, please visit www.ets.org/toefl or e-mail toefl@ets.org. See the information regarding English requirements below.

SAT Reasoning Test for first-year candidates only. For more information about the SAT and how to register for it, contact the College Board at http://www.collegeboard.org. (Students from mainland China are exempt from this requirement.)

Certificate of Finance. The Certificate of Finance is required to verify the student’s sources of financial support for his/her expenses during the one-to-four years at Clarkson. In addition to completing the form, financial documentation verifying the source of funding is required from a bank, employer, or sponsoring organization. Once a student is accepted by the institution, the Certificate of Finance is processed, and the enrollment deposit is submitted, an I-20 will be issued. The I-20 will reflect any merit-based scholarship awarded to the student. The Certificate of Finance form is provided by the International
Admission office.

**Recommendations.** A minimum of two recommendations should be submitted, preferably one from a math or science teacher for applicants wishing to pursue an engineering or science degree. The letters should discuss the student’s ability to succeed at the university level and present reasons to admit the student.

**Personal Statement.** Describe a special interest, experience or achievement that is important and meaningful to you.

**Campus Visit/Interview (optional).** International students are strongly encouraged to visit the campus. The International Admission Office (tel. 315-268-2125) can greatly assist in coordinating the visit to include pick-up from nearby airports, arranging for student hosts, faculty appointments, campus tours, admissions interview, meals, and hotel arrangements.

**Application Fee:** There is a required $50 application fee for International first-year applicants. The application fee is waived for students who apply online. Once a student’s admission application file is complete, it will be reviewed and a decision made.

At the time of admission, an International student is considered for a merit-based international scholarship. Such awards vary according to the strength of the student’s academic record and in 2014 ranged from $5,000 to $25,000 per year.

Students who accept the offer of admission must submit a $300 nonrefundable deposit to reserve a place in the entering class. (Note: The deposit is placed in a special account to provide payment for any outstanding charges for which the student is responsible at the time of graduation or upon withdrawal from the University. At that time, the unused portion is refunded.)

**Admission Criteria**
Students are selected for admission based on the following:
- Academic performance in secondary school, college or university
- Class standing
- Recommendation(s)
- SAT and TOEFL (English proficiency) scores
- Participation in extracurricular events, community service, and sports
- Essay and interview (if completed)

**Financial Aid/Scholarships for International Students**

*International Scholarships:* All international students are considered for scholarships based on their academic record that includes: grade-point average, class standing, SAT and TOEFL scores and letter(s) of recommendation. No financial assistance application is required. International student awards are available up to $20,000 per year.

*Honors Scholarship:* Students who are accepted into the Clarkson Honors Program receive an additional merit award. The Honors Program is aimed at providing a special environment for top students. To be considered, students need to be in the top 10% of their class and have excellent standardized test scores. For more information, please see the Honors entries in this catalog (see Academic Program Options).

*Employment:* International students are allowed to work on campus for up to 20 hours per week. The jobs include office worker, lifeguard, food service, etc. Hourly wages start at U.S. $8.00 per hour. The number of positions available varies from year to year.

*Loans:* There are private lenders who offer educational loans to international students. In most
cases, eligible students may borrow up to the cost of attendance less any financial aid for a given year provided they have a U.S. citizen or permanent resident co-borrower. Clarkson does not recommend any particular lender and does not offer a preferred lender list. Students are free to borrow from the lender of their choice.

**English Requirements**
Admission to Clarkson University requires a minimum TOEFL of 550 (paper based), 213 (computer based), or 80 (internet based) for undergraduates. Students may submit on a case-by-case basis other proof of English proficiency. Request for waiver of the TOEFL exam should be sent to the Coordinator of International Students.

**I-20/Visa**
U.S. Citizenship and Immigration Services (USCIS): The USCIS is the branch of the U.S. government that regulates the status of all people visiting the United States who are not citizens, including immigrants, visitors, students, and permanent residents (“green card” holders). International students attending Clarkson will be classified as nonimmigrant, subject to a number of regulations. They should take the time to understand their situation and to fulfill legal obligations. The International Students & Scholars Office will assist with Visa/I-20 issues, and can be reached by telephone at 315-268-7970 or by mail at Clarkson University, Box 5651, Potsdam NY 13699, USA.

*Getting a Visa:* To obtain a visa, students should submit an application and supporting documents with their passport to the U.S. Consulate or Embassy that has jurisdiction for their place of residence. Students must also submit the required SEVIS fee to the U.S. Department of Homeland Security prior to applying for their visa. Visit http://www.fmjfee.com/ for more information.

The supporting documents usually consist of the acceptance letter sent to the student by Clarkson; an I-20 for an F-1 (student) visa; evidence of ability to pay for studies; and sometimes evidence that the student does not intend to become an immigrant to the U.S. Check specific requirements for your home country.

When the Consul is satisfied with the application, the student’s passport will be returned with a visa stamped in it. This stamp allows the student to enter the U.S. only when possessing the I-20.

It is not necessary for Canadian students to obtain a visa at the Consulate. They simply present their I-20, passport and evidence of support at the border. Canadian students are required to pay the SEVIS fee prior to their arrival at the border crossing.

For a list of Consulates and Embassies, including addresses and phone numbers, visit usembassy.state.gov/. Further international information can be obtained at www.clarkson.edu/isko.

**ACCELERATED ADMISSION GRADUATE SCHOOL POLICY**
This policy is intended to encourage early consideration and preparation for graduate work at Clarkson by highly qualified students. Such students would likely participate in undergraduate research experiences and would have identified a graduate advisor before baccalaureate graduation. These students may also be interested in accelerating their course of study to graduate within three years in order to begin their graduate work as soon as possible.

Any student who completes at least two years of residential study at the University and who has received a baccalaureate degree from Clarkson will automatically be accepted into any Clarkson graduate program for a master’s degree, at minimum, if he or she meets the conditions below at the time of entry to Graduate School. Eligible students must have:
• graduated in good standing from Clarkson within the previous year and have taken any necessary prerequisite courses for entrance to the graduate program in question;
• exhibited the quality of character expected of an entering graduate student of Clarkson University, as indicated by a letter from their academic advisor, department chair, or the dean of the school in which their baccalaureate degree resides;
• maintained a minimum grade-point average of 3.50 in their major; and
• achieved a School-defined minimum score on a designated national exam; the CUSB requires the GMAT or GRE exam and all others require the GRE.

Applications for graduate admission from students receiving a Clarkson University baccalaureate degree who have not met all conditions specified above will still be considered, but admission will no longer be automatic.

Graduate students should see the Graduate School pages of this catalog for application procedures (p. 306)

NONDEGREE STUDENTS
An individual may enroll at Clarkson University for nondegree study on either a full-time or a part-time basis. Although such individuals are classified as nonmatriculating, they are provided an opportunity for academic study in areas of interest. This status may be used to obtain exposure in a particular area as a foundation for further academic work. Many persons with a degree use this status to gain exposure to another discipline without pursuing a degree. Students who are enrolled as nondegree students may not earn a degree from the University without gaining admission to a degree-granting program. Nondegree students may accumulate up to 15 hours of coursework credit while in this status and must matriculate into a Clarkson degree program to earn credit beyond this.

Persons interested in admission as a nondegree student should contact Student Administrative Services. Nondegree students must obtain approval for the courses they want to take from the director of First-Year Advising and University Studies, or the dean of the appropriate School, if the courses are on the graduate level. This approval is given on the basis of the student’s academic background and personal goals.

Such students have no class standing and are not eligible to participate in any extracurricular activities involving intercollegiate competition.

PART-TIME MATRICULATED STUDENTS
A person may pursue a baccalaureate degree as a part-time matriculated student. For further information, call Student Administrative Services at 315-268-6451.

EXPENSES
Tuition and other charges at Clarkson are set at the minimum permissible for financially responsible operation, and are considerably below actual costs. Gifts and grants received through the generosity of alumni, industry, foundations, and friends play an important part in reducing the difference.

UNIVERSITY CHARGES
The summary of annual fixed University charges for the 2015-2016 academic year follows:
Fixed Charges: 2015-2016

Tuition

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate full-time charge (12 to 19 credit hours)</td>
<td>$43,690</td>
</tr>
<tr>
<td>Undergraduate Credit Hour Rate (11 hours or less)</td>
<td>$1,457</td>
</tr>
<tr>
<td>Graduate Students: Credit Hour Rate</td>
<td>$1,457</td>
</tr>
<tr>
<td>Physician Assistant Program Flat Rate Per Term</td>
<td>$13,998</td>
</tr>
<tr>
<td>Physical Therapy Program Flat Rate Per Term</td>
<td>$18,941</td>
</tr>
<tr>
<td>Occupational Therapy Program Flat Rate Per Term</td>
<td>$14,000</td>
</tr>
</tbody>
</table>

Undergraduate students registered for 12 to 19 credit hours (inclusive) are designated as full-time students and are charged at the full term rate. Students exceeding the full-time load of 19 credits will be charged at the credit-hour rate for each credit hour over 19.

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room (based on two person in freshman housing)</td>
<td>$7,334</td>
</tr>
<tr>
<td>Meal Plans</td>
<td>$6,510</td>
</tr>
<tr>
<td>Fees</td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students</td>
<td>$940</td>
</tr>
<tr>
<td>Clarkson School Students</td>
<td>$1,490</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>$590</td>
</tr>
<tr>
<td>Undergraduate Full-Time Direct Costs</td>
<td>$62,686</td>
</tr>
</tbody>
</table>

Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $3,858 for one academic year.

Activity Fee

The student government charges each student a fee in support of the student activity program. This nonrefundable fee is collected each semester.

Facilities Usage Fee

The facilities usage fee is charged to each full-time residential program student. The funds are nonrefundable and are applied toward expenses incurred in the operation of the Student Health Center and the recreational facilities available to students.

Health Insurance

Health insurance is mandatory at Clarkson University. You will not be cleared for the term unless a Health Insurance Form is on file in Student Administrative Services. A new form must be submitted each academic year. All students must either have health insurance coverage under their own policy or be covered by their parents’ policy or enroll in Clarkson’s contracted insurance. The rate for 2015-2016 is $2,236 for coverage from 8/1/15 – 8/1/16.

Payment

Payment in full for all tuition, fees, residence and dining expenses must be made on or before the financial clearance deadline published at the beginning of each term in the pamphlet of Financial Information, which
is sent to students with the first tuition invoice for the term. Check-in cannot be completed and the student cannot be admitted to class unless satisfactory payment is made. All accounts will be assessed a late fee charge of 1% of the unpaid balance at the end of each month. Enrollment indicates that the student agrees to pay all attorneys’ fees and other reasonable collection costs necessary for the collection of any amount not paid when due and will be added to the unpaid balance. It is the University’s policy to withhold transcripts and diplomas until the balance of the account is paid in full.

Refund Policy
If a student withdraws from the University, all refunds will be based on the last recorded day of attendance determined by and attested to by the Registrar. A student who withdraws within the first four weeks of the term period is eligible to receive a refund as follows:

Semester/Trimester Program Refund Policy

If the student withdraws before the first day of classes 100% refund
1-5 class days 90% refund
6-10 class days 75% refund
11-15 class days 50% refund
16-20 class days 25% refund
21 class days to end of semester 0% refund

Quarter Program Refund Policy

If the student withdraws before the first day of classes 100% refund
1-2 class days 90% refund
3-6 class days 50% refund
7-10 class days 25% refund
11 class days to end of semester 0% refund

Refunds will be applied to:
1. Tuition, Activity Fee, Facilities Usage Fee: All fees are included in the refund calculations. There will be no refund of the student health insurance premium if coverage is in force.
2. Meals: Refunded on the same schedule (consumption will not be considered in refund calculation).
3. Room: Refunded on same schedule.

OFFICIAL DATE OF WITHDRAWAL
The official date of withdrawal is established upon receipt of written notice of withdrawal from the student by Office of the Vice President for University Outreach and Student Affairs.

ADVANCED PLACEMENT/ADVANCED CREDIT
A majority of students receiving Advanced Placement credit at Clarkson have taken the Advanced Placement Examination of the College Board. The most common AP areas are listed below. Credit in most other subjects is awarded when a score of 4 or greater is received. Clarkson also grants credit based on International Baccalaureate Exams and CLEP Exams. Advanced placement credit based on tests or
examinations (includes AP, CLEP, IB, etc.) will be limited to a combined 30 credit hours. For further information, contact Student Administrative Services at 315-268-6576.

**Biology**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
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</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4</td>
<td>BY100 Biology Elective with Lab</td>
</tr>
<tr>
<td>5</td>
<td>BY140/142 and BY160/162 Biology I and II with Labs</td>
</tr>
</tbody>
</table>

**Chemistry**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4</td>
<td>CM131 General Chemistry I</td>
</tr>
<tr>
<td>5</td>
<td>CM131/132 General Chemistry I/II</td>
</tr>
</tbody>
</table>

**Computer Science**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>CS141 Intro. to Computer Science I</td>
</tr>
<tr>
<td></td>
<td>Computer Science I</td>
</tr>
<tr>
<td></td>
<td>Computer Science AB</td>
</tr>
<tr>
<td>4 or 5</td>
<td>Intro. to Computer Science I</td>
</tr>
<tr>
<td></td>
<td>CM141/142 Intro. to Computer Science I/II</td>
</tr>
</tbody>
</table>

The computer science department schedules an exam in C++ for new students during the first week of the fall semester each year. Students earning a satisfactory grade receive credit for CS141 Introduction to Computer Science I. The exam may also be taken in other pre-approved languages. Contact the Computer Science Department for more information.

**English**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>COMM210 Theory of Rhetoric (c2)</td>
</tr>
<tr>
<td></td>
<td>Literature and Composition</td>
</tr>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>LIT101 Literature and Writing (c1)</td>
</tr>
</tbody>
</table>

**Mathematics**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>MA131 Calculus I</td>
</tr>
<tr>
<td></td>
<td>Calculus AB</td>
</tr>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4</td>
<td>MA131 Calculus I</td>
</tr>
<tr>
<td></td>
<td>Calculus BC</td>
</tr>
<tr>
<td>5</td>
<td>MA131/132 Calculus I/II</td>
</tr>
</tbody>
</table>

The mathematics department schedules a calculus exam during the first week of the fall semester. Students
receiving a satisfactory grade receive credit for MA131 Calculus I. To be eligible for AP credit for MA131, Calculus I, first-year students must also perform at a satisfactory level on the Calculus Readiness Survey (which is taken in late May) or successfully complete the on-campus advanced placement exam given in the first week of the fall semester. For further information, see the department Web page at www.clarkson.edu/math.

**Physics**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4</td>
<td>SC131 Intro to Physics I</td>
</tr>
<tr>
<td>5</td>
<td>SC131 Intro to Physics I</td>
</tr>
<tr>
<td></td>
<td>SC132 Intro to Physics II</td>
</tr>
</tbody>
</table>

Credit awarded for Physics B, non-calculus-based physics, will not substitute for PH131 and/or PH132 required by many Clarkson majors.

**Advanced Placement Credit Through College Course Transfer**

Students may enter Clarkson having already taken college courses while still in high school. Such courses will be considered for academic transfer credit if a grade of C or better was earned. Students should send an official transcript as well as a course description to Student Administrative Services as soon as available. The course(s) will be evaluated for transfer credit by the academic department responsible for the course curriculum.

**Credit by Examination**

It is possible in some cases for a new student to take a special advanced-standing exam provided by the respective department. A satisfactory grade enables a student to receive credit. The format and availability of such exams are at the discretion of the appropriate department chairperson. Students interested in Credit by Examination are encouraged to notify the appropriate department as early as possible so a mutually convenient time to take the exam can be arranged. Note: Students who plan to take either or both the Calculus and Computer Science exams scheduled during the first week of the fall semester need make no special arrangements. Those exams are scheduled into orientation.

Clarkson will consider the following for advanced credit: AP, CLEP, GCE, A-levels IB, OACs, French Baccalaureate, Abitur, Italian Maturita and the Swiss Maturite. While credit is usually granted, there are situations, due to the technical nature of some of the programs, where it is not. Each case will be reviewed on an individual basis.
Undergraduate Financial Assistance
Financial assistance from Clarkson may consist of scholarships, grants, loans, and employment, either singly or in combination. The Office of Financial Aid distributes aid in such a way as to help the maximum number of qualified students enroll and continue in school until graduation. Students will not have the entire cost of education met by Clarkson; every student will be expected to pursue other sources of aid outside the University. Students are encouraged to explore state and private loan and scholarship opportunities through their high school guidance offices or state education departments.

Prospective U.S. first-year students who wish to be considered for aid from Clarkson must complete the following:
- File a completed application for admission by January 15th of the final year of secondary school
- File the Free Application for Federal Student Aid (FAFSA) no later than FEBRUARY 1st.

The preferred and easiest method to apply is online at www.fafsa.ed.gov. The paper form may be available from high school guidance offices. Early Decision Plan applicants will receive appropriate applications and instructions directly from Clarkson’s Undergraduate Admission Office.

Prospective U.S. transfer students who wish to be considered for financial aid must apply for admission to Clarkson and submit the FAFSA form. Financial aid award notices are issued to transfer students on a rolling basis beginning in early March for fall admission and in early November for spring admission.

Retention requirements for financial aid varies depending upon the source and type of aid - federal, state or institutional. Students must maintain Satisfactory Academic Program for Financial Aid. Some institutional, endowed and sponsored scholarships have a minimum GPA requirement. Most institutional scholarships are limited to 8 semesters. Responsibilities of students receiving financial assistance under provisions of one or more federal programs include an annual application (FAFSA) and maintenance of Satisfactory Academic Progress for Financial Aid as published annually in the Clarkson Regulations issued to each enrolled student. These regulations are available to prospective students upon request from the Admissions Office. Please note: Clarkson is required by federal regulations to verify specific information submitted on the FAFSA application. Federal compliance procedures require that parents and/or students submit IRS Income Tax Transcripts and W-2 forms if requested by Clarkson. The eligibility schedules for federal and New York State financial assistance can be found in the annual Clarkson Regulations.

WHO RECEIVES CLARKSON AWARDS?
At Clarkson almost 98 percent of all undergraduates receive some form of financial assistance which includes a variety of resources including grants, scholarships, loans and work study. Over 90 percent of first-year students receive awards directly from the University.

SOURCES OF FINANCIAL ASSISTANCE

Clarkson Need Based Awards-

Clarkson Grant
Substantial funds are available for students who show above-average promise for success at Clarkson.
Award amounts vary according to the financial need and academic achievement. Awards for the academic year are made during the preceding spring by the Office of Financial Aid. Students must file the FAFSA each year to be considered for Clarkson Grants.

**Adirondack Scholars Award**
Competitive scholarships are available for students who reside in one of the following counties: Clinton, Essex, Franklin, Hamilton, Herkimer, Jefferson, Lewis, St. Lawrence, Warren, or Washington. This award is based on merit and financial need. Students are required to file the FAFSA each year to be considered and/or continue to receive this award.

**Clarkson Merit Based Awards -**

**Clarkson Merit Scholarship**
A limited number of merit awards are available to both new and continuing students, based solely on prior academic success and the promise of future achievement. Consideration is automatic.

**Clarkson Scholarship**
A limited number of Clarkson Scholarships are available and are based on the overall admission application including all component including high school GPA, Standardized Exam Scores, Extra-curricular activity, Recommendations, and Essays. Consideration is automatic.

**Clarkson SAE Scholarships**
Eight $6,000 scholarships are available to outstanding undergraduate students who plan to study engineering at Clarkson. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.

**Clarkson FIRST Scholarship**
This award recognizes select high school seniors who have participated on a FIRST Robotics (FRC) or Tech Challenge (FTC) team. Scholarships range from $1,000 - $6,000 annually. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.

**Five-Boroughs Scholarship**
This award recognizes students from the five boroughs for their hard work and commitment to academics. Recipients will receive $6,000 per year upon enrollment at Clarkson. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.

**Project Lead The Way**
This award goes to select high school seniors who have completed three Project Lead the Way courses in their high school. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.

**Spirit of Innovation**
This scholarship recognizes select high school seniors who have been a Spirit of Innovation participant at their high school. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.
SAGE Tuition Rewards (Savings and Growth for Education)
This is a unique, private college savings program. Tuition Rewards are discounts off tuition at participating colleges that represent the minimum scholarship that an eligible student will receive if attending a member college. A student receives Tuition Rewards from multiple "sponsors" (for example, parents and grandparents). A sponsor designates the tuition rewards to the student when she/he begins her/his senior year of high school. If the student does not use the tuition rewards, they are rolled back into the sponsor's account for use by other students.

Clarkson counts Tuition Rewards as part of the normal institutional and merit scholarships. For more information on SAGE Tuition Rewards please visit https://secure.tuitionrewards.com/index.cfm.

Clarkson WACE National CO-OP Scholarship Program
$6000 per year scholarship based on academic record and scholarship application. Any major may apply. Submit the scholarship application online http://www.waceinc.org/scholarship/index.html. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by February 15.

Young Entrepreneurs and Young Innovators Programs
Prospective students who are selected into these programs at the Young Entrepreneurs and Innovators Business Plan Competition will receive guidance and support from faculty and alumni mentors, office space in our incubator, and will attend Clarkson without payment of tuition for their four year undergraduate career through a combination of merit-based financial aid (after accounting for other aid for which the student may be eligible) and a purchase by Clarkson of 10% equity in their firm at fair market value.

Clarkson Leadership and Achievement Award
This program annually recognizes high school juniors and community college students who demonstrate strong leadership qualities in combination with excellent academic achievement. Participating high schools and community colleges nominate one student each year for the Leadership Award. The student, upon acceptance and enrollment at Clarkson, will receive a $15,000-per-year scholarship for up to four years (total $60,000). These schools may also nominate one student each year for the Achievement Award who, upon acceptance and enrollment at Clarkson, will receive an $12,000-per-year scholarship for up to four years (total $48,000). Students who receive ROTC scholarships may retain a maximum of $1,000 of the Leadership or Achievement Award each year for up to four years (total $4,000).

Tuition exchange recipients and students who receive the full tuition Clarkson employee benefit are not eligible to receive the Leadership or Achievement Awards.

Honors Program
Students of exceptional ability are accepted into the University Honors Program as entering freshmen or after their first year. All Honors students receive a scholarship as part of their Clarkson financial aid package. (See Academic Program Options).

Phi Theta Kappa Scholarship
For Transfer students only. Amounts vary.
Alpha Beta Gamma Scholarship
For Transfer Students only. Amounts vary.

Alumni Connection Awards
Holcroft Alumni Recognition Awards
Awards based on strong potential for success and the recommendation from a Clarkson alumnus/alumna. Awards are $500 per year—students can only receive one award, regardless of the number of recommendations. We suggest students contact alumni who know enough about them to provide a meaningful reference. Recommendation letters must be submitted by February 15 of the student's senior year (December 1 for Early Decision applicants).

Alumni Family Award
If you indicate on your application for admission that you have a brother, sister, aunt, uncle, or cousin who attended Clarkson, you may qualify for a $500 scholarship. Only one scholarship will be granted regardless of how many alumni family members you have.

Alumni Legacy Award
If you indicate on your application for admission that you have a mother, father, grandmother, or grandfather who attended Clarkson, you may qualify for a $1000 Alumni Legacy Scholarship. Only one scholarship will be granted regardless of how many qualifying family members you have.

New York State Tuition Assistance Program (TAP)
New York State residents may be eligible for TAP. NYS Legal Residency is required. For dependent students, parent NYS residency is also required. Awards range from $500 to $5,165 annually for up to 8 semesters. No repayment is required. Students must file a FAFSA application and an Express TAP application (ETA) each year to be considered for assistance. Awards are based on multiple factors including family size, number of siblings attending college in NYS and NYS taxable income. Students are notified directly by the New York Higher Education Authority Corporation (HESC) of their awards. TAP can only be credited toward tuition charges. For students who receive other tuition only scholarships or grants, the total of TAP and the other aid cannot exceed the tuition charge. TAP awards are credited to the student account after certification of full-time enrollment status and confirmation of satisfactory academic progress. The standards of satisfactory academic progress for TAP are indicated below.

Satisfactory Academic Progress - Effective July 1, 2011 New York State enacted revised regulations regarding satisfactory academic progress. The regulations changed the number of credits a student must accumulate and the cumulative grade point average that must be achieved each semester.

The chart that pertains to you depends upon the year you received your first TAP award and whether or not you are a HEOP student. Please refer to the charts below:

The following chart must be used by all institutions for students who received their first TAP in 2007-2008 through and including 2009-2010 and HEOP students who received their first award in 2007-2008 and thereafter:

<table>
<thead>
<tr>
<th>Calendar: Semester Program: Baccalaureate Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior being certified for this payment:</td>
</tr>
<tr>
<td>1st  2nd  3rd  4th  5th  6th  7th  8th  9th**  10th**</td>
</tr>
<tr>
<td>A student must have accumulated this many credits:</td>
</tr>
</tbody>
</table>
Calendar: Semester Program: Baccalaureate Program

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>3</th>
<th>9</th>
<th>21</th>
<th>33</th>
<th>45</th>
<th>60</th>
<th>75</th>
<th>90</th>
<th>105</th>
</tr>
</thead>
<tbody>
<tr>
<td>With at least this grade point average:</td>
<td>0</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The following chart must be used by all 4 year institutions for students (excluding HEOP) who received their first TAP award in 2010-2011 and thereafter:

Calendar: Semester Program: Baccalaureate Program

<table>
<thead>
<tr>
<th>Prior being certified for this payment:</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
<th>7th</th>
<th>8th</th>
<th>9th**</th>
<th>10th**</th>
</tr>
</thead>
<tbody>
<tr>
<td>A student must have accumulated this many credits:</td>
<td>0</td>
<td>6</td>
<td>15</td>
<td>27</td>
<td>39</td>
<td>51</td>
<td>66</td>
<td>81</td>
<td>96</td>
<td>111</td>
</tr>
<tr>
<td>With at least this grade point average:</td>
<td>0</td>
<td>1.5</td>
<td>1.8</td>
<td>1.8</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Other NYS Scholarships**
New York State offers others scholarships in addition to TAP. Visit www.hesc.ny.gov for more information.

**State Scholarships**
New Jersey, Pennsylvania, Rhode Island, Vermont, and many other states have state-sponsored scholarship programs which can be used at Clarkson. It is suggested students contact their high school guidance office or state education department for information on state scholarships.

**NYS Aid to Native Americans**
A member of any Native American tribe within New York State may be awarded $2,000 annually for a maximum of four years of full-time study. State aid to Native Americans is an entitlement program. There is neither a qualifying examination nor a limited number of awards. Application forms may be obtained from the Native American Education Unit, New York State Education Department, Albany, New York 12234.

**Pell Grants**
Eligibility for the federal Pell Grant is determined by the Department of Education based on the information provided on the FAFSA. Students must submit a FAFSA each academic year. Award amounts are set annually by the federal government. Pell Grants do not need to be repaid.

**Supplemental Educational Opportunity Grant (SEOG)**
This is a nonrepayable federal grant, administered by the University and awarded to Pell Grant recipients. Students must submit a FAFSA each academic year. Awards are contingent based upon financial need and the availability of federal funding. Awards typically range from $300 - $600 annually.

**Federal Work-Study Program**
Federal Work-Study is awarded to eligible students based on the information submitted on the FAFSA. Students are given the opportunity to work at various sites on campus. The amount each work-study student may earn is predetermined by the Office of Financial Aid.
The student works a specific number of hours each week during the semester to earn that amount. Students are included in the University payroll system and receive a bi-weekly paycheck. Work-study money is allocated to the University by the federal government and jobs are contingent upon funding.

Veterans Scholarship Program
The Veterans Readjustment Benefits Act of 1966 enables veterans to obtain financial aid for a college education. To be eligible, a veteran must have been released from the service since January 31, 1955, and have served more than 181 days. Information and applications are available at the local Veterans Administration Office.

Clarkson provides funds for highly competitive academic awards made annually to Army and Air Force veterans who have been separated from the service for less than a year. The scholarships provide up to full tuition until completion of the degree program.

Air Force Reserve Officers’ Training Corps (ROTC) Scholarships
Merit-based tuition scholarships are available to Air Force ROTC cadets ranging from $3,000 to full tuition and fees. Below is the list of current scholarships:

- TYPE I — $44,630 - tuition and fees - 2015-2016
- TYPE II — $18,000 towards tuition
- TYPE III — $9,000 towards tuition
- TYPE VI — $3,000 towards tuition
- TYPE VIII — A competitive-based academic upgrade of a TYPE II, pays up to 80% of tuition and fees.

TYPE I, II, III, and VIII include a book allowance of $300 per semester, a monthly tax free stipend of: Freshman - $300; Sophomore - $350; Junior - $450, and Senior - $500 and the Clarkson ROTC Incentive Scholarship (see below).

Army Reserve Officers’ Training Corps (ROTC) Scholarships
Army ROTC Scholarship winners receive the full tuition and fee benefit of $44,630 for the 2015-2016 academic year. Winners will also receive a book allowance of $1,200 per year and a tax-fee stipend of $300-$500 per month for 10 months. All Army ROTC Scholarship winners are eligible to receive the Clarkson ROTC Incentive Scholarship.

Clarkson ROTC Incentive Scholarship (Army and Air Force)
Eligible ROTC Scholarship recipients may receive the Clarkson ROTC Incentive Scholarship. This scholarship is valued at $14,132 for the 2015-2016 academic year. Proceeds from the Clarkson ROTC Incentive Scholarship may only be used for housing and meal expenses.

VA Yellow Ribbon Program
Beginning in August 2009, Clarkson has been approved as a participant in the VA Yellow Ribbon Program. The Post 9/11 Veterans Educational Assistance Act provides partial tuition and fee benefits to eligible active duty, veterans and eligible dependents. As a Yellow Ribbon school, Clarkson will contribute 50% of the remaining cost of tuition and fees. The Department of Veterans Affairs will match this amount. In partnership with the Department of Veterans Affairs, Clarkson will ensure that the full cost of tuition and fees will be covered at a rate of 100%.
Employment at Clarkson

Each year various departments and offices on campus employ students who do not qualify for federal work study. Students may interview as the jobs become available. Student Administrative Services is able to assist interested students find employment at the University.

ARAMARK (University Food Service)

ARAMARK hires about 200 students each year. Students may inquire at the ARAMARK office when they arrive on campus.

Clarkson Payment Plan (PP)

Clarkson provides a 12-month payment plan, an option attractive to many families. Participation in the PP is extended to anyone with a U.S. address. The applicant determines the amount to be financed; the maximum amount is the total charges less estimated financial aid, and the minimum amount is $1,000 a semester. The PP is available with no finance or interest charges, so long as payments are made in accordance with the terms of the contract.

Detailed information regarding the PP and applications are available from Student Administrative Services, Clarkson University, Box 5548, Potsdam, NY 13699-5548; 315-268-6451 or at http://www.clarkson.edu/sas/forms/index.html.

Clarkson Endowed, Sponsored, and Share Clarkson Scholarships

Various individuals, foundations and corporations have donated funds to establish scholarships for Clarkson students who meet certain criteria. Endowed scholarships provide assistance to students in perpetuity. Sponsored scholarships provide assistance on an annual basis. In general these awards are made to incoming new students who show academic promise and leadership potential as well as continuing upper-class students who maintain exceptional cumulative grade point averages and meet other specified criteria. Recipients are selected by the Office of Financial Aid Scholarship Committee. Students are notified of the award by the financial aid package notification process (paper award letter for new students; on-line for continuing students) and amounts are credited to the student’s account each semester. Generally, students retain the award for the remainder of their undergraduate career at Clarkson to the extent of a four-year period, provided academic and financial aid satisfactory academic progress standards are maintained. Some scholarships have higher minimum GPA requirements.

Scholarships established through the generosity of Clarkson benefactors are awarded with the understanding that there is a moral obligation for the student to repay the funds received. By accepting the grant award, the student accepts the moral responsibility to contribute to Clarkson when financially able to do so. By fulfilling this moral obligation, the student will help replenish the grant fund ensuring Clarkson will be able to offer institutional aid to future students. A list of endowed and sponsored scholarships follows:

Endowed Scholarships
Advani Endowed Scholarship Fund
Ackermann
The Arthur, Dora and JoAnn L. Armani Endowed Scholarship Fund
Frank and Lee Augsbury Endowed Scholarship Fund
Azote Inc. Endowed Scholarship Fund
Gordon W. Babcock ’46 Endowed Scholarship Fund
Edward J. Barno ’77 Endowed Scholarship Fund
The Gordon C. "Stub" Baker ’27 Endowed Scholarship Fund
Raymond and Esther Baker Endowed Scholarship Fund
The Arnold and Helen Barben Endowed Scholarship Fund
The H. Douglas and Sara Barclay Endowed Scholarship Fund
Professor Robert Barr Endowment Scholarship
Charles E. Becker Memorial Scholarship Fund
John J. Bero, Sr. Memorial Scholarship Fund
Bart Blaner ’83 Endowed Scholarship
Andrea K. Bridge ’68 and John E. O’Beirne Endowed Presidential Scholarship Fund
Bradford Broughton Technical Communications Endowed Scholarship Fund
William G. Brown ’37 Memorial Endowed Scholarship Fund
Ernest and Evelyn Bulriss Endowed Scholarship
A. Douglas Burrow ’31 Endowed Scholarship
Purcell J. and Edith O. Brownell Endowed Scholarship Fund
Cala Family Endowed Scholarship Fund
Janice L. Campbell Endowed Scholarship Fund
Robert ’61 and Cynthia Campbell Hockey Endowment Scholarship Fund
Robert W. Carroll Jr. ’63 Graduate Endowed Scholarship Fund
Robert W. Carroll Jr. ’63 Undergraduate Endowed Scholarship Fund
James D. Cartin Memorial Scholarship Fund
Brian Y. Changlai MD, PhD ’70, Mary C. Daye MD ’71 and Brian A. Changlai MD Endowed Scholarship Fund
John D. and Helen Chapple Endowed Scholarship Fund
Siren R. Chudgar, MD ’96 and Jennifer L. Chudgar Endowed Scholarship Fund
Edwin C. Clark Memorial Scholarship Fund
Clarkson University General Scholarship Fund
Clarkson University Memorial Scholarship Fund
Clarkson University Parents Endowed Scholarship Fund
Class of 1947 Endowed Scholarship Fund
Class of 1963 Endowed Scholarship Fund
Frederick W. Cleveland North Country Merit Scholarship Fund
Thomas F. Clough ’62 Endowed Presidential Achievement Scholarship Fund
Doug and Jane Collette Endowed Scholarship Fund
Wallace H. Coulter Endowed Scholarship
Wendall O. Covell Scholarship Fund
Kristin Bandy Craig Memorial Scholarship Fund
The Crane Family Endowed Scholarship Fund
Clarkson University Pop Band Alumni Association Endowed Scholarship
Ralph S. Damon Endowed Scholarship Fund
David E. Davies ’77 Endowed Scholarship Fund
DeCrescenzo-Lupe Endowed Scholarship
Deneka Family Endowed Scholarship Fund
The Development Authority of the North Country (DANC) Endowed Scholarship Fund
R. David Diederich ’64 Memorial Endowed Scholarship
Benson G. Diefendorf Endowed Scholarship Fund
James L. Dohr Accounting Scholarship Fund
Brendan Donohue ’84 Memorial Endowed Scholarship Fund
Richard C. ’55 and Joy M. Dorf Endowed Scholarship Fund
John M. ’59 and Joyce A. Eikenberg Endowed Scholarship Fund
Emerson Foundation Matching Grant for Endowed Presidential Scholarships
James E. Fassett Endowed Scholarship Fund
The Samuel B. Feitelberg Physical Therapy Fellowship Endowed Scholarship
Joan and Barry S. Fischer ’54 School of Business Endowed Scholarship Fund
Barry S. Fischer ’54 Endowed Scholarship Fund
Ferris Fayette Flint Electrical Scholarship Fund
John F. Frazier ’38 & L.K. Sillcox Endowed Scholarship
J. Ronald Frazer ’45 Endowed Fellowship
Walter Fuss ’51 Endowed Scholarship for Civil Engineering
Phil Garda ’67 Memorial Endowed Scholarship Fund
Alan W. Gibney ’69 Endowed Scholarship Fund
FLIR Systems, Inc. Endowed Scholarship Fund
Fred and Betsy Garry Endowed Scholarship Fund
William B. Gero Memorial Scholarship Fund
Alan W. Gibney ’69 Endowed Scholarship
Christopher W. Gilmore ’88 Memorial Endowed Scholarship
The Ruth and Sandy ’54 Ginsberg Endowed Scholarship Fund
Giromini Family Endowed Scholarship
The Joel ’57 and Lynda Goldschein Endowed Scholarship Fund
Frank C. Goodrich Memorial Endowed Scholarship Fund
George A. Gray Endowed Fellowship Fund
Karl A. Greenhagle ’69 Endowed Scholarship Fund
Anna and Frank Greenwall Scholarship Fund
Frank E. Gutmann Memorial Scholarship Fund
Margaret Van Hamlin Haddad Scholarship Fund
Steven W. ’68 and Laurie Hafener Endowed Scholarship Fund
David L. Hall ’65, ’68 Memorial Endowed Scholarship
Erwin C. ’48 and Jeanne Hamm Scholarship Fund
Hammam Endowed Scholarship
Terry O. Harden ’76 Memorial Scholarship Fund
Frank M. Hardiman Scholarship Fund
Harrison-Campbell Endowed Scholarship Fund
The Lynn P. Harrison, III and Tonya P. Harrison Endowed Scholarship Fund
William P. Harrison Endowed Scholarship Fund
Ralph E. ’55 and Solita Hawes Endowed Scholarship Fund
David ’83 and Sheryl Heacock Endowed Scholarship for Engineering and Management
Charles W. Hearl ’51 Endowed Scholarship Fund
William Randolph Hearst Endowed Scholarship Fund
Ellen Herrick Endowed Scholarship Fund
Barbara Hewett Lowers Endowed Scholarship
Mildred Dear Hill and Robert R. Hill ’48 Endowed Scholarship
George O. and Clara E. Hodge Endowed Scholarship Fund
David L. ’75 and SaraAnne Baker Hopkins Endowed Scholarship
Harry and Florence P. Hull and Katherine Hull Endowed Scholarship Fund
William ‘61 and Elaine Hurd Endowed Scholarship Fund
Michael Lewis Jaeger Memorial Endowed Scholarship
Clarke H. Joy ‘29 Memorial Endowed Scholarship
Albert C. and Ella Hyde Endowed Scholarship Fund
Sol Kaplan Scholarship Fund
The Kardan Scholarship Fund
The Gary F. Kelly Endowed Scholarship Fund
Kent Family Endowed Scholarship
William H. ‘53 and Beverly Lane Endowed Scholarship Fund
William H. Lane Incorporated Endowed Scholarship Fund
Earl L. LaPointe ‘22 Memorial Scholarship Fund
Sylvain L. Larose ‘75 Endowed Hockey Scholarship Fund
Kristine M. Layn Endowed Scholarship Fund
The Howard E. ‘48 and Mary Lou Lechler Endowed Scholarship
Cecile and Herman Lieberman Endowed Scholarship Fund
Joseph ’82 and Rachel Loo Endowed Scholarship
Barbara Hewett Lowers Endowed Scholarship Fund
The Norman ’51 and Pat Maggione Scholarship
Jason Marsden ’91 Endowed Scholarship
Egon Matijevic’ Endowed Chemistry Scholarship Fund
Peter M. Mayo ’71 Endowed Scholarship
Theodore Sr. and Wanda McWharf Endowed Scholarship
Arthur, Eleanor and Jack Mietz Endowed Scholarship Fund
Charles T. Mosier ’72 Memorial Endowed Scholarship Fund
Steve Neely Endowed Memorial Scholarship Fund
J. Paul Nessler ’69 Memorial Endowed Scholarship Fund
The Ronald R. "Monk" Neugold ’52 Endowed Scholarship Fund
The Newell Family Endowed Scholarships:
   Edgar A. Newell Endowed Scholarship Fund
   Jean S. Newell Society of Women Engineers Endowed Scholarship Fund
   W. Allan Newell Endowed Scholarship Fund
New York State Federation of Home Bureaus (St. Lawrence County) Scholarship Fund
New York State Federation of Home Bureaus (Louise Villeneuve McMahon) Scholarship Fund
Lisa Niles ’78 Memorial Endowed Scholarship
Nathan and Janet Owen Endowed Scholarship Fund
Anthony J. Palumbo ’60, and Phyllis A. Palumbo Chemical Engineering Endowed Scholarship Fund
James P. Papayanakos Scholarship
Kenneth R. and Margaret K. Parker Endowed Scholarship Fund
Sara Snell Petersen/W. Hollis Petersen Endowed Scholarship Fund
The Dick Pratt Endowed Prize Fund (PEP Fund) established by Phyllis A. Palumbo and Anthony J. Palumbo, M.D. (1960), and Family
Ledyard H. Pfund ’40 Presidential Achievement Award Scholarship Fund
Leo ’25 and Gertrude Ploof Endowed Scholarship Fund
Harold A. and Dorothy Putnam Endowed Scholarship Fund
Peter Radding ’63 Memorial Endowed Scholarship
George H. Randall ’16 and Paul W. Randall ’92 Endowed Scholarship Fund
Stephen C. Redding ’63 Memorial Scholarship Fund
Kyle G. Reichley ’85 Memorial Endowed Scholarship
Gerald ’58 and Judith Reinman Endowed Scholarship Fund
The Ernest ’42 and Constance Richmond Memorial Endowed Scholarship Fund
Ridings Family Endowed Scholarship Fund
Elwyn J. Rodee Endowed Scholarship Fund
Paul Rodgers Memorial Endowed Scholarship
William J. Rowley Endowed Scholarship Fund
Francis E. ’63 and Mona K. Sage Endowed Scholarship Fund
Albert L. and Mary S. Sayer Endowed Scholarship Fund
Joseph Scaturro Endowed Scholarship Fund
Fred Schoenhubt ’78 Endowed Scholarship Fund for Hockey
Ralph and Jessie Scott Endowed Scholarship Fund
Willard G. Shafer ’53 Endowed Scholarship Fund
Shelly Electric Endowed Scholarship Fund
Thomas E. Simpkins ’30 Endowed Scholarship Fund
F. Carlton and Ethel B. Simpson Endowed Memorial Scholarship Fund
Sisson Family Endowed Scholarship Fund
Jay P. Smee ’52 Endowed Scholarship Fund
Barry P. Smith ’65 Endowed Scholarship Fund
James T. and Grace B. Smith Endowed Scholarship Fund
William D. ’54 and Shirley Smith Endowed Scholarship Fund
John Ben Snow Foundation Endowed Scholarship
George J. Stanley Endowed Scholarship Fund
Charles Thomas ’63 Adirondack Endowed Scholarship
The Thompson Family Endowed Scholarship Fund
Fay ’62 & Nadine Tolman Endowed Scholarship Fund
Toole-O’Donnell Families and MVW Endowed Scholarship Fund
Earle E. Towlson ’27 Memorial Endowed Scholarship Fund
Edward F. Tucker Endowed Scholarship Fund
Merton Van Sant/Industrial Development Agency Endowed Scholarship Fund
David A. Walsh ’67 Endowed Scholarship Fund
Melissa A. Walsh ’03, ’05 Memorial Endowed Scholarship
Mr. and Mrs. Robert N. Wagner Scholarship Fund
The Dr. John ’73 and Roberta Wasenko and Family School of Engineering Endowed Scholarship Fund
The Dr. John ’73 and Roberta Wasenko and Family Health Sciences Endowed Scholarship Fund
Dr. Mark W. and Beulah Welch Endowed Scholarship Fund
John “Jack” S. ’54 and Norma Welch Memorial Endowed Scholarship
Richard and Gina Weniger Memorial Endowed Scholarship
J.R. Weston Endowed Scholarship Fund
Nancy E. and James E. Wood ’64 Endowed Scholarship Fund
MK Woods ’82 Endowed Scholarship Fund
Clarence F. Wright Endowed Memorial Scholarship Fund
Eugene R. Yeager Jr. ’75 Memorial Scholarship Fund
Yentzer Endowed Scholarship Fund
Terry Yurkiewicz ’66 Memorial Hockey Endowed Scholarship
Zieger Endowed Scholarship Fund
Sponsored Scholarships

Barrett Paving CEM Sponsored Scholarship
Bechtel Foundation Sponsored Scholarship
Donald Clark Sponsored Scholarship
Clarkson Club Sponsored Scholarship
Clarkson University General Sponsored Scholarship
Colden Corporation Sponsored Scholarship
James A. Comstock Memorial Sponsored Scholarship
Bill Cotter ’73 Sponsored Scholarship
Kristin Bandy Craig Memorial Sponsored Scholarship
Crane Fund for Women and Children Sponsored Scholarship
DDS Companies Sponsored Scholarship
Delta Upsilon Sponsored Scholarship
Daniel P. Fellegara ’06 Memorial Sponsored Scholarship
Giromini Family Sponsored Scholarship
Glens Falls Contractors Association Sponsored Scholarship
NewPage Corporation Sponsored Scholarship
Edwin E. Hatch Foundation Sponsored Scholarship
Honors Program Sponsored Scholarship
Ralph A. Janaro Memorial Sponsored Scholarship
Michael Lewis Jaeger Memorial Sponsored Scholarship
Andrew Joseph Jankowiak Sponsored Scholarship
Kathleen Kafka and Reed Phillips Memorial Sponsored Scholarship
Key Bank Sponsored Scholarship
Krigman ’63 MME Undergraduate Research Grant Fund Sponsored Scholarship
Joel Lerich ’62 Memorial Sponsored Scholarship
Edward T. Misiaszek Sponsored Scholarship
Miss New York of the North Country Sponsored Scholarship
National Starch & Chemical Company Sponsored Scholarship
Steve Neely Memorial Sponsored Scholarship
North Country Friends Sponsored Scholarship
O’Brien & Gere Sponsored Scholarship
Karen Mazella Olmstead ’84 Memorial Sponsored Scholarship
N I Rea Sponsored Scholarship
Gerald ’58 and Judith Reinman Sponsored Scholarship
Ruston Paving Company CEM Sponsored Scholarship
David Scaringe ’01 Memorial Sponsored Scholarship
Todd Stanley Searfoss ’79 Memorial Sponsored Scholarship
Sprout Foundation Sponsored Scholarship
Sprout Foundation Sponsored Scholarship #2
Stantec Consulting Services Incorporated Sponsored Scholarship
Norman Westerman Thurston ’63 Sponsored Scholarship
Wildwood Foundation Sponsored Scholarship
Wyeth-Ayerst Sponsored Scholarship
Share Clarkson Direct Scholarships

Gilbert and Ruth Adams Class of 2017 Share Clarkson Direct Scholarship
Dorr B. Begnal '83 Class of 2015 Share Clarkson Direct Scholarship
Gordon Boncke '47 Class of 2016 Share Clarkson Direct Scholarship
Bruce G. Boncke '71 Class of 2019 Share Clarkson Direct Scholarship
Bouchard/Mountjoy Class of 2013 and 2018 Share Clarkson Direct Scholarship
Amy Castronova '04 Class of 2014 and 2019 Share Clarkson Direct Scholarship
James M. Coughlin '53 Share Clarkson Direct Scholarship
Sean '89 and Lori '89 Donohoe class of 2013 and 2018 Share Clarkson Direct Scholarship
Goldman Class of 2013 Share Clarkson Direct Scholarship
Joel '75 and Lynda Goldschein Class of 2014 and 2018 Share Clarkson Direct Scholarship
Elinore and Beecher '50 Greenman Classes of 2014, 2015, 2016, 2017 and 2018 Share Clarkson Direct Scholarship
Rosemary A. Harrington Class of 2015 Share Clarkson Direct Scholarship
W. Jon Harrington Class of 2015 Share Clarkson Direct Scholarship
M. Hubbard Construction, Inc. Classes of 2013 and 2016 Share Direct Clarkson Scholarship
Jolyn Foundation Class of 2013, 2014 and 2018 Share Clarkson Direct Scholarship
Matthew J. Maslyn '77 Class of 2015 Share Clarkson Direct Scholarship
John and Verna Sherrick Class of 2013 and 2018 Share Clarkson Direct Scholarship
Robert '74 and Julia Storms Class of 2015 and 2018 Share Clarkson Direct Scholarship
Structural Associates, Inc. Class of 2013 Share Clarkson Direct Scholarship
Alissa, Donna and Steven M. '68 Tritman Class of 2017 Share Clarkson Direct Scholarship
Susan J. and Ellsworth F. '65 Vines Class of 2015 Share Clarkson Direct Scholarship
Rita Fadale Wagner Class of 2013 Share Clarkson Direct Scholarship
In Honor of Katherine H. Wears Class of 2019 Share Clarkson Direct Scholarship
Wolfley Family Class of 2014 Share Clarkson Direct Scholarship

Prize Funds
Gregory P. Arnold ’73 Memorial Award
Jerome D. Barnum Memorial Prize
Randy Brockway ’91 Memorial Award
Stephen Brunauer Memorial Award
Charles M. Clark Memorial Award
Frederica Clarkson Prize
Levinius Clarkson Prize
Vern Clute Memorial Academic Achievement
William Coleman Memorial Prize
Francis Deneen Prize
William Farrisee Memorial Award
Doc Jones Prize
Elizabeth A. Kissel ’90 Memorial Award
Richard Brady Legro ’82 Memorial Award
Albert Merrill ’13 Faculty Prize
Dr. Carl Michel Prize
Fran Neragin Prize
Perkins Family Memorial Award
Kyle G. Reichley ’85 Memorial Award for Excellence in Management
Shirley Rogers Memorial Award
Robert E. Rosati ’52 Award for Excellence in Mechanical Engineering
John B. Russell Memorial Prize
Ilse J. Shaw Award
R. Shankar Subramanian ’69 Prize for Outstanding Scholarly Achievement in Chemical Engineering
Martin A. Welt ’54 Family Awards

**Endowed and Sponsored Prizes and Awards**
Clarkson bestows prizes and awards, both monetary and nonmonetary, upon deserving Clarkson students in recognition of their outstanding contributions to the academic, athletic and extracurricular life of the institution. Amounts are credited to the student’s account.

A list of prizes and awards follows:
Raymond R. Andrews Achievement Award
Gregory P. Arnold ’73 Memorial Endowed Prize
Jerome D. Barnum Memorial Award
Randy Brockway ’91 Memorial Award
Stephen Brunauer Memorial Award for Excellence in Chemistry
CEE Junior Faculty Endowed Prize Fund
Charles Martin Clark Award
Clarkson Alumni Frederica Clarkson Award
Clarkson Alumni Levinus Clarkson Award
Vern Clute Memorial Academic Achievement Award
Communication & Media Sophomore Award
Communication & Media Junior Award
Communication & Media Senior Award
Major William Coleman Award
Francis DeLucia ’66 Endowed Prize Fund
Digital Arts & Sciences Sophomore Award
Digital Arts & Sciences Junior or Rising Senior Award
Francis Dineen Award
The Dean William J. Farrisee Memorial Award
John W. Graham Jr. Leadership Award
George A. Gray Endowed Fellowship
Doc Jones Prize Fund
Elizabeth A. Kissel ’90 Endowed Memorial Award
The John H. Koerner, Jr. ’76 Intramural Award
The John H. Koerner, Jr. ’76 Memorial Award
The Martin M. Koshar ’55 Endowed Prize
Richard Brady Legro ’82 Memorial Award
Albert D. Merrill ’13 Endowed Faculty Prize
Dr. Carl Michel Award
Mike Morrison ’89 Memorial Coaches Award
Fran Neragin Award
Perkins Family Memorial Award
Dick Pratt Endowed Prize Fund
The Norman L. Rea Award
Kyle G. Reichey ’85 Memorial Alumni Award for Excellence in Info Systems & Business Processes
The Shirley Rogers Residence Hall Advisor Award
Robert E. Rosati ’52 Award for Excellence in Mechanical Engineering
Keith M. Russ Memorial Award
John B. Russell Memorial Prize
Ilse J. Shaw School of Management Freshman Award
Ilse J. Shaw School of Management Sophomore Award
STAFDA Outstanding Junior Award
STAFDA Outstanding Senior Award
Arthur L. Straub Memorial Award
R. Shankar Subramanian Prize for Outstanding Scholarly Achievement in Chemical Engineering
The Peter ’90 and Chandra Wargo Digital Arts & Sciences Award
Arthur J. Wells Prize
Martin A. Welt ’54 Family Awards

LOANS

William D. Ford Federal Direct Loan
Federal Direct Loans including both subsidized and unsubsidized loans, are low-interest loans funded by the federal government. Maximum annual borrowing limits are: First-year students, $5,500; sophomores, $6,500; juniors and seniors, $7,500. Aggregate loan totals for combined subsidized and unsubsidized loans cannot exceed $31,000 for dependent undergraduates and $57,500 for independent undergraduates. Aggregate loan limits for subsidized loans for all undergraduate students may not exceed $23,000.

Perkins Loan
The Perkins Loan is a federally funded, University-administered loan program for undergraduate students. This is a need based loan that is awarded based on information provided on the FAFSA. Loans are awarded annually based on the availability of funding. Loan amounts typically range from $1000 - $4,000.

The interest rate is five percent (fixed) and payments commence nine months after the recipient ceases to be a student. Under certain conditions, some or the entire loan may be subject to cancellation. Repayments are made on a monthly basis over a period not to exceed 10 years. The minimum monthly payment is $30. Students with Perkins loans who are withdrawing from Clarkson should contact ECSI, our loan servicer, to arrange for an exit interview. ECSI may be reached at 888-549-3274 or online at www.ecsi.net. Click on the Borrower link and then log-in to your account.

Clarkson Loan Funds
Clarkson has 23 separate loan funds from which students may borrow up to $2,000 in any semester, subject to availability and borrower qualification. These loans are available through Student Administrative
Services. Repayment begins nine months after a student’s enrollment at Clarkson terminates. A list of loan funds follows:

Frederick E. Anderson Memorial Loan Fund
The Arnold and Helen Barben Scholarship Incentive Loan Fund
Beazer East Loan Fund
Clarkson University Memorial Loan Fund
ABB Combustion Engineering Scholarship Incentive Loan Fund
Arthur Vining Davis Scholarship Incentive Loan Fund
Decker/Dulude/Corning Scholars Program
Demereee-Toohey Scholarship Incentive Loan Fund
Charles A. Frueauff Scholarship Incentive Loan Fund
Kent Family Endowed Scholarship Fund
John H. Koerner, Jr., Loan Fund
Robert and Jane LaHair Scholarship Incentive Loan Fund
Lambda Phi Epsilon Student Loan Fund
Theodore Sr. and Wanda McWharf Endowed Scholarship Fund
George O. Miles Memorial Loan Fund
National Grid Scholarship Incentive Loan Fund
North Country Friends Loan Fund
Alan D. Nolet '78 Scholarship Incentive Loan Fund
The William S. Prescott Memorial Incentive Loan Fund
Procter & Gamble Chemical Engineering Loan Fund
Elwood (Pete) Quesada Scholarship Incentive Loan Fund
N. L. and Eleanor Rea Student Loan Fund
George E. Snyder Memorial Loan Fund
Walter E. Turnbull Memorial Scholarship Incentive Loan Fund
Arthur O. and Louella K. West Memorial Loan Fund

Students with loans who are withdrawing from Clarkson should contact Student Administrative Services to arrange for an exit interview.

**TOTAL WITHDRAWAL FROM THE UNIVERSITY – TREATMENT of FEDERAL TITLE IV AND INSTITUTIONAL AID**

There are occasions when a student may leave the University prior to the completion of a semester. If a student officially withdraws from the University, takes a leave of absence, unofficially withdraws or is dismissed during the semester, for the purposes of financial aid each of these situations is treated as a withdrawal.

A student intending to leave the University must contact Student Administrative Services to begin the official withdrawal process.

The law specifies how Clarkson must determine the amount of Title IV program assistance that you earn if you withdraw from school. The Title IV programs that are covered by this law are: Federal Pell Grants, Iraq and Afghanistan Service Grants, Federal Direct Student Loans, PLUS loans, Federal Supplemental Educational Opportunity Grants (FSEOG) and Federal Perkins Loans.
When you withdraw from the University during the semester, the amount of Title IV program assistance that you have earned up to that point in time is determined by a specific formula. If you received less assistance than the amount that you earned, you may be able to receive those additional funds. If you received more assistance than you earned, the excess funds must be returned to the US Department of Education.

The amount of assistance that you have earned is determined on a pro rata basis. The formula is based upon the number of days the student has attended as a percentage of the total number of days in the semester. For example, if you completed 30% of the semester, you earn 30% of the assistance you were originally awarded. Once you have completed more than 60% of the semester, you have earned all of the assistance that you were awarded for the semester. Federal regulations require this calculation if the student officially or unofficially withdraws, is dismissed or otherwise leaves the University during a semester.

Student transcripts are reviewed at the conclusion of each semester. If a student received all “F” grades during a semester, federal regulations require the Office of Financial Aid to obtain additional information from the Academic Department(s). If the Academic Department(s) determines that the student completed yet failed to meet the course objectives in at least one course, no changes to the student’s financial aid for that semester is required. If however, the Academic Department(s) determines that the student did not complete all courses (i.e. stopped attending all courses); the student is considered to have unofficially withdrawn from the University. In this case, the last date of an academic related activity (i.e. documented attendance in class, submission of a homework assignment or the taking of an exam) is used to determine the date of the unofficial withdrawal. If the last date of an academic related activity is after the 60% date of the semester, no adjustment to a student’s financial aid for that semester is required. If however, the date occurs prior to the 60% date, a Title IV refund calculation is required and necessary adjustments to a student’s financial aid for the semester will be made. In absence of a documented last date of an academic related activity, federal regulations require Clarkson to use the midpoint (50%) of the semester.

The Federal Title IV Refund Procedure is separate and distinct from the Office of Student Account’s refund policy for tuition, fees and other charges at Clarkson. Therefore, a student may still owe funds to cover unpaid institutional charges.

Clarkson scholarships, grants and loans aid will be reduced based on individual circumstances, the date of withdrawal and the Student Account Refund Policy.

Satisfactory Academic Progress for students who return to the University for a subsequent semester will be reviewed and a determination will be made based on the Maximum Time Frame, PACE and GPA standards as stated above.
SCHOOL OF ARTS & SCIENCES

Peter R. Turner, Dean; Jerry W. Gravander, Associate Dean

The School of Arts & Sciences provides the foundation for all of Clarkson’s degree programs and also offers distinctive majors and minors.

The School of Arts & Sciences offers an array of major programs. Some are in traditional disciplinary areas such as Biology, Chemistry, Computer Science, Mathematics, History, and Psychology, while others, such as Biomolecular Science and Digital Arts & Sciences, integrate knowledge from several disciplinary areas to address recently emerging issues. All benefit from Clarkson’s strengths in engineering and business, and all are focused on preparing students for graduate school, professional programs, and careers.

All Clarkson students complete the Clarkson Common Experience, which includes courses in science, mathematics, technology, and the humanities and social sciences. These are critical components of every degree program in the University, and through them students acquire the quantitative reasoning, critical thinking, and effective communication skills and the basic scientific knowledge that are essential in their major programs and in their development as responsible citizens, effective professionals, and technological leaders.

Our rapidly changing and increasingly complex world makes it desirable for students to extend their education beyond the boundaries of their particular major. The School of Arts & Sciences provides students in all areas of the University the opportunity to do so through its numerous minor programs.

The School of Arts & Sciences has graduate programs in the disciplines of Biology, Chemistry, Computer Science, Information Technology, Mathematics, Occupational Therapy, Physics, Physical Therapy and Physician Assistant Studies. Faculty and students also participate in the interdisciplinary Data Analytics, Environmental Science and Engineering, Environmental Policy and Governance, and Materials Science and Engineering graduate programs. Students in our undergraduate majors have the opportunity to enrich their educational experience by working in the research projects that are at the heart of the graduate programs.

<table>
<thead>
<tr>
<th>Undergraduate Majors</th>
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<tbody>
<tr>
<td>Applied Mathematics &amp; Statistics (p.)</td>
<td>Interdisciplinary Liberal Studies (p.)</td>
</tr>
<tr>
<td>Biology (p.)</td>
<td>Interdisciplinary Social Sciences (p.)</td>
</tr>
<tr>
<td>Biomolecular Science (p.)</td>
<td>Mathematics (p.)</td>
</tr>
<tr>
<td>Chemistry (p.)</td>
<td>Physics (p.)</td>
</tr>
<tr>
<td>Communication (p.)</td>
<td>Political Science (p.)</td>
</tr>
<tr>
<td>Computer Science (p.)</td>
<td>Psychology (p.)</td>
</tr>
<tr>
<td>Digital Arts &amp; Sciences (p.)</td>
<td>Social Documentation Double Major (p.)</td>
</tr>
<tr>
<td>History (p.)</td>
<td>Software Engineering (p.)</td>
</tr>
<tr>
<td>Humanities (p.)</td>
<td>Interdisciplinary Liberal Studies (p.)</td>
</tr>
</tbody>
</table>
Pre-Professional Programs

Pre-Occupational Therapy
Clarkson offers an undergraduate Pre-OT advising program and a graduate degree program in Occupational Therapy. Students interested in preparing for entrance into Clarkson’s Masters of Occupational Therapy degree program should contact the department at 315-268-2161.

Pre-Physical Therapy and Physical Therapy
Clarkson offers an undergraduate Pre-PT concentration and an entry level Doctor of Physical Therapy graduate degree program. Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should contact the department at 315-268-3786.

Pre-Physician Assistant and Physician Assistant Studies
Clarkson offers an undergraduate Pre-Physician Assistant advising program and a graduate degree program in Physician Assistant Studies. Students interested in preparing for entrance into Clarkson’s Masters of Physician Assistant Studies degree program should contact the department at 315-268-7942.

Pre-Medicine, Pre-Dentistry, and Pre-Veterinary Programs
Students may earn a degree in any major program and also prepare for careers in health sciences. Students interested in preparing for professional schools in dentistry, medicine or veterinary science should contact the Chair of the Health Professions Advisory Committee at 315-268-3968.

Pre-Law
Pre-law advising is available for students in the School of Arts & Sciences to help them develop academic programs that will serve as a strong foundation for future legal studies. A list of pre-law advisors is available through the School of Business. The advisors provide counseling and information about law schools and careers in law.

Other Curricular Opportunities

Minors
Clarkson’s curricula contain a number of elective courses. Furthermore, many students have room for additional courses through advanced placement, overloading, and by taking courses in the summer. Therefore students, in consultation with their advisors, have an opportunity to formulate academic programs that reflect individual interests, career goals, and areas of professional specialization via minors in all of Clarkson’s schools.

University Honors Program
Clarkson offers a four-year undergraduate University Honors Program for exceptionally talented students in any major. For more information call the director at 315-268-2290.

Co-ops and Internships
Students interested in gaining work experience while in college are encouraged to participate in the University Co-op or Internship Program. Please refer to University Outreach and Student Affairs for more details on these programs.
Study Abroad
Students interested in cultural and trade relations between the United States and other countries may participate in the University Study Abroad Program. Any sophomore may apply.

Bachelor of Professional Studies
An entering first-year or transfer student may create, in consultation with an academic advisor, a program uniquely tailored to meet special occupational or career objectives through the Bachelor of Professional Studies (BPS) degree.

4+1 Program
Students majoring in Arts and Sciences may use their free electives to provide a foundation for entering a 4+1 program at Clarkson. Through this program, students complete a Master of Science in Management Systems or a Master of Business Administration with one year of coursework beyond the bachelor degree. Contact the Graduate Business Programs Office at 315-268-6613

Alternatively, students in the Sciences can use electives with some selective overloads to start senior year work towards an M.S. in one of the science disciplines, such as chemistry. Thus, within a five-year program, the student would receive both a B.S. and a thesis M.S. degree. This puts the student in a better competitive position for work or advanced graduate education.

Social Documentation: Communication and Humanities/Social Sciences Integrated Double Major
This innovative option invites students to combine their interests in learning and using cutting-edge technology with a solid base in the social sciences (history, political science, anthropology and sociology) or the humanities (literature, film and philosophy).

Social Documentation (SD) emphasizes creativity, flexibility and versatility, allowing students to pursue a broad span of interests leading to careers in filmmaking, writing, web-based technologies, radio and TV, or governmental and non-governmental agencies. Guided by their SD advisor, students choose courses in both their majors that reflect their own interests and future plans; additionally, they take a series of core courses in common with all other SD majors to gain the research, technical and rhetorical skills they will need for career success. (For further information, see the Social Documentation section under Interdisciplinary Undergraduate Programs.)

Science Studies
Many students approach their first year having found all of their secondary school science courses fascinating and wishing to explore several fields more deeply before declaring a major. These students may choose to participate in the Science Studies option which provides students with an opportunity to learn more about programs within the School of Arts & Sciences prior to selecting a final program for continued study. Students taking advantage of this option work with an advisor to develop an individualized course schedule for the first semester, designed to facilitate explorations and to keep options open. These individualized programs may involve trade-offs in later course selection, but will not extend time required to obtain a degree. With assistance from their academic advisor, undergraduates will select an approved program which best suits their individual goals and objectives. Science Studies students are fully matriculated students at Clarkson University. For more information, contact the Science Studies advisor at 315-268-6544.
Graduate Programs. Clarkson’s School of Arts & Sciences offers a number of graduate programs at the Masters and Doctoral levels, as well as Professional programs in the Health Sciences (see above for listing). See also Research and Academic Centers.

Faculty

Biology
Tom A. Langen Chair and Professor of Biology; Professors Thomas Lufkin, Michael R. Twiss, Craig Woodworth; Associate Professors, Kenneth Wallace; Assistant Professors Andrew David, Cintia Hongay, Petra Marion Kraus, Stefanie Kring, Damien Samways, Shantanu Sur, Ronald LaCourse, Michael Tighe; Adjunct Professor Marcia Anne Blackman, Andrea May Cooper, Brian Leydet; Adjunct Assistant Professor Jr-Shiaun Lin, John Edward Pearl, William Walter Reiley, Alexei V Tumanov; Instructors, Patricia Burdick

Chemistry and Biomolecular Science
Devon Shipp Chair and Professor of Chemistry and Biomolecular Science; Phillip A. Christiansen, Victor K LaMer Chair/Distinguished University Professor, Chemistry Egon Matijević; Senior University Professor Richard E Partch; Professors Silvana Andreescu, CAMP Distinguished Professor Dan Goia; Milton Kerker Chair and Professor in Colloid Science Evgeny Katz; Associate Professors, Costel Darie, Artem Melman, James C. Peploski; Assistant Professors He Dong, Paul Goulet, Galina Melman, Mario Wriedt; Adjunct Assistant Professor Kevin MacVittie, Mario Wriedt; Research Assistant Professor Alisa Genevieve Woods; Distinguished Emeritus Professor; Instructor and Instrument Manager, Daniel Andreescu

Communication and Media
William Karis Chair; Professors Stephen Farina; Johndan Johnson-Eilola; Associate Professors William Dennis Horn; Assistant Professors Alex Lee; Steven Pedersen; Instructor Courtney Johnson-Woods, Dan Dullea

Computer Science
Christopher Lynch Chair; Associate Professors Alexis Maciel, Jeanna Matthews, Christina Tamon; Assistant Professor Natasha Banerjee, Yaoqing Liu, Junaed Sattar; Emeritus Professor James Lynch

Humanities and Social Sciences
Bill Vitek Chair; Professors Daniel Bradburd, Joseph Duemer, Jonathan Goss, Sheila F. Weiss; Associate Professors Stephen Bird, Ellen C. Caldwell, Stephen Casper, Laura E. Ettinger, Sarah C. Melville, Christopher C. Robinson, Annegret Staiger; Assistant Professors Jennifer Ball, Michael Garcia, Brian Hauser, Claudia Hoffmann, Christopher Morris, S.N. Nyeck, Lisa Propst, JoAnn Rogers, Christina Xydias, Ryan Zroka, Bryan Hudak; Adjunct Instructor John Stephen Hopkins, Andrew Szarka, Summar West; Professor Emeritus Owen E. Brady, David M. Craig, Lewis P. Hinchman, John N. Serio, Jan Wojcik

Mathematics
Joseph Skufca Chair; Professors Erik Bollt, Kathleen Fowler, Scott Fulton, Associate Professors Sumona Mondal, Adom Domonic Giffin; Assistant Professors Ying He, Rana Parshad, Guohui Song, Jie Sun, Guangming Yao, Michael Felland, Christopher Martin, Sara Morrison, Brad Smith; Mathematics & Computer Science Visiting Assistant Professor Ahmad Rasheed Almomani
Occupational Therapy
Rondalyn Varney Whitney Chair; Assistant Professor Mario Ciani; Clinical Assistant Professor Lisa Tebo; Adjunct Instructor Cindy Hammecker-McLean, Claire Richardson

Physical Therapy
George Fulk Chair; Associate Professors Leslie Russek; Assistant Professor Ali Boolani; Clinical Professors Christopher Towler, Stacey Zeigler; Clinical Assistant Professors Vicki LaFay, Rebecca Martin, Jay K. Rigsbee, Heather Shattuck; Adjunct Clinical Instructor Jeanne Marie Peacock, William Ropdolfo; Adjunct Clinical Lab Instructor Susanne Yenoli; Professor Emeritus Samuel B. Feitelberg

Physician Assistant Studies
Assistant Professors Christopher Boiallis; Clinical Associate Professor Keith Young; Clinical Assistant Professors Laura Goshko, Terri Evrard Joyce, Ryan Mazzone, Dawn White; Adjunct Clinical Assistant Professor Mariam Asar MD, Christopher Brandy, Robert DiGiacco, Terrence Fina, Sanjeev Gupta, Gregory Healey, Nedim Hukovic, Michael Joyce, Avery Marzulla-Dulfer, Laurie Mousaw, Orrin Palmer, Pakkam Rajasekaran, Alka Srivastava, Charles Wilson; Adjunct Clinical Instructor Ryan Titus; Adjunct Clinical Professor Manasvi Jaitly; Clinical Adjunct Instructor Tonya Seymour

Physics
Dipankar Roy Chair; Professors Vladimir Privman – Robert A. Plane Chair, Daviel ben-Avraham, Lawrence Schulman, Associate Professor Maria Gracheva; Assistant Professors Dmitriy Melnikov, Michael Ramsdell, Jan Scrimgeour, Joshua Thomas; Professor Emeritus M. Lawrence Glasser;

Psychology
Robert Dowman Chair; Associate Professor Andreas Wilke; Assistant Professors Jennifer Knack, Lisa Legault; Adjunct Instructor Gary Kelly
Undergraduate Arts & Sciences Majors

B.S. in Applied Mathematics & Statistics

Program Chair: Joseph Skufca

Applied mathematics is a problem solving profession. Mathematical and statistical methods provide the tools for the analysis and solution of real-world problems which can be formulated quantitatively. While all technical fields require a solid foundation in mathematics, students of applied mathematics and statistics dig deeper, developing expertise both in mathematical methods and in the applications areas which interest them.

The B.S. in Applied Mathematics and Statistics is designed for students who wish to develop their mathematical skills and apply them to challenging problems. In addition to gaining a solid and broad education in applied mathematics and statistics, students also choose applications electives in areas of engineering, science, or business that give rise to significant applications of mathematics. The program is sufficiently flexible that students can also complete a minor or double major in another field, such as computer science, physics, or business. Students are encouraged to participate in research projects with faculty, starting as early as their freshman year. Graduates work in industry, business, research laboratories, or government agencies as applied mathematicians, statisticians, and actuaries. Some continue their education in graduate programs in applied mathematics, statistics, or applications areas.

The curriculum is designed so that students learn to:

• reason clearly, logically, and analytically;
• demonstrate a solid understanding of the core material and a deeper understanding of at least one area of mathematics;
• work effectively with standard mathematical software packages and write mathematical programs using a high-level computer language;
• apply mathematical knowledge to solve real-world, open-ended problems;
• read mathematical texts and literature and write mathematical proofs;
• communicate effectively, both orally and in writing; and
• work effectively both individually and in teams.

In addition to the major in Applied Mathematics and Statistics, the mathematics department also offers a separate major in Mathematics, with more emphasis on abstract mathematics and proof; this major may be more appropriate for students whose primary interest is in the mathematics itself or are planning graduate study in mathematics or statistics.

In addition to the general undergraduate requirements, students majoring in Applied Mathematics and Statistics must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students must complete 44 credits in the MA/STAT subject areas, including the following courses:</td>
<td>44</td>
</tr>
<tr>
<td>MA 131</td>
<td>Calculus I</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 132</td>
<td>Calculus II</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 200</td>
<td>Introduction to Mathematical Modeling &amp; Software</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 211</td>
<td>Foundations</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 231</td>
<td>Calculus III</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 232</td>
<td>Elementary Differential Equations</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 339</td>
<td>Applied Linear Algebra</td>
<td>(3)</td>
</tr>
<tr>
<td>MA 363</td>
<td>Mathematical Modeling</td>
<td>(3)</td>
</tr>
</tbody>
</table>
MA 377  Numerical Methods  (3)
MA 499  Professional Experience  (0)
STAT 383  Probability and Statistics  (3)
MA 451  Introduction to Mathematical Research  (2)
Or MA 453 & MA 431  Introduction to Mathematical Instruction, and Mathematics Course Assistance  (1), (1-3)

Three of the following:
MA 331  Fourier Series & Boundary Value Problems  (3)
MA 332  Intermediate Differential Equations  (3)
STAT 381  Probability  (3)
STAT 382  Mathematical Statistics  (3)
STAT 384  Applied Statistics II  (3)
CS 141  Introduction to Computer Science I  4
PH 131  Physics I  4
PH 132  Physics II  4
Science Elective  Any 3 credit course from the BY, CM, or PH subject area  3

Application Electives – Five courses from the following list:  15-16
BY 314  Bioinformatics  (4)
CE 420  Computational Methods of Struc  (3)
CE 438  Intro Finite Ele Math  (3)
CH 490  Elementary Transport Phenomena  (3)
CM 371  Phys Chem I  (3)
CM 372  Physical Chemistry II  (3)
EC 311  Introduction to Econometrics  (3)
EC 350  Economic Prin & Eng Econ  (3)
EC 384  Game Theory/Economic Strategy  (3)
EE 264  Introduction to Digital Design  (3)
ES 220  Statics  (3)
ES 222  Strength of Materials  (3)
ES 223  Rigid Body Dynamics  (3)
ES 250  Electrical Science  (3)
ES 260  Materials Science & Eng I  (3)
ES 330  Fluid Mechanics  (3)
ES 340  Thermodynamics  (3)
ES 400  Num & Eng Computing  (3)
ES 405  Design of Exp & Anlys of Data  (3)
ME 442  Eng Analy Using Finite Element  (3)
ME 443  Optimal Engineering  (3)
OM 331  Operations & Supply Chain Mgt  (3)
PH 221  Theoretical Mechanics I  (3)
PH 231  Fundamentals of Modern Physics  (3)
PH 323  Optics  (3)
PH 325  Thermal Physics  (3)
PH 331  Quantum Physics I  (3)
PH 380  Electromagnetic Theory I  (3)
PH 381  Electromagnetic Theory II  (3)
PH 432  Quantum Physics II  (3)
PH 451  Statistical Mechanics I  (3)

74-75

Up to 12 credit hours of advanced (300- or 400-level) coursework in Aerospace Studies or Military Science may count toward graduation requirements. Aerospace Studies or Military Science credits at the 100 and 200 levels do not count toward the required 120 hours. Other restrictions may apply; check with the department for details.

The following is a typical course sequence for the applied mathematics and statistics curriculum. Not all students will complete these courses in the outlined order.
## The Suggested Course Sequence for Applied Mathematics & Statistics Students

### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>PH 131</td>
<td>Physics I</td>
<td>4</td>
</tr>
<tr>
<td>CS 141</td>
<td>Intro to Comp Sci I</td>
<td>4</td>
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<tr>
<td>UNIV 190</td>
<td>The Clarkson Seminar</td>
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<td>FY 100</td>
<td>Freshmen Seminar</td>
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### Second Semester

<table>
<thead>
<tr>
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<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA 132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>PH 132</td>
<td>Physics II</td>
<td>4</td>
</tr>
<tr>
<td>MA 200</td>
<td>Math Modeling &amp; Software</td>
<td>3</td>
</tr>
<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Free Elective (CS 142 recommended)</td>
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**Total:** 15 Cr. Hrs.

### Third Semester

<table>
<thead>
<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA 211</td>
<td>Foundations</td>
<td>3</td>
</tr>
<tr>
<td>MA 232</td>
<td>Elem Differential Equations</td>
<td></td>
</tr>
<tr>
<td>Science Elective</td>
<td></td>
<td>3</td>
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<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
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**Total:** 15 Cr. Hrs.

### Fourth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA 231</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>MA 339</td>
<td>Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 383</td>
<td>Probability &amp; Statistics</td>
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</tr>
<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
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<td>3</td>
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</table>

**Total:** 15 Cr. Hrs.

### Fifth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA 377</td>
<td>Numerical Methods</td>
<td>3</td>
</tr>
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<td>MA/STAT Elective</td>
<td></td>
<td>3</td>
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<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
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</tbody>
</table>

**Total:** 15 Cr. Hrs.

### Sixth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA 363</td>
<td>Mathematical Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MA 451</td>
<td>Intro to Math Research</td>
<td>2</td>
</tr>
<tr>
<td>MA/STAT Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
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</table>

**Total:** 14 Cr. Hrs.

### Seventh Semester

<table>
<thead>
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<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA/STAT Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Free Electives</td>
<td></td>
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</tbody>
</table>

**Total:** 15 Cr. Hrs.

### Eighth Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA/STAT Electives</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Application Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Total:** 15 Cr. Hrs.
B.S. in Biology
Program Chair: Tom Langen

Biology is the study of life in all of its unique forms and complexity. Modern biology spans numerous research areas that explore the diversity of life at multiple levels of organization: molecules, cells, organ systems, species, ecosystems, and biosphere. The foundation of the Biology Program is a core curriculum of interactive classroom and laboratory experiences covering fundamental knowledge in biodiversity, cellular and molecular biology, genetics, microbiology, anatomy, physiology, and ecology. Biology majors typically pursue career paths in biotechnology, ecology and environmental science, or health-related professions.

The course curriculum for the Biology Major is designed to realize the following learning outcomes:

• Achieve proficiency in biology by mastering the core knowledge of the discipline and specializing in one or more subfields of the life sciences.
• Acquire scientific skills through inquiry-based laboratories and practical learning experiences that include the opportunity for directed study and thesis research guided by a professor.
• Develop the ability to think critically and solve problems though exposure to quantitative laboratory- and field-based research, primary research literature, and the history of biological science.
• Learn how to use appropriate technology, methodology and informational tools that accelerate progress in the workplace such as computer software, bioinformatics, genetic engineering, cell culture, microscopy, etc.
• Master oral and written communication skills essential for work in all fields of biology and the health professions.
• Develop social skills of interpersonal interaction including an awareness and appreciation of cultural diversity that enhances progress and enriches the pursuit of scientific endeavors.
• Gain strong appreciation of the importance of professional ethical behavior in society and the workplace.
• Obtain insight to current issues of bioethical concern ranging from preservation of global biodiversity to the improvement of human health through modern advances in biotechnology.
• Learn about career opportunities in the life sciences in preparation for seeking professional employment after graduation.

Upper-level Biology majors choose from a variety of elective courses that build upon fundamental principles and allow students to explore areas of personal interest. We encourage students to complement a program of bioscience courses drawn from research and teaching strengths of the department with relevant courses in other basic sciences, mathematics, engineering, business, and humanities. Students may also take advantage of courses offered through the Associated Colleges Program or the Clarkson Trudeau Biomedical Scholars Program (see below) to broaden their educational experience. The large array of choices in biological sciences can be used to tailor a customized career plan leading to graduate school or a professional degree program. Students interested in a more specialized background may consider interdisciplinary studies in chemistry, biomolecular engineering, mathematics, physics, psychology, environmental engineering, environmental science and policy, and environmental and occupational health.

Specific course requirements of the Biology Major are listed below, along with a suggested schedule. Students are guided throughout the year with personal advising and mentoring by Biology faculty members. Undergraduate participation in basic or applied research is highly encouraged and available through work in faculty laboratories, the senior thesis, summer research programs, and internships.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 140</td>
<td>Biology I: Inheritance, Evolution &amp; Diversity</td>
<td>3</td>
</tr>
<tr>
<td>BY 142</td>
<td>Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BY 160</td>
<td>Biology II: Cell and Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BY 162</td>
<td>Biology II Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BY 214</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BY 401</td>
<td>Professional Assessment</td>
<td>0</td>
</tr>
<tr>
<td>CM 103 &amp; CM 105</td>
<td>Structure and Bonding &amp; Chemistry Lab I</td>
<td>3, 2</td>
</tr>
<tr>
<td>(Or CM 131)</td>
<td>General Chemistry I</td>
<td>(4)</td>
</tr>
<tr>
<td>CM 104 &amp; CM 106</td>
<td>Equilibrium and Dynamics &amp; Chemistry Lab II</td>
<td>3, 2</td>
</tr>
<tr>
<td>(or CM 132)</td>
<td>General Chemistry II</td>
<td>(4)</td>
</tr>
<tr>
<td>CM 241</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CM 242</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CM 244</td>
<td>Organic Chemistry Lab</td>
<td>3</td>
</tr>
<tr>
<td>PH 141 (or PH 131)</td>
<td>Physics for Life Sciences I (or Physics I)</td>
<td>4</td>
</tr>
<tr>
<td>PH 142 (or PH 132)</td>
<td>Physics for Life Sciences II (or Physics II)</td>
<td>4</td>
</tr>
</tbody>
</table>

Each of the following elective categories must be satisfied:

- **Biology Electives**: 21-23 credits
- **Lab Electives**: 4-6 credits
- **Math and Computer Science Electives**: 9 credits
- **Professional Experience**: 1-3 credits

**Elective categories:**

**Biology Electives**
- Any course under the “BY” subject area

**Lab Elective**
- Students must take two BY lab courses (200-level or higher), excluding BY 405 and BY 410

**Math and Computer Science Elective**
- Three math or computer science courses (100-level or higher), including 1 calculus course and 1 statistics course

**Professional Experience**
- One of the following courses: BY 405, BY 410, BY 495, BY 498, BY 499

The following is a typical course sequence for the biology curriculum. Not all students will complete these courses in the outlined order.

### The Suggested Course Sequence for Biology Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>1st Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 140</td>
<td>Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BY 142</td>
<td>Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CM 103</td>
<td>Structure and Bonding</td>
<td>3</td>
</tr>
<tr>
<td>CM 105</td>
<td>Chemistry Lab I</td>
<td>2</td>
</tr>
<tr>
<td>MA 180</td>
<td>Intro to College Math</td>
<td>4</td>
</tr>
<tr>
<td>UNIVERS</td>
<td>The Clarkson Seminar</td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>2nd Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 160</td>
<td>Biology II</td>
<td>3</td>
</tr>
<tr>
<td>BY 162</td>
<td>Biology II Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CM 104</td>
<td>Equilibrium &amp; Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CM 106</td>
<td>Chemistry Lab II</td>
<td>2</td>
</tr>
<tr>
<td>MA 181</td>
<td>Basic Calculus</td>
<td>3</td>
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<tr>
<td>Knowledge Area Elective</td>
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### FY 100 Freshmen Seminar

<table>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>CM 241</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>PH 141</td>
<td>Physics for Life Science I</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY Lab Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Area Elective</td>
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#### Third Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CM 241</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<tr>
<td>PH 141</td>
<td>Physics for Life Science I</td>
<td>4</td>
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<tr>
<td>BY Lab Elective</td>
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<tr>
<td>Knowledge Area Elective</td>
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#### Fourth Semester

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CM 241</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<tr>
<td>CM 242</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>PH 142</td>
<td>Physics for Life Science II</td>
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<tr>
<td>Statistics elective</td>
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<table>
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<th>Course</th>
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</thead>
<tbody>
<tr>
<td>CM 244</td>
<td>Organic Chemistry Lab II</td>
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<tr>
<th>Course</th>
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<tr>
<td>BY Lab Elective</td>
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#### Fifth Semester

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>Biology Electives</td>
<td></td>
<td>6</td>
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<tr>
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<tr>
<td>Math or Computer Science Elective</td>
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<td>Free Elective</td>
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#### Sixth Semester

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<tr>
<td>Knowledge Area Elective</td>
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<tr>
<td>Free Elective</td>
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#### Seventh Semester

<table>
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<tr>
<td>Knowledge Area Elective</td>
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<td>Free Elective</td>
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<tr>
<td>Professional Experience Elective</td>
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#### Eighth Semester

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<th>Title</th>
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<tr>
<td>Biology Electives</td>
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<tr>
<td>Knowledge Area Elective</td>
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</table>

### Health-Related Biology Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>BY 310</td>
<td>Developmental Biology (3 cr.)</td>
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</tr>
<tr>
<td>BY 350</td>
<td>Comparative Vertebrate Anatomy (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 352</td>
<td>Comparative Vertebrate Anatomy Lab (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 358</td>
<td>Animal Learning &amp; Cognition (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 360</td>
<td>Comparative Physiology (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 362</td>
<td>Comparative Physiology Lab (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 416</td>
<td>Principles of Toxicology and Epidemiology (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 452</td>
<td>Pharmacology (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 454</td>
<td>Physiological Psychology (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 455</td>
<td>Cell and Molecular Biology of Cancer (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 458</td>
<td>Cognitive Neuroscience (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 460</td>
<td>Neurobiology (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 471</td>
<td>Anatomy &amp; Physiology I (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 472</td>
<td>Anatomy &amp; Physiology II (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 473</td>
<td>Anatomy &amp; Physiology I Lab (2 cr.)</td>
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</tr>
<tr>
<td>BY 474</td>
<td>Anatomy &amp; Physiology II Lab (2 cr.)</td>
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</tr>
<tr>
<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<tr>
<td>BY 480</td>
<td>Advanced Cell Biology (3 cr.)</td>
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<tr>
<td>BY 482</td>
<td>Bioinformatics (4 cr.)</td>
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</tr>
<tr>
<td>BY 490</td>
<td>Molecular Biology Laboratory (4 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 495</td>
<td>Bioinformatics (4 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 499</td>
<td>Bioinformatics (4 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 500</td>
<td>Recent Advances in Biological Research (1 cr.)</td>
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</tr>
<tr>
<td>BY 400</td>
<td>Directed Study in Bioscience (1-4 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 471</td>
<td>Anatomy &amp; Physiology I (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 472</td>
<td>Anatomy &amp; Physiology II (3 cr.)</td>
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<tr>
<td>BY 473</td>
<td>Anatomy &amp; Physiology I Lab (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 474</td>
<td>Anatomy &amp; Physiology II Lab (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 480</td>
<td>Advanced Cell Biology (3 cr.)</td>
<td></td>
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<tr>
<td>BY 482</td>
<td>Bioinformatics (4 cr.)</td>
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<td>BY 490</td>
<td>Molecular Biology Laboratory (4 cr.)</td>
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<td>BY 495</td>
<td>Bioinformatics (4 cr.)</td>
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<td>BY 500</td>
<td>Recent Advances in Biological Research (1 cr.)</td>
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<td>BY 400</td>
<td>Directed Study in Bioscience (1-4 cr.)</td>
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<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<tr>
<td>BY 471</td>
<td>Anatomy &amp; Physiology I (3 cr.)</td>
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<tr>
<td>BY 472</td>
<td>Anatomy &amp; Physiology II (3 cr.)</td>
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<td>BY 473</td>
<td>Anatomy &amp; Physiology I Lab (2 cr.)</td>
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<td>Anatomy &amp; Physiology II Lab (2 cr.)</td>
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<tr>
<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<tr>
<td>BY 480</td>
<td>Advanced Cell Biology (3 cr.)</td>
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### Molecular Biology-Related Biology Electives

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<thead>
<tr>
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<tbody>
<tr>
<td>BY 352</td>
<td>Comparative Vertebrate Anatomy Lab (2 cr.)</td>
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<tr>
<td>BY 358</td>
<td>Animal Learning &amp; Cognition (3 cr.)</td>
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<tr>
<td>BY 360</td>
<td>Comparative Physiology (3 cr.)</td>
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<tr>
<td>BY 362</td>
<td>Comparative Physiology Lab (2 cr.)</td>
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<tr>
<td>BY 416</td>
<td>Principles of Toxicology and Epidemiology (3 cr.)</td>
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</tr>
<tr>
<td>BY 452</td>
<td>Pharmacology (3 cr.)</td>
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<tr>
<td>BY 454</td>
<td>Physiological Psychology (3 cr.)</td>
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<tr>
<td>BY 455</td>
<td>Cell and Molecular Biology of Cancer (3 cr.)</td>
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<tr>
<td>BY 458</td>
<td>Cognitive Neuroscience (3 cr.)</td>
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<tr>
<td>BY 460</td>
<td>Neurobiology (3 cr.)</td>
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<tr>
<td>BY 471</td>
<td>Anatomy &amp; Physiology I (3 cr.)</td>
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<td>BY 472</td>
<td>Anatomy &amp; Physiology II (3 cr.)</td>
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<td>BY 473</td>
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<td>BY 474</td>
<td>Anatomy &amp; Physiology II Lab (2 cr.)</td>
<td></td>
</tr>
<tr>
<td>BY 476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<tr>
<td>BY 480</td>
<td>Advanced Cell Biology (3 cr.)</td>
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### General Biology Electives

<table>
<thead>
<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>BY 313</td>
<td>Biogeochemical Earth Systems Science (3 cr.)</td>
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</tr>
<tr>
<td>BY 328</td>
<td>Conservation Biology (3 cr.)</td>
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</table>

### Environment-Related Biology Electives
The Clarkson Trudeau Biomedical Scholars Program

The Clarkson Trudeau Biomedical Scholars Program is an intensive semester-long living and learning experience (the “Trudeau Semester”) and a separate summer research program that both take place off campus at the renowned Trudeau Institute in Saranac Lake, New York.

The 15-credit program Trudeau Semester is an undergraduate program designed to provide a select group of undergraduate students the opportunity to learn multidisciplinary aspect of bioscience related to the human health field. The program is specifically designed for students from the majors of Biology, Biomolecular Science, Chemistry, and Chemical and Biomolecular Engineering, and also serves as a professional experience. The Trudeau Semester is taught by Clarkson and Trudeau Institute faculty who are respective experts in their field. The academic program provides a range of disciplines that by design will each contribute to a related topic that is the focus of a semester-long, integrative project that aims to demonstrate how technology serves humanity, a core Clarkson value.

Students study and conduct a research project at the Trudeau Institute located approximately one mile from their townhouse residences in Saranac Lake. At the Trudeau Institute there is dedicated laboratory space for instruction and study offices, as well as an office for a faculty member. Each course is 3 weeks in duration, with the exception of the Term Integrated Research Project, which the students are involved with the entire semester. Students present their research findings at the Symposium for Undergraduate Research Experiences conference that takes each semester on the Clarkson University Campus, in addition to a public presentation.

For additional information see the Trudeau Semester web site at http://www.clarkson.edu/trudeauscholar/
B.S. in Biomolecular Science
Program Director: Phillip Christiansen

Science has undergone a remarkable transformation over the last few years, and nowhere has the impact been so dramatic as at the interface between biology and chemistry — the bio-molecular sciences. Recent developments in biotechnology, biofuels, pharmaceuticals, genetic engineering and medicine have been truly astounding and will only continue throughout the 21st century. Few sciences will have the impact on our lives as this one, and few offer the opportunities for individuals to make such a vast variety of contributions. Clarkson University's program in Biomolecular Science is designed to:

• Provide students with the knowledge base to meet the challenges of professional careers spanning the full range of the chemical and biosciences.
• Provide an intellectually stimulating environment, including exposure to open-ended problems of the type encountered in industry, graduate school and professional programs in the health sciences.
• Provide an environment that ensures students the opportunities to develop communication skills and professional relationships.

This is a truly interdisciplinary program, building on strong foundations in both chemistry and biology, and finishing with capstone courses and labs in biochemistry, molecular biology and biotechnology. Professional and free electives allow students to build specializations and to participate in faculty-directed research, a “trademark” of science education at Clarkson.

Careers span the full range of the chemical and biological sciences, with exceptional opportunities in the pharmaceutical and medical industries, in biotechnology and genetic engineering, biofuels, forensics and the health sciences. The program at Clarkson is also excellent preparation for entrance into professional schools in medicine and dentistry, or for the Doctor of Physical Therapy or Physician Assistant programs at Clarkson.
REQUIREMENTS

**Biology (24 credits)**
BY140 Life’s Diversity
BY160/162 Cell and Molecular Biology with Lab
BY214 Genetics
BY412 Molecular Biology
BY450/451 Biochemistry I and II
BY470 Biotechnology Lab

**Chemistry (31 credits)**
CM103/105 Structure and Bonding with Lab
CM104/106 Equilibrium and Dynamics with Lab
CM221/223 Spectroscopy with Lab
CM241/242 Organic Chemistry I and II

CM244 Organic Chemistry Lab
CM371/372 Physical Chemistry I and II

**Professional Electives and Prof. Experience (12 credits)**

**Physics and Math (17 credits)**
PH131/132 Physics I and II
MA131/132 Calculus I and II

Statistics

**Clarkson and First-Year Seminars (4 credits)**

Knowledge Areas (including a University Course) in addition to BY214 (12 credits)

**Free Electives (15 credits)**

Total — 120 credits

---

**Biomolecular Science Sample Curriculum**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
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<td>MA131</td>
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<td>UNIV190</td>
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<td>FY100</td>
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15
## SOPHOMORE YEAR

<table>
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<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
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<tr>
<td>CM221</td>
<td>Spectroscopy</td>
</tr>
<tr>
<td>CM223</td>
<td>Spectroscopy Lab</td>
</tr>
<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
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<tr>
<td>PH131</td>
<td>Physics I</td>
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## JUNIOR YEAR

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<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
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<tr>
<td>CM371</td>
<td>Physical Chemistry I</td>
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<tr>
<td>BY450</td>
<td>Biochemistry I</td>
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<tr>
<td>Statistics</td>
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<td>Professional Elective</td>
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<td>Free Elective</td>
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## SENIOR YEAR

<table>
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<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
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<tr>
<td>BY412</td>
<td>Molecular Biology Lab</td>
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<td>Free Elective</td>
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<td></td>
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B.S. in Chemistry
Program Chair: Devon Shipp
Chemistry is the most central of sciences. It deals with the properties, composition and structure of matter, with the changes that occur in matter and with energy relationships involved in those changes. Chemistry has been at the forefront of virtually all recent advances in materials, medicine and renewable fuels. The chemistry program at Clarkson has been designed to:

- Provide students with a core knowledge base to meet the challenges of professional careers spanning the full range of the chemical sciences.
- Ensure that students have the opportunity to develop strong professional communication skills.
- Provide a stimulating intellectual environment with exposure to open-ended problems likely to be encountered in industry, graduate schools and professional programs.

It is a rigorous degree program and students completing the requirements may be certified by the American Chemical Society if so desired. At the same time, it has the flexibility to allow students to develop the specialties that best meet their career goals. The small laboratory learning environment provides strong interaction between students and with instructors and the laboratory, as well as research experiences provide students ample opportunities to develop communication skills through small group presentations and reports. The chemistry faculty are internationally known for the quality of their research and undergraduates are encouraged to become involved in research with the faculty and graduate students as early as their freshman year.

A pre-health sciences program is available for students interested in medical school or a health-care related field. Clarkson also offers a pre-physical therapy undergraduate concentration which prepares students for the entry level Doctor of Physical Therapy degree program, as well as pre-physician assistant undergraduate program leading to the Masters of Physician Assistant Studies degree program.

REQUIREMENTS

**Chemistry (45 credits)**
CM103/105 Structure and Bonding with Lab
CM104/106 Equilibrium and Dynamics with Lab
CM121 Freshman Seminar
CM221/223 Spectroscopy with Lab
CM241/242 Organic Chemistry I and II
CM244 Organic Chemistry Lab
CM300 Instrumental Lab
CM312 Inorganic Chemistry
CM320 Separations and Electrochemistry
CM345 Advanced Lab
CM371/372 Physical Chemistry I and II

**Biology Elective (3 credits)**

**Physics and Math (20 credits)**
PH131/132 Physics I and II
MA131/132 Calculus I and II
MA232 Differential Equations

**Statistics**
Clarkson and First-Year Seminar,
Knowledge Areas, University
Course and Professional Experience (22 credits)

**Free Electives (29 credits)**

**Total — 120 credits**
# Chemistry Sample Curriculum

## FIRST YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td>Structure and Bonding(^1)</td>
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<td>CM104</td>
<td>Equilibrium and Dynamics(^1)</td>
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<td>CM105</td>
<td>Chemistry Lab I(^1)</td>
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<td>MA132</td>
<td>Calculus II</td>
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<td>MA131</td>
<td>Calculus I</td>
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<td>PH132</td>
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<td>PH131</td>
<td>Physics I</td>
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<td>First-Year Seminar</td>
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<td>KA Elective</td>
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<td>Clarkson Seminar</td>
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**Total: 16 Cr. Hrs.**

## SOPHOMORE YEAR

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<th>Cr. Hrs.</th>
<th>Course</th>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>CM221</td>
<td>Spectroscopy</td>
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<td>CM242</td>
<td>Organic Chemistry II</td>
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<td>CM223</td>
<td>Spectroscopy Lab</td>
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<td>CM244</td>
<td>Organic Chemistry Lab</td>
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<td>CM241</td>
<td>Organic Chemistry I</td>
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<td>MA232</td>
<td>Differential Equations</td>
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**Total: 15 Cr. Hrs.**

## JUNIOR YEAR

<table>
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<td>Instrumental Laboratory</td>
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<td>CM371</td>
<td>Physical Chemistry I</td>
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<td>CM312</td>
<td>Survey of Inorganic Chemistry</td>
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<tr>
<td>CM320</td>
<td>Separations and Electrochemistry</td>
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<td>CM372</td>
<td>Physical Chemistry II</td>
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<td>Free Elective</td>
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**Total: 16 Cr. Hrs.**
## SENIOR YEAR

### (Standard Option)

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<td>KA/UC Elective</td>
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<tr>
<td>Free Electives</td>
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### (Thesis Option)

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<td>Free Electives</td>
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</table>

1 With the permission of the department chair, CM131-132 may be accepted in lieu of CM103-106 for a student who wishes to transfer into the Department of Chemistry after having completed the first year in another department.

2 Those students wishing to satisfy the requirements for an American Chemical Society-accredited B.S. degree will need at least six credit hours in advanced chemistry electives, including biochem I. Thesis can count for only three such credits. Those students electing the standard option need at least one credit hour of an elective chemistry laboratory course.
B.S. in Communication
Program Chair: Bill Karis

Program Goals
Clarkson’s Communication degree integrates communication, design and technology. Students develop a repertoire of communication skills and a solid understanding of communication theory and practice. Together these prepare students to pursue professional careers or graduate programs in this dynamic field.

Starting with a set of five required courses, students develop abilities which are the foundation of any successful 21st century career in communication: writing, speaking, graphic design, media design, teamwork and communication theory. Students then enhance and deepen these abilities through seven additional communication courses, which can be focused in areas like new media or technical communication. Students may select specific courses or, in conjunction with Communication & Media faculty, design independent study projects to further personal and professional interests.

Our faculty takes advantage of Clarkson’s technological environment to provide instruction in writing, speaking, graphic design, digital video, digital audio, web design, information design, usability testing, public relations, environmental communication, and media literacy. Students work with C&M faculty in experiential learning projects, ongoing research activities, and regular classes to learn, design and experiment with the latest communication practices.

- **Outcome 1:** Students will develop informative and persuasive communication skills.
- **Outcome 2:** Students will develop competencies in a range of communication technologies.
- **Outcome 3:** Students will develop an ability to work effectively and ethically in the professional workplace.
- **Outcome 4:** Students will develop the ability to critically analyze language and media use in society and the workplace.

Program Requirements
Communication majors take five required COMM courses: COMM 210 Rhetoric for Business, Science and Engineering, COMM 341 Introduction to Web Design, a COMM 300 level professional communication course and a COMM 400 level communication theory course chosen from lists maintained by the Communication & Media Department, COMM 490 Communication Internship, and seven other elective COMM courses, such as COMM 217 Public Speaking, COMM 100 2D Digital Design, COMM 310 Mass Media & Society, COMM 327 Digital Video 1, COMM 322 Typography & Design, and COMM 360 Audio Production.

In addition, the general requirements for the B.S. in Communication ensure that students have substantial exposure to mathematics, science, technology, computing, and liberal arts. Communication majors are also required to obtain 15 credit hours in an external field (e.g., biology, computer science, digital arts, history, business, information technology, psychology) which often provides them with a secondary field for further personal or professional development.

Students can use the remaining credits required for graduation to pursue individual interests or career goals. COMM 490 (Internship) serves as a bridge to industry or to advanced study in the field. Students may choose to complete their internship by doing professional communication work for offices on campus or for off-campus businesses and organizations.

Students may earn a double major by fulfilling the requirements for the B.S. in Communication and
another discipline at Clarkson, often without overload coursework. Students pursuing other majors may acquire a minor in Communication.

Social Documentation

Social Documentation is a double major integrating a Communication major with a social science, humanities, or liberal studies major. It emphasizes critical inquiries into societal issues along with the study of recording and documenting theories, techniques and technologies. A substantive knowledge base in a social science or humanities discipline enables students to ground their Communication degree in an area of interest that will also give them a distinctive perspective. Likewise, the critical thinking, persuasive, and media production skills learned from the Communication program will empower the social science or humanities major to more effectively create products that can influence, entertain or educate. For more information, see the Social Documentation Curriculum.

DEGREE REQUIREMENTS: Along with meeting the requirements of the Clarkson Common Experience, Communication majors must fulfill the following requirements:

**GENERAL REQS: 26 hrs.**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>Mathematics Courses (include. Stat 282)</td>
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<tr>
<td>Science Courses (include. lab course)</td>
<td>7</td>
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<tr>
<td>Computer Courses</td>
<td>6</td>
</tr>
<tr>
<td>Add'l Math, Science, or Computer Course</td>
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<tr>
<td>FY100, First-Year Seminar</td>
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**COMMUNICATION REQS: 36 hrs.**

<table>
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<tbody>
<tr>
<td>COMM210 Theory of Rhetoric for Business, Science and Engineering</td>
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<tr>
<td>COMM3xx From C&amp;M List</td>
<td>3</td>
</tr>
<tr>
<td>COMM341 Intro. to Web Design</td>
<td>3</td>
</tr>
<tr>
<td>COMM4xx From C&amp;M List</td>
<td>3</td>
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<tr>
<td>COMM490 Communication Internship</td>
<td>3</td>
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<tr>
<td>Plus 7 Communication Courses</td>
<td>21</td>
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</table>

**EXTERNAL FIELD: 15 hours**

Five courses to be chosen in consultation with advisor in a subject area outside the Communication major, such as the following:

- Biology
- Business
- Chemistry
- Computer Science
- Digital Arts & Sciences
- Engineering

**FREE ELECTIVES: 43 Hours**

Students choose the remaining hours to fulfill remaining Knowledge Areas, to take additional Communication courses, or additional liberal arts, engineering, business, or science courses; to pursue another external field; to transfer credit from junior and community colleges; to double major; or to design
individual areas of study.

The Communication program is designed to be flexible. In most cases, students work closely with faculty to arrange an appropriate sequence of courses. The following eight-semester plan is typical only in that it indicates students should take the general requirements before pursuing the external field requirement. Since all courses are not offered each semester, and since some courses in the external field may have prerequisites, students should seek guidance from the Communication and Media Department in planning their academic programs.

**Communication Sample Curriculum**

### FIRST YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
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</tr>
<tr>
<td>COMM210</td>
<td>Theory of Rhetoric</td>
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<td>COMM310</td>
<td>Mass Media &amp; Society</td>
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<td>Intro to College Math</td>
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### SOPHOMORE YEAR

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<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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</tr>
<tr>
<td>COMM31</td>
<td>Intro to Web Design</td>
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<tr>
<td>COMM Elective</td>
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</tr>
<tr>
<td>External Field</td>
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</tr>
<tr>
<td>Computer Course (TECH)</td>
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<tr>
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15 15

| Total       | 17     |

| Total       | 15     |
## JUNIOR YEAR

### First Semester

<table>
<thead>
<tr>
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<tbody>
<tr>
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<tr>
<td>MA/SC/Computing Elective</td>
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<tr>
<td>Elective</td>
<td></td>
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<tr>
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<tr>
<td>Elective</td>
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### Second Semester

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<tr>
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<td>External Field</td>
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<tr>
<td>Computer Elective</td>
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| Total                   |                                   | 15       |

## SENIOR YEAR

### First Semester

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<td>From C&amp;M List</td>
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<tr>
<td>COMM490</td>
<td>Internship</td>
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| Total |                               | 15       |

### Second Semester

<table>
<thead>
<tr>
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<td>External Field</td>
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| Total                   |                                   | 15       |

## Topical Listing of Communication Courses

Not all courses are offered each year or each semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>COMM210</td>
<td>Theory of Rhetoric for Business, Science and Engineering</td>
<td>COMM417</td>
<td>Business and Professional Speaking</td>
</tr>
<tr>
<td>COMM214</td>
<td>Computer Applications and Concepts</td>
<td>COMM420-425</td>
<td>Independent Study</td>
</tr>
<tr>
<td>COMM217</td>
<td>Introduction to Public Speaking</td>
<td>COMM427</td>
<td>Digital Video Production II</td>
</tr>
<tr>
<td>COMM221</td>
<td>2D Digital Design</td>
<td>COMM428</td>
<td>Public Debate and the Environment</td>
</tr>
<tr>
<td>COMM226</td>
<td>Short Film Screenwriting</td>
<td>COMM440</td>
<td>PHP/MySQL Interactive Design</td>
</tr>
<tr>
<td>COMM310</td>
<td>Mass Media and Society</td>
<td>COMM441</td>
<td>JavaScript Interactive Design</td>
</tr>
<tr>
<td>COMM312</td>
<td>Public Relations</td>
<td>COMM442</td>
<td>Advanced World Wide Web Interface Design</td>
</tr>
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</table>
B.S. in Computer Science
Program Chair: Christopher A. Lynch

Computer technology plays a critical role in virtually every business and institution. It is an essential tool in every branch of science and engineering. Many forms of art and entertainment are centered on computer technology. Computer scientists are professionals who understand the technology and have the skills to develop and apply it.

Many computer scientists work as software developers who design, implement, test and maintain computer software. They can also work as information technology specialists who deploy and manage information technology, including computer systems, computer networks, database systems and Web technology. Some are researchers who invent new technology or study its theoretical foundations.

The Computer Science major is organized into four options. The General option is the most flexible. It allows students to tailor their program of study to a wide variety of professional and personal goals. The other three options prepare students for the specific career paths mentioned above: Software Design and Development, Information Technology and Research. The requirements of the General option are shown below. The other options are described in detail in the CS student handbook, which is available on the web pages of Computer Science Department. The first five semesters of the sample schedule shown below are common to all options of the CS major. In addition to the requirements specific to the CS major, students must also satisfy the requirements of the Clarkson Common Experience. See the CS student handbook for guidance.
The Computer Science major is designed so that by the time they graduate, students should be able to:

- demonstrate a solid understanding of the core concepts of computer science and some advanced topics in computer science;
- reason clearly and analytically about software and computing systems;
- work effectively with a variety of programming languages, software tools and computing environments;
- solve substantial real-world problems;
- communicate effectively orally and in writing;
- work effectively in teams; and
- use computer science literature and other similar resources for independent study or to research the solution to a computing problem.

In addition to the general undergraduate requirements, students majoring in Computer Science must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 141*</td>
<td>Intro to Computer Science I</td>
<td>4</td>
</tr>
<tr>
<td>CS 142*</td>
<td>Intro to Computer Science II</td>
<td>3</td>
</tr>
<tr>
<td>CS 241*</td>
<td>Computer Organization</td>
<td>3</td>
</tr>
<tr>
<td>CS 242*</td>
<td>Adv Programming Concepts in Java</td>
<td>3</td>
</tr>
<tr>
<td>CS 341</td>
<td>Programming Languages</td>
<td>3</td>
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<tr>
<td>CS 344</td>
<td>Algorithms and Data Structures</td>
<td>3</td>
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<tr>
<td>CS/MA 345</td>
<td>Automata Theory and Formal Languages</td>
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</tr>
<tr>
<td>CS 350</td>
<td>Software Design &amp; Development</td>
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</tr>
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<td>CS 444</td>
<td>Operating Systems</td>
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<tr>
<td>CS 499</td>
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<tr>
<td>MA 131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MA 132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MA 211</td>
<td>Foundations</td>
<td>3</td>
</tr>
<tr>
<td>MA 339</td>
<td>Applied Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>Or MA 239</td>
<td>Elementary Linear Algebra</td>
<td>3</td>
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<tr>
<td>STAT 383</td>
<td>Probability and Statistics</td>
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<tr>
<td>Or MA/STAT 381</td>
<td>Probability</td>
<td></td>
</tr>
<tr>
<td>Science Electives</td>
<td>One 2-course lecture/lab sequence in CM or PH, plus 4 additional credits in CM, PH, or BY</td>
<td>12</td>
</tr>
</tbody>
</table>

| CS Electives I (3 courses) | Any 3-credit CS 400-level course (excluding CS 407, 408, 411, 412, 497, & 498) | 9       |
| CS Electives II (2 courses) | Any 3-credit CS 400-level course, EE 368, EE 466, IS 314, COMM 440, COMM 442, or COMM 444. | 6       |

= Or equivalent

- Up to 12 credit hours of advanced (300- or 400-level) coursework in Aerospace Studies or Military Science may count toward graduation requirements. Aerospace Studies or Military Science credits at the 100 and 200 levels do not count toward the required 120 hours. Other restrictions may apply; check with the department for details.

The following is a typical course sequence for the computer science curriculum. Not all students will complete these courses in the outlined order.
### The Suggested Course Sequence for Computer Science Students

#### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>CS 141</td>
<td>Intro to Comp Sci I</td>
<td>4</td>
</tr>
<tr>
<td>MA 131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>Science Sequence Course I</td>
<td></td>
<td>4</td>
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<tr>
<td>UNIV 190</td>
<td>The Clarkson Seminar</td>
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<tr>
<td>FY 100</td>
<td>Freshmen Seminar</td>
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#### Second Semester

<table>
<thead>
<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>CS 142</td>
<td>Intro to Comp Sci II</td>
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<tr>
<td>MA 132</td>
<td>Calculus II</td>
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<tr>
<td>Science Sequence Course II</td>
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<tr>
<td>Free Elective</td>
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<td><strong>Total</strong></td>
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#### Third Semester

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</thead>
<tbody>
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<td>CS 242</td>
<td>Advanced Programming Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MA 211</td>
<td>Foundations</td>
<td>3</td>
</tr>
<tr>
<td>Science Elective</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Knowledge Area Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
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#### Fourth Semester

<table>
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<tbody>
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<td>CS 241</td>
<td>Computer Organization</td>
<td>3</td>
</tr>
<tr>
<td>CS 344</td>
<td>Algorithms and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>MA 339</td>
<td>Applied Linear Algebra</td>
<td>3</td>
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<tr>
<td>Knowledge Area Elective</td>
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<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
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#### Fifth Semester

<table>
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</thead>
<tbody>
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<td>CS 341</td>
<td>Programming Languages</td>
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</tr>
<tr>
<td>CS 345</td>
<td>Automata Theory</td>
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</tr>
<tr>
<td>CS 350</td>
<td>Software Des &amp; Dev</td>
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</tr>
<tr>
<td>Knowledge Area Elective</td>
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#### Sixth Semester

<table>
<thead>
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<th>Course</th>
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#### Seventh Semester

<table>
<thead>
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<tbody>
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#### Eighth Semester

<table>
<thead>
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<th>Course</th>
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<tbody>
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<tr>
<td>Free Electives</td>
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<tr>
<td><strong>Total</strong></td>
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B.S. in Digital Arts & Sciences
Co-Program Chairs: Bill Karis and Christopher A. Lynch

Digital Arts & Sciences (DA&S) is a multidisciplinary B.S. degree spanning the boundaries between the sciences and the arts. DA&S students benefit from an education in both the artistic and scientific aspects of digital media. The program prepares students for career opportunities in a wide range of fields — such as working with film and video gaming companies, mobile and web application design and development, computational science research (scientific visualization and simulation), interactive display systems and immersive experience design.

Students take advantage of programs in digital art, math, computer science and communication & media. The program’s objective is to combine artistic and scientific skills and interests to develop creative talent with a strong technical foundation.

The curriculum for the Digital Arts & Sciences Major is designed to achieve the following outcomes:

• Develop a strong interdisciplinary foundation in the digital arts, mathematics, and computer science fields
• Specialize in one or more areas of advanced study in the program
• Acquire artistic and scientific skills through project-based assignments that include the opportunity for directed study and thesis projects guided by a professor
• Experience working in a collaborative, team-based atmosphere for large-scale projects that are designed to emulate real-world situations and problems
• Learn how to utilize technological, traditional and experimental methods of creative and analytical problem-solving
• Master oral, visual, and written communication skills essential for work in all fields of the arts and sciences
• Learn about career opportunities in the arts and sciences in preparation for seeking professional employment or advanced academic study after graduation
• Create a portfolio of artistic and scientific research which demonstrates the knowledge gained as a student in the program

DA&S students benefit from small classes and personal attention. The DA&S major is strengthened by Clarkson's technology-rich environment. Students have access to state-of-the-art facilities and experiences such as:

• Eastman Kodak Center for Excellence in Communication
• Usability Testing Laboratory
• Virtual Reality Discovery Laboratory
• Clarkson Open Source Institute
• Digital Art Software and Programs
• Digital Arts Visualization Lab
• Digital Arts Experimental Studio
• Industry Standard Art & Design Software
• Digital Video and Audio Equipment
• 2D and 3D Printing Technology
• Audio Production Studio
• Motion Capture Equipment
• Field Trips to International Digital Arts Festivals, Conferences and Companies

Digital Art Portfolio Development
DA&S students develop their research and creative abilities through an extensive portfolio development
process spanning multiple semesters. The culminating project, a digital art portfolio, requires each DA&S student to demonstrate his or her creative ability and technical prowess in a variety of media choices, using a wide range of digital tools. The portfolio will tangibly demonstrate a student’s skills and potential, and will prove to be a key first-step in leading to job opportunities and/or entry to graduate school.

**REQUIREMENTS (see below for details)**

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<th>Areas of Study</th>
<th>Credit Hours</th>
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<tr>
<td>Digital Arts DA</td>
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<tr>
<td>Mathematics and Computer Science (MA, STAT, and CS)</td>
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**Digital Arts & Sciences Sample Curriculum**

**FIRST YEAR**

<table>
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<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>DA110</td>
<td>Drawing</td>
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<td>DA100</td>
<td>Intro to Digital Art</td>
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<td>MA131</td>
<td>Calculus I</td>
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<td>MA132</td>
<td>Calculus II</td>
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<td>DA120</td>
<td>Elements of Design</td>
<td>3</td>
<td>DA140</td>
<td>Intro to Digital Art: Form &amp; Code</td>
<td>3</td>
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<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
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<td>DA/COMM</td>
<td>/MA/CS Elective</td>
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<td>FY100</td>
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**SECOND SEMESTER**

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### SOPHOMORE YEAR

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<tbody>
<tr>
<td><strong>Course</strong></td>
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<tr>
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<tr>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>MA377</td>
<td>Numerical Methods</td>
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<td>3</td>
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<td>DA491</td>
<td>Professional Practice</td>
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<tr>
<td>DA/COMM/MA /CS Physics I</td>
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</tr>
<tr>
<td>DA/COMM /MA/CS Elective</td>
<td>3</td>
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<td></td>
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<tr>
<td>First Semester</td>
<td>Second Semester</td>
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</tr>
<tr>
<td><strong>Course</strong></td>
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<td>Elective</td>
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</table>

120 hours that satisfy the requirements of the Clarkson Common Experience and that include the following:

**Digital Arts and Communication & Media (DA and COMM) courses as follows:**
- DA100 Introduction to Digital Art: Time & Image
- DA110 Drawing
- DA120 Elements of Design or COMM221 2D Digital Design
- DA140 Introductory to Digital Art: Form & Code
- DA__ DA Elective
- DA2__ DA 200 level Elective
- DA3__ DA 300 level Elective
- DA491 Professional Practice
- DA492 Senior Studies

**Mathematics and Computer Science (MA, STAT, and CS) courses as follows:**
- CS141 Introduction to Computer Science I
- CS142 Introduction to Computer Science II
- CS452 or EE465 Computer Graphics
- MA131 Calculus I
- MA132 Calculus II
- MA230 3-D Space & Projection Geometry, or MA231 Calculus III
- MA 339 Applied Linear Algebra
- MA 377 Numerical Methods

**Major Electives**
- COMM/DA/MA/CS Elective
- COMM/DA/MA/CS Elective

**Science Requirements**
- PH131 Physics I or PH141 Physics for Life Sciences I
- Three credits from physics, chemistry, biology, or Science Foundation courses

**Clarkson Common Experience Requirements**
- UNIV 190 Clarkson Seminar
- Five Knowledge Area (KA) courses; must collect four different KA’s from the six available KA’s (one course must be a UNIV course (covers two KA’s).
  - Contemporary & Global Issues (CGI)
  - Cultures & Society (CSO)
  - Economics & Organizations (EC)
- Imaginative Arts (IA)
- Individual & Group Behavior (IG)
- Science, Technology & Society (STS)
- Communications Points: Total of 6 points, at least 2 points must be in Major courses at 300+ level.

Further Requirements
- Additional credits in electives to bring your total credits to 120.
- Students must also meet the Common Experience requirements for communication points and a technology course, though it is anticipated that the required courses will satisfy these. MA231 Calculus III satisfies the MA230 requirement for double majors or changes of major.
B.S. in History
Program Chair: Bill Vitek

Program Goals
History examines human experience, confronting students with facets of human life in the past and in the present. The history major at Clarkson provides students with the opportunity to learn about lives, times, and places distant from their own, and it provides them with the tools to think about them critically, gaining a greater understanding of the complexities of their world.

Students majoring in History will:
- Appreciate history as an interpretive discipline
- Have a broad understanding of history
- Demonstrate mastery of appropriate research methodologies in history by producing a capstone research paper
- Gain expertise in using technology to explore historical problems

History majors work closely with their advisors to develop a coherent program of study. In addition to courses in American History and Gender & Sexuality studies, students have the unique opportunity to develop areas of expertise generally unavailable at liberal arts colleges, by taking sets of history courses focused on Science, Medicine, Technology, and Society; War Studies; and the Ancient, Medieval and Renaissance World.

Through their History major at Clarkson, students will also gain the ability to:
- Write clearly and persuasively
- Speak effectively in a group setting
- Think critically
- Understand and analyze complex problems
- Examine and interpret evidence
- Organize and synthesize large amounts of information
- Approach current issues with historical perspective

Program Requirements *

120 credit hours, including:
- 1 credit Introduction to the Liberal Arts pre-seminar
- 9 courses in history, including:
  - 6 courses at the 300-level or above
  - 1 course in pre-modern history
  - 1 course in modern history
- Humanities/Social Sciences Research Seminar
- 5 courses in a pre-professional external field
- Fulfillment of the requirements of the Clarkson Common Experience

Students majoring in History are required to take at least five courses in a pre-professional external field, such as pre-law, pre-med, pre-physical therapy, business or communications and media. This concentration provides students with opportunities to increase career choices, while at the same time exploring a wide variety of interests through their major.

Finally, history majors will be encouraged:
- To Study Abroad. Students who study abroad should take at least one course in the history of their host country.
- Do Historical Internships, for example, at local historical museums.

* Program Requirements
*Courses taken to fulfill requirements for a Humanities/Social Sciences Major cannot be used to fulfill requirements for a Humanities and Social Sciences Minor.*

### History Courses

#### 200-level courses:

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>Ancient Greece</td>
</tr>
<tr>
<td>HIST2</td>
<td>American History, 1776-1877</td>
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<td>HIST2</td>
<td>American History, 1877-present</td>
</tr>
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<td>HIST2</td>
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</tr>
<tr>
<td>HIST2</td>
<td>War and Society</td>
</tr>
<tr>
<td>HIST2</td>
<td>The Warrior in Literature</td>
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<tr>
<td>HIST2</td>
<td>Twentieth-Century Germany</td>
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<td>Introduction to Global History</td>
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<td>HIST320</td>
<td>Medicine and Society in America</td>
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<td>HIST323</td>
<td>War Literature II</td>
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<tr>
<td>HIST325</td>
<td>Sexuality and Health in American History</td>
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<td>HIST326</td>
<td>Modern Sex: Sexualities and Genders in Modern America</td>
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<td>HIST327</td>
<td>History of Women in America</td>
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<td>HIST328</td>
<td>History of Gender and Sexuality in the transatlantic World</td>
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<td>HIST331</td>
<td>Ancient Medicine and Magic</td>
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#### 400-level courses:

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<td>HIST332</td>
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<tr>
<td>HIST333</td>
<td>Science, Technology, and</td>
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- HIST342 War and Gender
- HIST343 War in the Middle Ages
- HIST345 The Civil War
- HIST346 America, 1790-1850
- HIST347 World War I in History and Literature
- HIST348 World War II, The European Theater
- HIST349 Cold War America, 1945-1955
- HIST350 History of Nazi Germany
- HIST351 History of the Holocaust
- HIST352 European History, 1789-1914
- HIST353 Special Topics in History
- HIST354 Construction of Nazi Germany
- HIST356 Germany at War
- HIST360 Voices of the Past
- HIST390-99 Special Topics in History
- HIST390 ST: Reformation Europe A list of Humanities and Social Sciences Courses can be found at: [https://www.clarkson.edu/peoplesoftphp](https://www.clarkson.edu/peoplesoftphp)
- HIST391 Medieval Survey
- HIST392 Renaissance Survey
- HIST459 Neuroscience and Society
- HIST485 Advanced Topics
Society in the Renaissance
HIST334 Crime and Gender in Early Modern Europe
HIST335 History of Medicine in Europe and North America
HIST336 Prosperity & Depression: The United States, 1920-1941
HIST338 Women, Gender and Science in American History
HIST340 Warfare in Ancient Greece
HIST341 War in Ancient Greece

A list of Humanities and Social Sciences Courses can be found at: https://www.clarkson.edu/peoplesoftphp

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<tr>
<th>Course</th>
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<td>History Major Course</td>
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<td>STAT282</td>
<td>Statistics</td>
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First Semester

Second Semester
### SOPHOMORE YEAR

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### JUNIOR YEAR

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</table>
B.S. in Humanities
B.S. in Interdisciplinary Liberal Studies
B.S. in Interdisciplinary Social Sciences

Program Chair: Bill Vitek

Program Goals
Clarkson offers interdisciplinary bachelor of science degrees in Humanities, Social Sciences and Liberal Studies. Students can also minor in these areas, as well as in interdisciplinary thematic areas.

The Humanities, Interdisciplinary Social Sciences and Interdisciplinary Liberal Studies programs challenge students to think critically and incisively about ideas, people, society and the human condition. Students learn about, think about, and come to understand the issues and problems of the contemporary world and of the past. They learn about the diversity and the complexity of social life, past and present. They learn how the human condition and human experience have been captured in literature and art. And they learn the ways in which people have sought to understand their lives through philosophical inquiry.

These degree programs offer a great deal of flexibility, allowing a student substantial elective choice. Each student works closely with an advisor to select both major and elective courses that meet his or her educational and career goals. Students minoring in the department also choose the courses in their programs in consultation with their advisors.

Courses in the Interdisciplinary Social Science, Humanities or Liberal Studies majors at Clarkson offer students intellectually challenging opportunities to help them:

- Gain critical perspectives on themselves and the world
- Understand the complexities of open-ended human problems
- Achieve awareness of cultural and social diversity
- Assess the ethical and social implications of science, technology and business
- Engage in and appreciate the creative process

Through their Interdisciplinary Social Science, Humanities or Liberal Studies major at Clarkson, students will also gain the ability to:

- Write clearly and persuasively
- Speak effectively in a group setting
- Think critically
- Understand and analyze complex problems
- Examine and interpret evidence
- Organize and synthesize large amounts of information

Program Requirements*

120 credit hours, comprising:

- 1 credit Introduction to the Liberal Arts pre-seminar
- 8 courses with an appropriate topical or thematic focus
- The Humanities/Social Sciences Research Seminar
- 5 courses in a pre-professional external field
- Fulfillment of the requirements of the Clarkson Common Experience

Students majoring in Interdisciplinary Social Science, Humanities or Liberal Studies at Clarkson are required to take at least five courses in a pre-professional external field, such as pre-law, pre-med, pre-
physical therapy, business, or communications and media. This pre-professional concentration provides students with opportunities to increase career choices, while at the same time exploring a wide variety of interests through their major.

* Courses taken to fulfill requirements for a Humanities/Social Sciences Major cannot be used to fulfill requirements for a Humanities and Social Sciences Minor.

HSS Sample Curriculum

<table>
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<tr>
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<td>MAJOR COURSE</td>
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SOPHOMORE YEAR

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### JUNIOR YEAR

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<td>Humanity Course</td>
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### SENIOR YEAR

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<td>Knowledge Area or</td>
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<tr>
<td>University Course</td>
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<tr>
<td>Free Elective</td>
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</table>

**Major courses are those designated Anthropology, Film, History, Literature, Philosophy, Political Science, Social Sciences or Science Technology and Society.**
Concentration in Gender & Sexuality Studies
The Concentration in Gender & Sexuality studies is a curricular option available within either the BS in Interdisciplinary Social Sciences or the BS in Interdisciplinary Liberal Studies degree programs. To complete this concentration, all students must:

1. Satisfy the requirements for the BS in Interdisciplinary Social Sciences or the BS in Interdisciplinary Liberal Studies degree programs (10 courses in the major—one Introduction to Liberal Arts, one Major Research Seminar, and eight content courses).
2. Take 15 credit hours (five courses) in Gender and Sexuality Studies, structured as follows.
   a. Students must take SS 220, Introduction to Gender, or SS 221, Introduction to Sexuality, as well as four courses from an approved list of Gender and Sexuality Studies courses maintained by the Humanities and Social Sciences department.
   b. Three of the five Gender and Sexuality Studies courses may be used to substitute for three of the required content courses in the major. The other two Gender and Sexuality Studies courses may be used to satisfy undesignated electives.

As of July 2015, the list of approved Gender and Sexuality Studies courses includes:
   • Either SS 220 or SS 221 (whichever one was not taken to satisfy requirement #1)
   • ANTH 225 Global Perspectives on Sexuality
   • ANTH 325 Sex and Commerce
   • ANTH 330 Men and Masculinities
   • HIST 326 Modern Sex: Sexualities and Genders in Modern America
   • HIST 327 History of Women and Gender in America
   • HIST 328 History of Gender and Sexuality in the Transatlantic World
   • HIST 329 History of the American Family
   • HIST 338 Women, Gender, and Science in American History
   • HIST 342 War and Gender: The Modern Period
   • LIT 240 Gender and Popular Culture
   • POL 355 Women and Politics
   • SOC 310 Women and Religion
   • SOC 330 Health, Wealth, Inequality, and the Environment

Students who complete the Gender & Sexuality Studies Concentration will have this noted on their transcripts.
### Topical Listing of Humanities and Social Sciences Courses

The courses listed below are typical of those offered by Liberal Arts. They may not be offered regularly, and new courses will be introduced. Use the list as a guide to the types of courses available. For further information, see [www.clarkson.edu/sas/courses_schedules/index.html](http://www.clarkson.edu/sas/courses_schedules/index.html)

**UNIVERSITY COURSE**

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<th>The Clarkson Seminar</th>
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**ANTHROPOLOGY**

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<th>Environment, Technology and Society</th>
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<td>Introduction to Cultural Anthropology</td>
<td>ANTH380</td>
<td>Drugs, Guns, Spices</td>
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<td>ANTH220</td>
<td>Understanding the Americas</td>
<td>ANTH381</td>
<td>Consumption and Culture</td>
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<td>Global Perspectives on Sexuality</td>
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<td>Food and Society</td>
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<td>ANTH230</td>
<td>Introduction to Race and Ethnicity</td>
<td>ANTH390-99</td>
<td>Special Topics</td>
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<td>ANTH320</td>
<td>Racial Inequality in the U.S.</td>
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<td>ANTH325</td>
<td>Sex and Commerce</td>
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<td>ST: Global Forces, Local Outcomes</td>
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<td>ANT332</td>
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**FILM STUDIES**

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**HISTORY STUDIES**

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<th>War in the Middle Ages</th>
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<td>America: 1877 to the Present</td>
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<td>America, 1790-1850</td>
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<td>World War I in History and Literature</td>
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<td>War and Society</td>
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<td>World War II, The European Theater</td>
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<td>HIST241</td>
<td>War Literature I</td>
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<td>Cold War History, 1945-1955</td>
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B.S. in Mathematics

Program Chair: Joseph Skufca

Mathematics is the study of numbers, functions, geometrical forms, and abstract logical structures and their associated relationships. In addition to providing an essential foundation for scientific and technical fields, mathematics is studied both for its own intellectual appeal and challenge and for its application to real-life problems. Students of mathematics also develop critical thinking and analytical skills useful for a wide variety of careers.

The mathematics program at Clarkson is rigorous and demanding, yet flexible enough to allow students to sample many disciplines or focus on a special interest. Many mathematics students also complete a minor or double major in a field such as computer science, physics, biology, or business. Students are encouraged to participate in research projects with faculty, starting as early as their freshman year. Graduates work in industry, business, or government agencies as mathematicians, statisticians, and actuaries. Many continue their education in graduate programs in mathematics or related fields; some become mathematics teachers or professors.

The mathematics curricula are designed so that students learn to:

• reason clearly, logically, and analytically;
• demonstrate a solid understanding of the core material and a deeper understanding of at least one area of mathematics;
• work effectively with standard mathematical software packages and write mathematical programs using a high-level computer language;
• apply mathematical knowledge to solve real-world, open-ended problems;
• read mathematical texts and literature and write mathematical proofs;
• communicate effectively, both orally and in writing; and
• work effectively both individually and in teams.

The mathematics major has two options. The mathematics option (detailed below) is designed for students with a general interest in mathematics and is excellent preparation for graduate school. The statistics option replaces some mathematics courses in the junior and senior years with statistics courses, and is designed to prepare students for careers as statisticians or actuaries. The department also offers a separate major in Applied Mathematics and Statistics.

### Requirements

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<th>Area of Study</th>
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<tr>
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*Required courses MA131, MA132, MA200, MA211, MA231, MA232, MA321, MA339, MA499, and STAT383, plus either MA451 or MA453 and MA431. The Math Option also requires two of MA311, MA313, MA314, and MA322; the Statistics Option also requires STAT381, STAT382, STAT384, and STAT488 (Statistics Project).

** Up to 12 credit hours of advanced (300- or 400-level) coursework in Aerospace Studies or Military Science may count toward graduation requirements. Aerospace Studies or Military Science credits at the 100 and 200 levels do not count toward the required 120 hours. Other restrictions may apply; check with the department for details.

Sample Curriculum

**FIRST YEAR**

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**SOPHOMORE YEAR**

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**Total:** 15 14

### SENIOR YEAR

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**Total:** 15

### Mathematics Courses

Not all courses are offered each year or each semester (see the course offering lists from SAS). Courses marked (*) do not count toward the graduation requirements for mathematics majors.

- **MA120** Introduction to STEM Mathematics*
- **MA131** Calculus I
- **MA132** Calculus II
- **MA180** Introduction to College Mathematics*
- **MA181** Basic Calculus*
- **MA200** Introduction to Math Modeling and Software Foundations
- **MA211** 3-D Space and Projective Geometry
- **MA230** Calculus III
- **MA231** Elementary Differential Equations
- **MA232**
- **MA400** Undergraduate Seminar
- **MA401-409** Directed Study
- **MA421** Seminar in Mathematics
- **MA431** Mathematics Course Assistance
- **MA447** Computer Algorithms
- **MA449** Computational Learning
- **MA451** Intro to Mathematical Research
- **MA453** Intro to Mathematics Instruction
- **MA456** Cryptography
- **STAT488** Statistics Project
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<td>Elementary Linear Algebra*</td>
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<td>Undergraduate Research</td>
</tr>
<tr>
<td>STAT282</td>
<td>General Statistics*</td>
<td>MA499</td>
<td>Professional Experience</td>
</tr>
<tr>
<td>MA300</td>
<td>Seminar in Actuarial Mathematics</td>
<td>MA511</td>
<td>Algebraic Structures</td>
</tr>
<tr>
<td>MA311</td>
<td>Abstract Algebra</td>
<td>MA514</td>
<td>Sets and Topology</td>
</tr>
<tr>
<td>MA313</td>
<td>Abstract Linear Algebra</td>
<td>MA521</td>
<td>Classical Complex Analysis</td>
</tr>
<tr>
<td>MA314</td>
<td>Number Theory and Its Applications</td>
<td>MA522</td>
<td>Classical Real Analysis</td>
</tr>
<tr>
<td>STAT318</td>
<td>Biostatistics</td>
<td>MA525</td>
<td>Functional Analysis</td>
</tr>
<tr>
<td>MA321</td>
<td>Advanced Calculus I</td>
<td>MA526</td>
<td>Convex Optimization and Analysis</td>
</tr>
<tr>
<td>MA322</td>
<td>Advanced Calculus II</td>
<td>MA531</td>
<td>Initial and Boundary Value Problems and PDEs</td>
</tr>
<tr>
<td>MA330</td>
<td>Advanced Engineering Mathematics*</td>
<td>MA533</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td>MA331</td>
<td>Fourier Series and Boundary Value Problems</td>
<td>MA562</td>
<td>Complex Analysis with Applications</td>
</tr>
<tr>
<td>MA332</td>
<td>Intermediate Differential Equations</td>
<td>MA563</td>
<td>Applied Dynamical Systems</td>
</tr>
<tr>
<td>MA339</td>
<td>Applied Linear Algebra</td>
<td>MA571</td>
<td>Numerical Solution of Differential Equations</td>
</tr>
<tr>
<td>MA345</td>
<td>Automata Theory and Formal Languages</td>
<td>MA572</td>
<td>Finite Element Methods</td>
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<tr>
<td>MA362</td>
<td>Complex Analysis with Applications</td>
<td>MA573</td>
<td>Matrix Theory and Computation</td>
</tr>
<tr>
<td>MA363</td>
<td>Mathematical Modeling</td>
<td>MA578</td>
<td>Numerical Analysis</td>
</tr>
<tr>
<td>MA368</td>
<td>Mathematical Biology Seminar</td>
<td>MA579</td>
<td>Introduction to Applied Optimization</td>
</tr>
<tr>
<td>MA369</td>
<td>Interdisciplinary Research in Biology &amp; Mathematics Numerical Methods</td>
<td>MA580</td>
<td>Introduction to Monte Carlo Simulation</td>
</tr>
<tr>
<td>MA377</td>
<td>STAT581</td>
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<td>STAT582</td>
<td>Mathematical Statistics I</td>
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<tr>
<td>STAT382</td>
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<td>STAT584</td>
<td>Advanced Applied Statistics</td>
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<tr>
<td>STAT383</td>
<td>Probability &amp; Statistics</td>
<td>MA601-619</td>
<td>Topics in Mathematics</td>
</tr>
<tr>
<td>STAT384</td>
<td>Advanced Applied Statistics</td>
<td>MA721-739</td>
<td>Seminar</td>
</tr>
<tr>
<td>STAT385</td>
<td>Bayesian Data Analysis</td>
<td>MA810</td>
<td>Thesis/Dissertation or Special Projects</td>
</tr>
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</table>
B.S. in Physics
Program Chair: Dipankar Roy

Physics, the most fundamental of the sciences, deals with the behavior and interaction of matter, energy, space and time. It is in Physics where the basic concepts, laws and measuring techniques have been developed in the broad areas of mechanics, heat and thermodynamics; wave motion, acoustics, optics, electricity and magnetism; and the structure of matter. The concepts and techniques of Physics are the foundations of the other Sciences and of Engineering. Clarkson’s Physics curriculum has been designed to meet the following goals:

- Present the fundamental knowledge needed for professional work in industry or graduate school, while including many free electives.
- Offer a flexible curriculum to satisfy diverse career objectives and make it possible to double major in Physics and other fields.
- Provide plenty of opportunity to get involved in active research as an undergraduate.

A double major with physics at Clarkson can be completed within four years, and this is even easier for students coming in with AP or college-level credits. In addition to providing a flexible double major program, the Physics curriculum strongly emphasizes undergraduate research. All faculty members are actively engaged in research, much of which is a part of the Physics graduate program (offering M.S. and Ph.D. degrees). Usually students identify research projects in their areas of concentration and continue to work on the project until graduation. Often their research leads to publication in internationally recognized scientific journals. Check out the Physics Department’s Web site for more information about the Physics Program and the various research areas of the physics faculty: www.clarkson.edu/physics.

THREE-YEAR ACCELERATED DEGREE PROGRAM
This program is available to students who arrive at Clarkson University with excellent preparation from high school. Its challenging pace requires harder work than the standard program and special dedication, but offers the opportunity to complete a degree in a shortened time span. Students in this accelerated program can save educational costs and enter the job market a year earlier. Contact the Physics Department for a sample curriculum.

REQUIREMENTS
Specific course requirements of the Physics Major are listed below, along with a sample (tentative) 8-semester plan.

<table>
<thead>
<tr>
<th>Area</th>
<th>Cr. Hrs.</th>
<th>Area</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>First-Year Seminar</td>
<td>1</td>
<td>Communications Elective(^{(3)}) (C2)</td>
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<td>Clarkson Seminar</td>
<td>3</td>
<td>Knowledge Area and University</td>
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<tr>
<td>Physics(^{(1)}) (or equivalent)</td>
<td>35</td>
<td>Course Electives</td>
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<td>Mathematics(^{(2)})</td>
<td>18</td>
<td>Concentration Electives(^{(4)})</td>
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<td>Chemistry</td>
<td>8</td>
<td>Information Technology Elective</td>
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<tr>
<td>Biology Elective</td>
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<td>Technology Elective</td>
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</tr>
<tr>
<td>Free Electives</td>
<td></td>
<td>[including a C1 course(^{(5)})]</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>120*</td>
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\(^{(1)}\) If required
\(^{(2)}\) If required
\(^{(3)}\) If required
\(^{(4)}\) If required
\(^{(5)}\) If required
Includes Physics Professional Requirement courses: PH 121, PH 232, PH 327, PH 331 (part of the Core Curriculum), and 3 credits from the list: PH 445, PH 446, PH 470-477 (Physics Professional Electives).

Mathematics courses for a Physics Major include: MA 131, MA 132, MA 231, MA 232, plus 3 credits of Probability/Statistics from: MA 381, STAT 381, STAT 383, MA 381, etc.

At least 6 Communication Points (C-1/C-2 courses combined) are required. At least 2 Communication Points (two C-1 or one C-2) must be earned in Physics through courses at the 300- or 400-level (PH 327, PH 445-446).

All of these must be in one area outside of Physics; an area need not be a department.

At least one of the free electives should be a [C1] or [C2] designated Communication Intensive Course unless a [C1] course is already included in the Biology or Concentration electives.

* Some non-credit courses in Physical Education, Aerospace Studies and/or Military Science might be required for graduation.

Sample Physics Curriculum (Core Option)**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
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<td>FY100</td>
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<td>MA131</td>
</tr>
<tr>
<td>CM131</td>
</tr>
<tr>
<td>PH121</td>
</tr>
<tr>
<td>UNIV190</td>
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<tr>
<th>SOPHOMORE YEAR</th>
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<tr>
<td><strong>First Semester</strong></td>
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<td><strong>Course</strong></td>
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<tr>
<td>PH231</td>
</tr>
<tr>
<td>PH232</td>
</tr>
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<td>MA232</td>
</tr>
<tr>
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<tr>
<td>KA/UC Elective</td>
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<tr>
<td>Information Tech. Elective</td>
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### JUNIOR YEAR

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<tr>
<td>PH325</td>
<td>Thermal Physics</td>
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<tr>
<td>PH380</td>
<td>Electromagnetic Theory I</td>
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<tr>
<td>MA381</td>
<td>Probability</td>
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<tr>
<td></td>
<td>Concentration Elective</td>
</tr>
<tr>
<td>KA/UC Elective</td>
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</tr>
<tr>
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**SENIOR YEAR**

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<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<tr>
<td>PH432</td>
<td>Elective (recomm. PH432)</td>
</tr>
<tr>
<td>PH435</td>
<td>Senior Seminar</td>
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<tr>
<td>KA/UC Elective</td>
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</tr>
<tr>
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<td>Concentration Elective</td>
</tr>
<tr>
<td>PH327</td>
<td>Professional Elective</td>
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<tr>
<td>PH327</td>
<td>Free Electives</td>
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</table>

** Double Major Curricula should be planned in consultation with student’s academic advisors from both major fields.
Physics Courses
Not all courses are offered each year or each semester. For further information, see www.clarkson.edu/sas/courses_schedules/index.html.

**UNDERGRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<th>Course Title</th>
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<tbody>
<tr>
<td>PH121</td>
<td>Physics First-Year Seminar</td>
<td>PH142</td>
<td>Physics for Life Sciences II</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I</td>
<td>PH221</td>
<td>Theoretical Mechanics I</td>
</tr>
<tr>
<td>PH132</td>
<td>Physics II</td>
<td>PH231</td>
<td>Fundamentals of Modern Physics</td>
</tr>
<tr>
<td>PH141</td>
<td>Physics for Life Sciences I</td>
<td>PH232</td>
<td>Modern Physics laboratory</td>
</tr>
<tr>
<td>PH157</td>
<td>Elementary Astronomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC101</td>
<td>Introduction to Astronomy</td>
<td>PH301</td>
<td>Teaching Methodology</td>
</tr>
<tr>
<td>SC131</td>
<td>Introduction to Physics I</td>
<td></td>
<td>in Physics I</td>
</tr>
<tr>
<td>SC132</td>
<td>Introduction to Physics II</td>
<td>PH302</td>
<td>Teaching Methodology</td>
</tr>
<tr>
<td>SC133</td>
<td>Collective Behavior in Physical,</td>
<td>PH322</td>
<td>Theoretical Mechanics II</td>
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<tr>
<td></td>
<td>Biological, and Other Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH331</td>
<td>Quantum Physics I</td>
<td>PH323</td>
<td>Optics</td>
</tr>
<tr>
<td>PH341</td>
<td>Solid State Physics I</td>
<td>PH325</td>
<td>Thermal Physics</td>
</tr>
<tr>
<td>PH380</td>
<td>Electromagnetic Theory I</td>
<td>PH327</td>
<td>Experimental Physics I</td>
</tr>
<tr>
<td>PH381</td>
<td>Electromagnetic Theory II</td>
<td>PH328</td>
<td>Experimental Physics II</td>
</tr>
<tr>
<td>PH401</td>
<td>Teaching Methodology in Physics III</td>
<td>PH547</td>
<td>Nuclear Physics</td>
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<tr>
<td></td>
<td>in Physics IV</td>
<td>PH551</td>
<td>Statistical Mechanics I</td>
</tr>
<tr>
<td>PH402</td>
<td>Teaching Methodology in Physics IV</td>
<td>PH553</td>
<td>Relativity</td>
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<tr>
<td></td>
<td></td>
<td>PH555</td>
<td>Mathematical Methods in Physics</td>
</tr>
<tr>
<td>PH426</td>
<td>Introduction to Biophysics</td>
<td>PH557</td>
<td>Introduction to Astrophysics</td>
</tr>
<tr>
<td>PH432</td>
<td>Quantum Physics II</td>
<td>PH560</td>
<td>Physics of Fluids</td>
</tr>
<tr>
<td>PH435</td>
<td>Physics Senior Seminar</td>
<td>PH570-573</td>
<td>Directed Study Experimental</td>
</tr>
<tr>
<td>PH442</td>
<td>Solid State Physics II</td>
<td>PH574-577</td>
<td>Directed Study Theoretical</td>
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<tr>
<td>PH443</td>
<td>Introduction to Theoretical Physics I</td>
<td>PH580</td>
<td>Electromagnetic Theory I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PH581</td>
<td>Electromagnetic Theory II</td>
</tr>
<tr>
<td>PH444</td>
<td>Introduction to Theoretical Physics II</td>
<td>PH589</td>
<td>(EE543) Physics of Semiconductor Devices</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>PH445</td>
<td>Senior Thesis I</td>
<td>PH591</td>
<td>Experimental Physics I</td>
</tr>
<tr>
<td>PH446</td>
<td>Senior Thesis II</td>
<td>PH592</td>
<td>Experimental Physics II</td>
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<tr>
<td>PH447</td>
<td>Nuclear Physics</td>
<td>PH641</td>
<td>(EE641) Charge Carrier Transport</td>
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<tr>
<td>PH451</td>
<td>Statistical Mechanics I</td>
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<td>in Semiconductors</td>
</tr>
<tr>
<td>PH453</td>
<td>Relativity</td>
<td>PH661</td>
<td>Classical Mechanics</td>
</tr>
<tr>
<td>PH455</td>
<td>Mathematical Methods in Physics</td>
<td>PH663</td>
<td>Electromagnetic Theory I</td>
</tr>
<tr>
<td>PH457</td>
<td>Introduction to Astrophysics</td>
<td>PH664</td>
<td>Electromagnetic Theory II</td>
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<td>PH460</td>
<td>Physics of Fluids</td>
<td>PH667</td>
<td>Statistical Mechanics II</td>
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<td>PH470-473</td>
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<td>PH669</td>
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<td>PH474-477</td>
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<td>PH670</td>
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<tr>
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<td>PH671</td>
<td>Advanced Quantum Mechanics</td>
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<td></td>
<td></td>
<td>PH679</td>
<td>Quantum Theory of Solids</td>
</tr>
<tr>
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<td>PH681</td>
<td>Selected Topics in Physics I</td>
</tr>
<tr>
<td></td>
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<td>Selected Topics in Physics II</td>
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**GRADUATE COURSES**

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<th>Course Title</th>
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<tr>
<td>PH489</td>
<td>(EE443) Physics of Semiconductor Devices</td>
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<td></td>
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<td>PH681</td>
<td>Selected Topics in Physics I</td>
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<tr>
<td></td>
<td></td>
<td>PH682</td>
<td>Selected Topics in Physics II</td>
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</table>
B.S. in Political Science
Program Chair: Bill Vitek

Program Goals
Political Science investigates the institutions, practices, traditions, concepts and rules by means of which human beings organize their lives in common and govern themselves.

Courses in Political Science enable students to use empirical analyses and theoretical constructs to understand political aspects of their world, both in the United States and in other parts of the globe.

Students majoring in Political Science will acquire:
- a comprehensive understanding of politics, political institutions, and the processes involved in translating values and information into public policy and legislation.
- a critical grasp of the leading theories and disputes animating the various subfields of Political Science.
- an appreciation of the facets of citizenship needed to participate fully in political life.

Through their Political Science major at Clarkson, students will also gain the ability to:
- Write clearly and persuasively
- Speak effectively in a group setting
- Think critically
- Understand and analyze complex problems
- Examine and interpret evidence
- Organize and synthesize large amounts of information

Program Requirements*
120 credit hours, comprising:
- 1 credit Introduction to the Liberal Arts pre-seminar
- 8 courses in political science ideally including one each in
  - American Politics
  - Political Theory
  - International and Comparative Politics
  - Law and Public Policy
- The Humanities/Social Sciences Research Seminar
- 5 courses in a pre-professional external field
- Fulfillment of the requirements of the Clarkson Common Experience
Political Science majors will take POL 220, American Politics and a series of courses chosen in consultation with their advisors to develop a coherent program of study. Students have the opportunity to develop areas of expertise in American Politics, Public Policy, Political Theory or Environmental Politics.

Students majoring in Political Science are required to take at least five courses in a pre-professional external field, such as pre-law, pre-med, pre-physical therapy, business or communications and media. This concentration provides students with opportunities to increase career choices, while at the same time exploring a wide variety of interests through their major.

* Courses taken to fulfill requirements for a Humanities/Social Sciences Major cannot be used to fulfill requirements for a Humanities and Social Sciences Minor.

### Political Science Courses

<table>
<thead>
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<tr>
<td>POL220</td>
<td>American Politics</td>
<td>POL362</td>
<td>Human Rights, Law and Politics</td>
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<tr>
<td>POL301</td>
<td>Political Theory</td>
<td>POL371</td>
<td>Environmental Law</td>
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<tr>
<td>POL302</td>
<td>Contemporary Political Theory</td>
<td>POL380</td>
<td>(PHIL380) The Law and Bioethics</td>
</tr>
<tr>
<td>POL320</td>
<td>The American Political Tradition</td>
<td>POL390-99</td>
<td>Special Topics in Political Science</td>
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<tr>
<td>POL350</td>
<td>(SOC350) International</td>
<td>POL391</td>
<td>American Foreign Policy</td>
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<tr>
<td>POL351</td>
<td>(SOC351) Globalization</td>
<td>POL400</td>
<td>Constitutional Law</td>
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<td>POL230</td>
<td>POL230 Introduction to Global Politics</td>
<td>POL470/570</td>
<td>(SOC470/570) Environmental Policy</td>
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<td>POL260</td>
<td>POL260 Introduction to Public Policy</td>
<td>POL471/571</td>
<td>Energy Policy</td>
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<tr>
<td>POL335/LIT335</td>
<td>POL335/LIT335 Violence and Reconciliation</td>
<td>POL372</td>
<td>Biofuel and Farm Policy</td>
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<td>POL355</td>
<td>POL355 Women and Politics</td>
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<td>POL370</td>
<td>Close and Contested Elections</td>
<td>SS380</td>
<td>Research Methods</td>
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<td>POL388</td>
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### FRESHMAN YEAR

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<td>Free Elective</td>
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<td>Common Experience</td>
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<td>Knowledge Area Course</td>
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<td>Common Experience</td>
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<td>Science Requirement</td>
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### JUNIOR YEAR

<table>
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<tr>
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<tr>
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<tr>
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<tr>
<td>PSCI MAJOR COURSE</td>
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<tr>
<td>or Free Elective</td>
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<tr>
<td>Common Experience</td>
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**Knowledge Area or University Course**  
3  Pre-professional  
Concentration Free Elective or  
**Pre-professional Concentration**  
3  Common Experience Technology and Humanity Course  
**Free Elective or Common Experience Technology and**  
3  
**15**

**SENIOR YEAR**

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<tr>
<td><strong>Course Title</strong></td>
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</tr>
<tr>
<td>Free Electives</td>
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</table>
B.S. in Psychology
Program Chair: Robert Dowman

Psychology is the study of mind and behavior. Its explorations span an enormous breadth, ranging from the activity of individual brain cells to the complex interactions between individuals and society. Psychology investigates how people develop and learn; how we perceive the world; how relationships are formed; how stress affects our health and impairs our performance; and why conflict is so much a part of the human experience. Psychologists also try to understand the nature and causes of abnormality and search for effective treatments to relieve the suffering it causes.

The Psychology program at Clarkson aims to provide each student with a solid foundation in the fundamental areas of psychology, as well as the opportunities to develop the problem solving, critical thinking, and communication skills that are critical in the workplace. We also strive to help students find interesting and rewarding careers related to psychology. To this end, each Psychology major is given lots hands-on learning opportunities. These include the directed research, where the student works closely with a faculty member on an experiment of mutual interest; clinical internships, where the student works with a therapist in a clinical environment; and industrial/organizational psychology internships where, the student works with psychologists in business settings.

Students graduating with a B.S. degree in psychology from Clarkson will:

• be able to critically evaluate information and apply it to a problem or question
• be able to apply psychological principles to real-world problems
• have content expertise in the areas of psychology represented by the psychology faculty
• be able to write clearly and effectively.

In addition to satisfying the Clarkson Common Experience, the B.S. in Psychology degree program requires:

REQUIRED PSYCHOLOGY COURSES
PY151 Introduction to Psychology
PY253 Social Psychology
PY255 Cognitive Psychology
PY456 Experimental Psychology

DIRECTED RESEARCH/INTERNSHIP REQUIREMENT (choose 1)
PY496 Directed Research
PY401-3 Internship

PHYSIOLOGICAL PSYCHOLOGY REQUIREMENT (choose 1)
PY454 Physiological Psychology
PY458 Cognitive Neuroscience

PY460 Neurobiology

COGNITIVE PSYCHOLOGY REQUIREMENT (choose 1)
PY357 Human Cognitive Evolution
PY358 Animal Learning and Cognition
PY359 Perception
PY360 Learning and Memory
PY461 Judgment and Decision Making

PSYCHOLOGY ELECTIVES (choose 3)
PY286 Organizational Behavior I
PY310 Human Sexuality
PY315 Personal Relationships
PY317 Psychology of Psychoactive Drugs
PY460 Neurobiology
PY462 Abnormal Psychology
PY463 Health Psychology
PY480 Directed Study in Psych.
PY319  Current Readings in Animal Behavior  PY481  Directed Study in Social Psych.
        Consumer Behavior
PY321
PY325  Group Dynamics  PY482  Directed Study in Physiological Psych.
PY335  Personality  PY483  Directed Study in Cognitive Psych.
PY340  Behavioral Ecology and Sociobiology  PY491  Directed Research in Health Psych.
PY361  Human Motivation  PY492  Directed Research in Psychophysiology
PY370  Developmental Psychology  PY493  Directed Research in Cognitive Psych.
PY411  Counseling Psychology  PY494  Directed Research in Social Psych.
PY453  Advanced Topics in Social Psychology  PY498-499  Senior Thesis
PY459  Neuroscience Society

**MATHEMATICS:** 3 college level math courses to include at least one calculus course and one statistics course.

The Professional & Professional Experience and Information Technology requirements are distributed throughout the Psychology Curriculum. PY456 satisfies the Technology Serving Humanity requirement.

**Sample Curriculum**

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<thead>
<tr>
<th>First Semester</th>
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<tr>
<td><strong>Course</strong></td>
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### SOPHOMORE YEAR

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<td>Psychology Cognitive Elective</td>
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### JUNIOR YEAR

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### SENIOR YEAR

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</table>
B.S. in Software Engineering

The discipline of software engineering is concerned with the application of engineering principles to the construction of computer software. It addresses critical issues across the life cycle of a software product, beginning with a proposal to develop an application that requires computing resources and continuing through the development, testing, operation, and maintenance of the software product until it is retired.

The software engineer plays the role of the architect of a complex system. He or she takes into account the user requirements and needs, feasibility, cost, quality, reliability, safety, and time constraints. To do this, the software engineer has to be able to understand the application area that is the target of the desired software system, develop the software and ensure that it is reliable, and also manage the project so that it is produced in an economical, timely manner.

Objectives of the Clarkson Software Engineering Program

Software engineering graduates should be well prepared for a lifetime of professional activity, and the objective of our program is to build a foundation on which graduates can build successful careers. This means that, within a few years after completing the program, we expect that our graduates will be contributing professionals, effective and responsible collaborators. They should also have continued to grow intellectually and as well rounded citizens. This means graduates are expected to have

- Advanced their careers as contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications
- become well-rounded citizens who rely on their engineering education to serve society in an ethical and professional manner
- become effective and responsible collaborators who function well in diverse team environments, with some graduates having emerged as leaders in their field
- have exhibited intellectual growth and pursued continual innovation in their field, while those graduates who are especially talented and motivated to pursue a graduate degree should be or have been successful at entering and completing graduate studies

To attain these objectives, the curriculum is structured so that when a student graduates from the Software Engineering program, he or she will have gained the knowledge, skills, and attributes that provide a foundation on which a successful career in the Software Engineering profession rests. Our graduates will attain the following student outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
In the context of the software engineering discipline, this means that graduates of the program will:

- have a fundamental understanding of computer systems
- be able to apply engineering principles to software design and construction, having developed the ability to:
  - develop software requirements and functional specifications
  - use proven techniques to design software structure before it is implemented
  - apply established verification and validation techniques
  - understand the importance of constructing large software systems using standardized components and reusing existing code (modules) where possible,
  - use software tools as effective aids in all phases of software development
  - design, develop, and deliver software in a cost effective manner
- have experience with issues encountered at every stage in the software life-cycle
- understand how to manage the development of software intensive systems
- be able to work on an interdisciplinary team of software components of a system
- have good interpersonal and communication skills
- be able to readily assimilate new technologies
- understand the impact their discipline has on society

Curriculum
To accomplish these goals, the curriculum is structured around a group of required courses in science, mathematics, and computer science and engineering. A variety of courses in the engineering sciences are included in the curriculum in order to provide exposure to application areas. Although there is ample opportunity for students to participate in team-based activities throughout the curriculum, each student’s program of study includes a major design experience in the senior year in which the student is required to bring together knowledge gained in a wide variety of courses to solve realistic problems, building significant applications in a team-based environment.

An Interdisciplinary Approach
Software Engineering is distinctive at Clarkson because it is interdisciplinary: we combine the expertise, knowledge, and experience of faculty from both the Electrical and Computer Engineering and the Computer Science Departments. That benefits the students because they master the application of theory as well as knowledge and understanding of processes software process as they gain the ability to develop effective and cost-efficient software systems. Clarkson’s program is also designed to help students build interpersonal and communication skills that can launch a successful career in today’s world.
## Software Engineering Curriculum

### FIRST YEAR
*(See Common First-Year Curriculum in Engineering)*

### SOPHOMORE YEAR

<table>
<thead>
<tr>
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<td>MA211</td>
<td>Foundations</td>
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<td>ES250</td>
<td>Electrical Science</td>
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<tr>
<td>EE261</td>
<td>Intro. to Programming and Software Design or</td>
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<tr>
<td>CS141</td>
<td>Computer Science I</td>
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<td>EE264</td>
<td>Intro. to Digital Design</td>
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<td>EE361</td>
<td>Fundamentals of Software Engineering</td>
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<tr>
<td>EE221</td>
<td>Linear Circuits or</td>
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<td>MA381</td>
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<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
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<td>Software Design for Visual Environments</td>
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<td>EE408</td>
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**JUNIOR YEAR**

**First Semester**

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<td>Operating Systems</td>
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<td>EE466</td>
<td>Computer Architecture</td>
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<td>CS458</td>
<td>Formal Methods for</td>
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<td>Programming Languages</td>
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<td>Undesignated Electives</td>
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|          |                                       | 15       |          |                                            | 15       |

**SENIOR YEAR**

**First Semester**

<table>
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* One of the KA/UC electives must be in economics.
Undergraduate Minors in Arts & Sciences

Minor in Biology
A minor in Biology is available to students who take at least 19 credit hours in Biology as follows:
Core Courses (9 credits): Students must take BY140 Biology I (3 cr.) and BY160 Biology II (3 cr.) and at least one of the following:
  BY214 Genetics (3 cr.)
  BY222 Ecology (3 cr.)
  BY320 Microbiology (3 cr.)
  BY360 Human Physiology (3 cr.)
  BY471 Human Anatomy and Physiology I (3 cr.)
  BY472 Human Anatomy and Physiology II (3 cr.)
Elective Courses (9 credits): Students must take at least 9 credits of Biology courses numbered 300 or above.
Laboratory Requirement (1-2 credits): Students must take at least one of the following laboratory courses:
  BY224 Ecology Laboratory (2 cr.)
  BY142 Biology II Laboratory (2 cr.)
  BY162 Biology II Laboratory (2 cr.)
  BY322 Microbiology Laboratory (2 cr.)
  BY362 Human Physiology Laboratory (2 cr.)
  BY473 Human Anatomy and Physiology I Laboratory (2 cr.)
  BY474 Human Anatomy and Physiology II Laboratory (2 cr.)
*Students should consult with the Biology Chair to determine whether AP Biology will satisfy the BY140 and BY160 requirement.
Minor in Biomedical Engineering

Minor in Biomedical Science and Technology

As various fields of medicine and health care increasingly depend upon advances in technology, graduates who possess combined expertise in engineering principles and knowledge of biological sciences at all levels will be in high demand. The minors in Biomedical Engineering and Biomedical Science and Technology enhance opportunities for Clarkson’s students to meet this need. Students can take only one (not both) of the two minors. See description under Undergraduate Interdisciplinary Minors in the Interdisciplinary Programs section of the Catalog.

Minor in Biology, Behavior, and Society (BiBS)

A diverse group of disciplines attempt to document and explain the origins and functions of human cognition, social behavior, and social organization: anthropology, biology, economics, history, psychology, and sociology each include a disciplinary focus on the origins and current consequences of individual and group behavior and social outcomes. However, among disciplines - and even within disciplines - there is disagreement about the relative importance of genes, natural environment, individual rational-choice, and sociocultural-construction on individual and group behavior, cultures, and social institutions. Historical views have ranged from strong biopsychological determinism, to environmental determinism & individual rational choice, to strong sociocultural determinism. Views on the origins and current functions of behavior, culture, and society can and often do affect social policy; extreme views have provided the intellectual rationale for eugenics, racism, sexism, imperialism, laissez-faire capitalism, and collectivization and ‘cultural revolution’. On a positive note, interdisciplinary progress at understanding the origins and functions of human behavior and human cultures & societies has contributed to progressive reforms in the areas of mental health, public health, laws and criminal justice, education, intercultural understanding, and programs to provide economic and social opportunity for the underprivileged.

Views on questions of ‘human nature’ have tended to become polarized between the ‘biological’ (biology, evolutionary psychology, biological anthropology) and the ‘social science’ (social psychology, cultural anthropology, history, sociology) poles. This dialectical relationship between the social and biological sciences and the corresponding dialogue between both, forces both sides in this rich debate to refine their positions and expose students to a deeper understanding of the foundations of the respective disciplines and their impact on the world. Our minor in Biology, Behavior, and Society (BiBS) will expose students to these diverse disciplinary traditions and their conflicts and debates in the present and past. This minor provides students the knowledge and skills to become informed, critical, and reflective citizens that can make balanced decisions about the imbricate relationship of biology, psychology, culture and society.

The BiBS minor is intended for students who want to acquire an interdisciplinary and comprehensive overview of the different perspectives on human behavior, human cultural evolution, and human social organization. The objective of this minor is for students to understand the theoretical and empirical foundations of multiple disciplines that contribute to understanding human behavior and be able to knowledgeably weigh the perspectives of each. An aspirational outcome is that students can develop a synthetic, informed understanding of the origins and function of human behavior, cultures, and societies. We believe that this minor will attract students who are interested in biology, psychology, social sciences, health careers, law, politics, and economics and provide them with bio-cultural literacy critical to evaluating the multiplicity of scientific claims about ‘human nature’.
The four core course requirements within this degree program provide the interdisciplinary foundation of psychology, biology, and social science. The three additional electives will provide a student with depth in specific areas while continuing to confront an interdisciplinary set of perspectives.

**REQUIREMENTS FOR THE BIOLOGY, BEHAVIOR, AND SOCIETY MINOR**

A minor in *Biology, Behavior, and Society* is available to students in all degree programs. To obtain a minor, students must complete 20 credits:

**Required courses (11 credits):**
- HIST270 Introduction to Culture, Society & Biology (3 credit) [CSO/STS, C1]
- BY/PY340 Behavioral Ecology and Sociobiology (3 credit) [IG]
- BY/PY357 Human Cognitive Evolution (3 credit)
- SA&S300 Arts and Sciences Seminar (1 credit)
- SA&S499 Biology, Behavior and Society Minor Portfolio (new course, 1 credit)

*A student, to complete the minor, will take SAS499 as an independent study course under the mentorship of the student’s minor advisor. The student will provide a portfolio based on (a) term papers or equivalent products from the three major required courses, (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.*

**Electives (9 credits):** *Electives must be from outside your declared major, and include at least three credits from each of the two categories:*

**Category 1 Electives**
- ANTH220: Understanding the Americas [UNIV/CSO/STS, C1]
- ANTH225: Global Perspectives on Sexuality [UNIV/CGI/STS]
- ANTH230: Introduction to Race and Ethnicity [UNIV/CGI/CGI]
- ANTH270: Environment, Technology and Society [STS]
- ANTH325: Sex and Commerce [UNIV/IG/CGI, C2]
- ANTH330: Men and Masculinities [CSO]
- HIST320: Medicine and Society in America [UNIV/CSO/STS, C1]
- HIST326: Modern Sex [UNIV/CSO/STS]
- HIST327: History of Women and Gender in America [UNIV/CSO/IG, C1]
- HIST328: History of Gender and Sex [UNIV/CSO/IG]
- HIST329: History of the American Family [UNIV/CGI/CSO, C1]
- HIST342: War and Gender [UNIV/CSO/IA, C1]
- HIST350: History of Nazi Germany [UNIV/CSO/IG, C1]
- HIST351: History of the Holocaust
- SOC330: Health, Wealth, Inequality and the Environment [UNIV/CGI/STS, C1]
- POL/SOC350: International Development and Social Change [EC]
- SOC385: Food and Society [UNIV/CGI/STS]
- SS220 Introduction to Gender [UNIV/CGI/IG]
**Category 2 Electives**
BY/PY319 Current Readings in Animal Behavior  
BY/PY358 Animal Learning and Cognition  
BY 460 Neurobiology  
BY420 Evolution  
EC384 Game Theory and Economic Strategy  
HIST/PY459 Neuroscience and Society [STS, C1]  
OS286/PY286 Organizational Behavior 1 [IG]  
PY253 Social Psychology  
PY310 Human Sexuality [UNIV/CGI/IG]  
PY315 Personal Relationships [C1]  
PY453 Advanced Topics in Social Psychology [C2]  
PY360 Learning and Memory  
PY461 Judgment and Decision Making  
PY463 Health Psychology [C1]

**Minor in Chemistry**
Students pursuing the minor in Chemistry must complete the following requirements. The minor is not open to students majoring in Chemistry or Biomolecular Science.

**First Year – Prerequisites:**

- CM103, CM104, CM105 and CM106  
  10 credits  
  or  
- CM131 and CM132  
  8 credits

Students must take five of the following 14 courses, including at least one of the labs:

- CM221 Spectroscopy  
- CM223 Spectroscopy Lab  
- CM241 Organic Chemistry I  
- CM242 Organic Chemistry II  
- CM244 Organic Chemistry Lab  
- CM300 Instrumental Lab  
- CM312 Introduction to Inorganic Chemistry  
- CM320 Separations and Electrochemistry  
- CM345 Advanced Lab  
- CM371 Physical Chemistry I  
- CM372 Physical Chemistry II  
- CM460 Biochemistry I  
- CM461 Biochemistry II  
- CM470 Biochemistry/Biotechnology Lab  

**Total Chemistry Credits**  
23 or 25
Minor in Cognitive Neuroscience

Required Basic Science Courses (29 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY151</td>
<td>Introduction to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>BY140</td>
<td>Biology I: Inheritance, Evolution and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>BY142</td>
<td>Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>BY160</td>
<td>Biology II: Cellular and Molecular Biology</td>
<td>3</td>
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<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CM131</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CM132</td>
<td>General Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>PH141</td>
<td>Physics for Life Sciences I</td>
<td>4</td>
</tr>
<tr>
<td>PH142</td>
<td>Physics for Life Sciences II</td>
<td>4</td>
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Required Cognitive Neuroscience Courses (9 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>PY458</td>
<td>Cognitive Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>BY/PY454</td>
<td>Physiological Psychology</td>
<td>3</td>
</tr>
<tr>
<td>BY/PY460</td>
<td>Neurobiology</td>
<td>3</td>
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</tbody>
</table>

Elective Psychology Courses: 2 courses (6 credits) chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY317</td>
<td>Psychology of Psychoactive Drugs</td>
<td>3</td>
</tr>
<tr>
<td>BY/PY358</td>
<td>Animal Learning and Cognition</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY359</td>
<td>Perception</td>
<td>3</td>
</tr>
<tr>
<td>PY360</td>
<td>Learning and Memory</td>
<td>3</td>
</tr>
<tr>
<td>PY462</td>
<td>Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PY463</td>
<td>Health Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Biology Courses: 2 courses (6 credits) chosen from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY360</td>
<td>Physiology</td>
<td>3</td>
</tr>
<tr>
<td>BY312</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BY214</td>
<td>Genetics</td>
<td>3</td>
</tr>
<tr>
<td>BY310</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BY350</td>
<td>Comparative Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>BY471</td>
<td>Anatomy and Physiology I</td>
<td></td>
</tr>
<tr>
<td>BY472</td>
<td>Anatomy and Physiology II</td>
<td></td>
</tr>
</tbody>
</table>

CM103/105 and CM104/106 will also satisfy the Chemistry requirement.
PH131 and PH132 will also satisfy the Physics requirement.
Biology majors taking the cognitive neuroscience minor cannot use PY/BY454 as one of their Biology elective courses.

Minor in Communication

Clarkson University offers a minor in Communication that is available to all undergraduate students with the exception of Communication majors. Courses used to fulfill the requirements of the minor include writing, speaking, graphic design, and theory. To achieve a minor in Communication, students must achieve a 2.0 grade average in six three-credit courses, distributed in the following fashion:

Students must take one course from each of the four groups below, plus any other two communication courses:
### Writing
- **COMM210** Theory of Rhetoric for Business, Science and Engineering
- **COMM226** Short Film Writing
- **COMM312** Public Relations
- **COMM313** Professional Communication
- **COMM 326** Feature Film Screenwriting
- **COMM330** Science Journalism
- **COMM428** Environmental Communication

### Speaking
- **COMM217** Introduction to Public Speaking
- **COMM312** Public Relations
- **COMM313** Professional Communication
- **COMM417** Business and Professional Speaking

### Design
- **COMM100** 2D Digital Design
- **COMM320** Digital Photography
- **COMM322** Typography and Design
- **COMM327** Digital Video Production I
- **COMM341** Introduction to Web Design
- **COMM345** Information Design
- **COMM360** Audio Production
- **COMM409** Introduction to Instructional Design
- **COMM427** Digital Video Production II
- **COMM440** PHP/My SQL Interactive Design
- **COMM441** JavaScript Interactive Design
- **COMM442** Advanced World Wide Web Interface Design
- **COMM444** Linux Web System Administration

### Theory
- **COMM310** Mass Media and Society
- **COMM410** Theory and Philosophy of Communication
- **COMM412** Organizational Communications and Public Relations Theory
- **COMM428** Environmental Communication

*Course may be used for one of two groups but not both.

**NOTE:** Students may transfer no more than six off-campus credits towards the minor. The chair of the Department of Communication & Media must approve transfer courses.
Minor in Computational Science
The minor in Computational Science and Engineering (CSE), is available to students in any major. The minor allows students to develop an expertise in CSE while pursuing a conventional major, which provides the context wherein they apply their computational skills. The requirements are:

MA377
Numerical Methods

At least two of:
MA232
Differential Equations
MA239/339
Elementary/Applied Linear Algebra
STAT282/383
Probability and Statistics

Plus application area electives to make a total of 21 credits. Application area electives are computational courses in departments other than Mathematics, typically drawn from the student’s major. The current list of approved courses is maintained by the Mathematics Department.

Minor in Computer Science
A minor in Computer Science is available to all students except those majoring in Computer Science or Software Engineering.

1. Core courses:
   CS141  Introduction to Computer Science I
   CS142  Introduction to Computer Science II
   MA211 Foundations
   CS344  Algorithms and Data Structures

2. Electives:
   Three additional CS courses, one numbered 200 or higher, one numbered 300 or higher, and one numbered 400 or higher. Each course must be worth at least three credits. Certain courses cannot be used for the minor and some substitutions are acceptable. Contact the Department of Computer Science for details.

Exclusion: The Minor in Computer Science is not open to students majoring in Computer Science or Software Engineering.

Minor in Gender & Sexuality Studies
All students choosing a minor in Gender and Sexuality Studies must complete 15 credit hours (five courses) and satisfy the following requirements:

1. Either SS 220, Introduction to Gender, or SS 221, Introduction to Sexuality

2. Four of the following Gender and Sexuality Studies courses:
As of July 2015, the list of approved Gender and Sexuality Studies courses includes:
Either SS 220 or SS 221 (whichever one was not taken to satisfy requirement #1)
ANTH 225 Global Perspectives on Sexuality
ANTH 325 Sex and Commerce
ANTH 330 Men & Masculinities
HIST 326 Modern Sex: Sexualities and Genders in Modern America
HIST 327 History of Women and Gender in America
HIST 328 History of Gender and Sexuality in the Transatlantic World
HIST 329 History of the American Family
HIST 338 Women, Gender, and Science in American History
HIST 342 War and Gender: The Modern Period
LIT 240 Gender and Popular Culture
POL 355 Women and Politics
SOC 310 Women and Religion
SOC 330 Health, Wealth, Inequality, and the Environment

3. SS 499 Zero-credit Minor Portfolio, as required of the other minors in the Department of Humanities and Social Sciences.

Advising for the minor takes place in the Department of Humanities and Social Sciences.

**Minors in Humanities and Social Sciences**

The Department of Humanities and Social Sciences offers minors that consist of a coherent set of five courses beyond the Clarkson Seminar, plus completion of a Minor Portfolio. There are three different types of minor: Thematic Minors, Disciplinary Minors, and Student-Designed Minors.

**Thematic Minors.** These interdisciplinary minors consist of five related humanities and social sciences courses that address a common theme. The currently available thematic minors are:

1. International and Cross-Cultural Perspectives
2. Literature and the Arts
3. Science, Technology and Society
4. War Studies

The list of courses in each of the thematic minors, as well as other information about them, is available from the Chair of Humanities and Social Sciences.

**Disciplinary Minors.** These minors consist of five courses in one of the disciplinary areas in the Department of Humanities and Social Sciences, for example, Anthropology, History, Sociology, Literature, Philosophy, and Political Science. A list of disciplinary areas, as well as other information about these minors, is available from the Department of Humanities and Social Sciences.

**Student Designed Minors.** Students propose these minors through the office of the Department of Humanities and Social Sciences to a faculty committee for approval. The proposal lists the courses that a student will take for his or her minor and articulates the coherence among the courses. Students are encouraged to design their minor in collaboration with a faculty advisor in the Department of Humanities.
and Social Sciences. Guidelines for developing and submitting a proposal for a student-designed minor are available from the department office.

**Minors Portfolio.** Under the guidance of a faculty advisor in the Department of Humanities and Social Sciences, a student completing one of the above minors will compile a portfolio that represents his or her learning experience in the minor. The portfolio will be completed within the appropriately designated 499, “Humanities/Social Sciences Minor Portfolio,” a zero-credit hour course under the direction of the student’s minor advisor in the department. A student must receive a P in the minor portfolio in order to complete the requirements for the minor. Additional information about the Minors Portfolio is available from the Department of Humanities and Social Sciences office, Snell 265.

* Courses taken to fulfill requirements for a Humanities/Social Science Minor cannot be used to fulfill requirements for a Humanities and Social Science Major.

**Minor in Information Technology**
A minor in Information Technology is available to students in any degree program. The requirements are 21 credits consisting of:

1. two courses in problem solving and programming: CS141 or EE261, and CS142 or EE361
2. one course in computer systems: CS241 or EE360
3. one course in database administration: IS314*
4. one course in computer networks: EE407/CS455
5. two courses concerned with Web technologies and administration: COMM442 and COMM444

* For School of Business Majors for whom IS314 is not a required course, IS211 may be used to fulfill this requirement.

**Minor in Mathematics**
A minor in Mathematics is available to a student who achieves a 2.0 grade-point average in seven three-credit courses from the following list:

|--------|-----------------------------|--------|-----------------------------|--------|------------------------------------------|--------|------------------------------|--------|----------------------------------|--------|-----------------------------|--------|----------------------------------|--------|-----------------------------|--------|-----------------------------|
MA132  Calculus II
MA211  Foundations
MA230  3-D Space and Projective Geometry
MA231  Calculus III
MA232  Elementary Differential Equations
MA239  Elem. Linear Algebra
Any three-credit courses numbered MA/STAT300 or above.

**Minor in Physics**
A minor in Physics is available to students in any degree program. To obtain a minor, a student must complete the following courses:

- **PH131**  Physics I (4 cr.)
- **PH132**  Physics II (4 cr.)
- **PH231**  Fundamentals of Modern Physics (3 cr.)
- **PH221**  Theoretical Mechanics (3 cr.)
- **PH331**  Quantum Physics I (3 cr.)

Any two 3-credit Physics courses at the 300-400 level (6 credits).

**These can include:**
- **PH371**  (CM 371) Physical Chemistry I
- **PH372**  (CM 372) Physical Chemistry II

**Minor in Psychology**
A minor in Psychology is available to students in any degree program, except Psychology. To obtain a minor in Psychology, a student must complete six courses, PY151 Introduction to Psychology and five PY courses selected from PY255, PY253, or any PY course numbered 300 or above, only one of which can be a directed research or internship.

**Minor in Software Engineering**
A minor in Software Engineering is available to students in any degree program with the exception of the Software Engineering and Computer Science degree programs. To obtain a minor, a student must complete the following course requirements:

a.  (CS141, CS142, and CS344) or (EE261, EE361, and EE363)
b. CS242 or EE408

c. EE368 or CS350

d. EE465/CS452, CS455/EE407, EE468/CS460, or other course approved by the Software Engineering Program Committee.

Minor in Statistics
A minor in Statistics is available to students in almost all degree programs. The requirements are:
At least 21 credits, distributed as follows.
1. One calculus course (MA181 or MA131 or equivalent)
2. One linear algebra course (MA239 or MA339 or equivalent)
3. One introductory statistics course (STAT282 or STAT383 or equivalent)
4. A total of at least 12 additional credits from statistics courses or projects including at least two statistics courses, or projects, from departments other than Mathematics. The current list of approved courses is maintained by the Mathematics Department.

Exclusion: Applied Mathematics and Statistics majors, and majors in Mathematics (Statistics option) are excluded from this minor.

Pre-Medicine, Pre-Dentistry, and Pre-Veterinary Programs
Students may earn a degree in any major program and also prepare for careers in health sciences. Students interested in preparing for professional schools in dentistry, medicine or veterinary science should contact the Chair of the Health Professions Advisory Committee at 315-268-3968.

Pre-Physical Therapy and the Physical Therapy Graduate Program
Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should contact the Department at 315-268-3786.

Pre-Physician Assistant and the Physician Assistant Graduate Program
Students interested in preparing for entrance into Clarkson’s Master of Physician Assistant Studies Graduate Program should contact the department at 315-268-7942.
Graduate Programs in Arts & Sciences

Through the School of Arts & Sciences, Clarkson offers Master of Science (M.S) and Doctor of Philosophy (Ph.D.) degrees in the following areas: biology (including bioscience and biotechnology), chemistry (including biomolecular), computer science, mathematics, and physics. In addition, master’s (M.S.) degrees in information technology, Occupational Therapy, and Physician Assistant Studies, as well as a Doctor of Physical Therapy degree are available. Faculty and students also participate in the interdisciplinary programs in environmental science and engineering, environmental policy and governance, and materials science and engineering.

For information regarding the admission process, application procedures, degree requirements and financial assistance, see the Graduate School. To learn more about faculty members and research areas contact the appropriate department. Additional information is also available at www.clarkson.edu/artsandsci/grad.

Biology

A major goal of the IB&B Program is to facilitate the training of students with skills needed to work on complex problems in biosciences. To support this aim, the graduate program faculty includes biologists, chemists, physicists, mathematicians, and engineers who serve as dissertation advisors. The program also requires participation of social scientists and ethicists who teach graduate courses in bioethics. In addition to the general program requirements described above, IB&B graduates are expected to acquire a significant specialized body of knowledge in at least one of the following four areas of specialization to provide intellectual depth to their education: (1) Molecular Bioscience & Biotechnology, (2) Biomedical Sciences & Neuroscience, (3) Computational Biology & Bioinformatics, or (4) Ecology, Evolution & the Environment.

Doctor of Philosophy

Bioscience and Biotechnology

Craig Woodworth, Director
woodworth@clarkson.edu

The Department of Biology offers a graduate program leading to the Ph.D. degree in Bioscience and Biotechnology. The goal of this program is to train students with the skills needed to work on complex problems in the biosciences. To support this aim, the graduate program faculty includes biologists, chemists, physicists, mathematicians, and engineers who serve as dissertation advisors. The program also requires participation of social scientists and ethicists who teach graduate courses in bioethics. In addition to the general program requirements described below, students are expected to acquire a significant specialized body of knowledge in at least one of the following four areas of specialization to provide intellectual depth to their education: (1) Molecular Bioscience & Biotechnology, (2) Biomedical Sciences & Neuroscience, (3) Computational Biology & Bioinformatics, or (4) Ecology, Evolution & the Environment. The faculty in the program are engaged in research covering a wide range of subjects in Bioscience and Biotechnology. Current research interests include: Neurophysiology and ion channels, molecular genetics of oogenesis and spermatogenesis, molecular phylogenetics and bioinformatics, comparative analysis of adaptive radiations, genetic regulation of enteric development, migration and differentiation and gene expression, microbial plankton ecology, behavioral and cognitive ecology, conservation science, analytical
chemistry of the great lakes, in situ remediation of contaminated soil and groundwater, and environmental contamination and its impact on human health.

For Master's level studies in Biology, the M.S. degree in Basic Science provides viable thesis and non-thesis options.

Program Requirements:
Required Two Core Graduate Lecture Courses (6 cr):
BY680 Advanced Cell Biology (3 cr)
BY682 Molecular Genetics (3 cr)
Required Graduate Laboratory Course (Choose one):
BY612 Molecular Biology Laboratory (4 cr)
BY670 Biochemistry & Biotechnology Laboratory (3 cr)
Specialization Elective Credits (6 cr):
Any 2 courses from one of the four specialization categories listed below
Free Elective Credits (3):
Any course from one of the specialization categories
Computational Biology Requirement: (3 cr):
Any course from the Computational Biology & Bioinformatics specialization category
Biology, Society, & Bioethics Requirement (3 cr):
Any course from the Biology, Society, & Bioethics category
Seminar Requirement (6 cr):
BY622 Graduate Seminar (6 cr taken over 6 semesters)
Specialization Area Courses:
Biomaterials and Biomedical Engineering Applications (3 cr)
Molecular Bioscience & Biotechnology
BY510 Developmental Biology
BY526 Introduction to Biophysics (3 cr)
BY612 Molecular Biology Laboratory (4 cr)
BY650 Biochemistry I (3 cr)
BY651 Biochemistry II (3 cr)
BY652 Pharmacology (3 cr)
BY670 Biochemistry & Biotechnology Laboratory (3 cr)
CM520 Separations and Electrochemistry (3 cr)
CM530 Colloid and Interfaces (3 cr)
CM544 Medicinal Chemistry (3 cr)
CM553 Medicinal and Pharmaceutical Biomaterials (3 cr)
CM562 Physical Chemistry for Life Sciences I (3 cr)
CM563 Pharmaceutical Chemistry (3 cr)
CM563 Physical Biochemistry (3 cr)
CM565 Biomimetic Nanotechnology (3 cr)
CM566 Bioelectronics & Bionanotechnology (3 cr)
ES552 Biomaterials & Biomedical Engineering Applications (3 cr)
Biomedical Sciences & Neuroscience
BY516 Immunobiology (3 cr)
BY518 Principles of Toxicology and Epidemiology (3 cr)
<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>BY520</td>
<td>Microbiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY540</td>
<td>Introduction to Biomedical Rehabilitation Engineering and Science</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY554</td>
<td>Physiological Psychology</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY560</td>
<td>Physiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY652</td>
<td>Pharmacology</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY655</td>
<td>Cell and Molecular Biology of Cancer</td>
<td>3 cr</td>
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<tr>
<td>BY660</td>
<td>Neurobiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>ME380</td>
<td>Special Topics: Biomechanics</td>
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</table>

**Computational Biology & Bioinformatics**

<table>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BY514</td>
<td>Bioinformatics</td>
<td>4 cr</td>
</tr>
<tr>
<td>BY659</td>
<td>Systems Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>CS511</td>
<td>Foundations of Computer Science</td>
<td>3 cr</td>
</tr>
<tr>
<td>ES505</td>
<td>Design of Experiments and Analysis of Data</td>
<td>3 cr</td>
</tr>
<tr>
<td>MA501</td>
<td>Advanced Engineering Mathematics I</td>
<td>3 cr</td>
</tr>
<tr>
<td>MA502</td>
<td>Advanced Engineering Mathematics II</td>
<td>3 cr</td>
</tr>
<tr>
<td>MA570</td>
<td>Fundamentals of Scientific Computation</td>
<td>F, 3 cr</td>
</tr>
<tr>
<td>MA571</td>
<td>Numerical Solution of Differential Equations</td>
<td>3 cr</td>
</tr>
<tr>
<td>MA580</td>
<td>Introduction to Monte Carlo Simulation</td>
<td>3 cr</td>
</tr>
<tr>
<td>STAT582</td>
<td>Mathematical Statistics</td>
<td>3 cr</td>
</tr>
<tr>
<td>STAT584</td>
<td>Advanced Applied Statistics</td>
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**Ecology, Evolution, & the Environment**

<table>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BY525</td>
<td>Biological Systems &amp; Environmental Change</td>
<td>3 cr</td>
</tr>
<tr>
<td>BY531</td>
<td>Limnology</td>
<td>4 cr</td>
</tr>
<tr>
<td>BY620</td>
<td>Evolution</td>
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<tr>
<td>ES533</td>
<td>Human Exposure Analysis</td>
<td>3 cr</td>
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<tr>
<td>ES534</td>
<td>Air Pollution Control</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE575</td>
<td>Coastal Engineering</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE577</td>
<td>Atmospheric Chemistry</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE579</td>
<td>Water and Wastewater Treatment Processes</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE580</td>
<td>Environmental Chemistry</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE583</td>
<td>Modeling Natural Aquatic Systems</td>
<td>3 cr</td>
</tr>
<tr>
<td>CE682</td>
<td>Environmental Biological Processes</td>
<td>3 cr</td>
</tr>
<tr>
<td>CH509</td>
<td>Receptor Modeling in Environmental Chemistry</td>
<td>S, 3 cr</td>
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<tr>
<td>IH550</td>
<td>Environmental, Health &amp; Safety Systems Analysis</td>
<td>3 cr</td>
</tr>
<tr>
<td>IH581</td>
<td>Advanced Topics in Environmental &amp; Occupational Health</td>
<td>S, 3 cr</td>
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</table>

**Biology, Society, and Bioethics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY567</td>
<td>Current Topics in Biology and Medicine</td>
<td>3 cr</td>
</tr>
<tr>
<td>POL571</td>
<td>Environmental Law</td>
<td>3 cr</td>
</tr>
<tr>
<td>POL580</td>
<td>The Law and Bioethics</td>
<td>3 cr</td>
</tr>
</tbody>
</table>
Chemistry

The Department of Chemistry and Biomolecular Science offers graduate programs leading to both M.S. and Ph.D. degrees in chemistry, including a biochemistry emphasis. Both degrees require advanced coursework along with faculty directed research culminating in a thesis and thesis defense. Assistantships, including scholarships with stipends, are available for well qualified students.

The research interests of the faculty span a range of experimental and theoretical areas. The department is internationally recognized for work in the broad field of materials chemistry with particular strengths in colloids and nanostructured materials. Most faculty are affiliated with the University's New York State funded Center for Advanced Materials Processing (CAMP). Work has included metallic and nonmetallic particles and their applications, materials for electronic applications and their preparation, polymers, biomaterials and surface responsive polymers. Work is also focused on environmental and health aspects of nanomaterials, including synthesis of porous metal organic frameworks for hydrogen storage, etc. A recent strength has emerged in bioanalytical and bioelectronic chemistry, including biosensors, biofuel cells as well as biocatalytic reactors and biologic devices. Additional work has included drug synthesis and delivery control. Work in proteomics is directed toward the identification of protein biomarkers for early diagnosis of cancers and other diseases.

Excellent laboratory facilities include scanning and transmission electron microscopes, scanning probe microscopes, atomic force microscope, atomic absorption, infrared, visible and ultraviolet spectrophotometers, nuclear magnetic resonance spectrometer, liquid scintillation, x-ray diffraction and energy dispersive x-ray, gas chromatography and high-performance liquid chromatography coupled with mass spectrometers.

Computer Science

The Department of Computer Science offers graduate programs leading to the degrees of Master of Science in Computer Science (offered jointly with the Department of Electrical and Computer Engineering) and Doctor of Philosophy in Computer Science. These programs are designed to increase the student’s fundamental knowledge and to give the student guidance and experience in research. A graduate student pursues these objectives by taking advanced courses, participating in seminars, and carrying out and reporting on a research project. The department provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests.

Faculty members are engaged in research over a wide range of subjects in computer science. Current research interests include: complexity theory, circuit complexity, proof complexity, computational learning theory, computer graphics, computer vision, quantum information, machine learning, networked systems, future internet architecture, software defined networking, automated deduction, software verification, cryptographic protocol analysis, operating systems, network security.

Details of the M.S. in Computer Science are in the interdisciplinary graduate programs section.

Data Analytics

See the Interdisciplinary Graduate Programs section.
Environmental Politics & Governance
See the Interdisciplinary Graduate Programs section.

Information Technology
See the Interdisciplinary Graduate Programs section.

Materials Science & Engineering
See the Interdisciplinary Graduate Programs section.

Mathematics
The Department of Mathematics offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees in Mathematics. These programs are designed to increase the student's fundamental knowledge and to give the student guidance and experience in research. A graduate student pursues these objectives by taking advanced courses, participating in seminars, and carrying out and reporting on a research project. The department provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests.

Faculty members are engaged in research over a wide range of subjects in the mathematical sciences. Current research interests include: dynamical systems, chaos, nonlinear dynamics, complex networks, critical phenomena and statistical mechanics, imaging science, functional analysis, numerical analysis, computational applied mathematics, inverse problems, optimization, hybrid and derivative-free optimization, sensitivity analysis, finite-element, multigrid, and spectral methods, fluid dynamics, atmospheric models, regional climate dynamics, computational geosciences, applied probability and statistics, multivariate and inferential statistics, application of nonparametric statistics, and biostatistics.

Physics
Graduate programs leading to degrees of Master of Science and Doctor of Philosophy are offered in the Physics Department. The programs provide a sound background in classical and modern physics, and guidance and experience in research. The department offers close personal association between graduate students and staff, giving special attention to the needs and interests of the individual; see http://www.clarkson.edu/physics/graduate/index.html

Well-prepared students may find it possible to complete the requirements for the Master’s degree in an academic year plus a summer; however, most students will require up to two years: see http://www.clarkson.edu/physics/graduate/graduate_ms.html. Doctoral candidates should expect to spend a minimum of two years beyond the Master’s in meeting degree requirements: see http://www.clarkson.edu/physics/graduate/graduate_phd.html.

Active research interests in the department include: chemical physics, energy storage and conversion, nonlinear phenomena, condensed matter physics, transport properties, effects of disorder, statistical mechanics, phase transitions, surface and interface physics, optics, biophysics, and self-assembly of nanomaterials, unconventional computing and (bio)sensing.
SCHOOL OF BUSINESS
Dayle Smith, Dean; Mark R. Frascatore, Associate Dean of Undergraduate Business Programs, Stephen Sauer, Associate Dean of Graduate Business Programs

The Clarkson University School of Business provides a valuable and interesting array of educational opportunities for students interested in careers that are aligned with the challenges and opportunities that face the business leaders of today. Managing innovation, the supply chain, customers, and flows of information and financial capital across global boundaries requires a set of knowledge and skills that become ingrained in our students. The proof is in the employment statistics of our graduates, who enjoy placement rates, starting salaries, and career mobility and flexibility that are among the best in the nation.

The mission of the Clarkson University School of Business is to work together to create and advance knowledge at the intersection of business and technology. We educate and develop students who span disciplinary boundaries, seek innovative solutions through creative problem solving, and lead in a global environment.

In an effort to achieve this mission, the School of Business has built a world-class faculty, and created a curriculum that requires hands-on learning, ample opportunities to develop leadership skills and build professional networks inside and outside the classroom. The School of Business has fostered an innovative and supportive culture where students and faculty enjoy working hard and seeing results.

We focus our resources on two areas that span the traditional functional boundaries: Global Supply Chain Management and Innovation & Entrepreneurship. Our curriculum has room for you to develop expertise in all of the traditional business disciplines: finance, accounting, marketing, management, operations and information systems, but we also allow you to clearly see how those business functions fit together in the real world, and help you create a balance of functional expertise with an understanding of the "big picture"; that is how the functional parts of organizations must work together to create value and wealth. This combination of detail-oriented expertise with a broad system-wide perspective is something that our employers helped us create. Our approach has proven to be effective and beneficial to employers and has helped us to earn national rankings in both supply chain management and entrepreneurship.

Our secret to implementing all of these ideas is simple to explain, but difficult for most schools to imitate. We offer an innovative first-year program for undergraduates where students innovate and then plan and run a real business; we offer multiple opportunities for hands-on learning; we help you build a professional network; we offer an integrated, technology-infused curriculum; and we start all of this early, at the beginning of your Clarkson experience. The result is a connected, knowledgeable graduate prepared for success in the business world and in the community. We can do this, and do it well, because of a combination of our size, our faculty, our alumni, our location and our heritage.

The strength of our curriculum is driven by the quality of our faculty. Faculty use active learning approaches to bring the curriculum to life. Small-group discussions, real-life case studies, field projects, student consulting teams and simulation exercises are examples of the teaching methods woven into courses. These experiences help develop students who can lead, be an effective team member, and work well with customers, suppliers, colleagues and the community. Written, oral and technological communication skills are integrated across the curriculum. Frequent visits by executives and managers link the classroom to the business world. To extend and broaden learning and development beyond the classroom, all School of Business students are required to have an international experience (either a traditional semester abroad or a short two to three week faculty-led trip) and a professional experience in the nature of an internship or a work co-op. Additionally, all students are encouraged to participate in campus organizations and professional societies. Strong programs in engineering and science provide special opportunities for students who wish to combine management and technical interests.
Our undergraduate and graduate programs of the School of Business are accredited by AACSB, the most prestigious national accrediting body for business programs. Fewer than 25 percent of the nation’s business programs share this distinction, which is based on an institution’s ability to deliver a comprehensive and unique business-related educational experience to its students.

FACULTY

Consumer and Organizational Studies
Professors Larry Compeau, Augustine A. Lado, Rajesh Sethi; Associate Professor Stephen Sauer, Sandra Fisher, Michael Wasserman; Assistant Professors Floyd Ormsbee, Na-Eun Cho, Zhaleh Semnani-Azad, Anju Sethi, Marc Compeau

Economics and Financial Studies
Professors Clifford Brown, Mark R. Frascatore; Associate Professors, Luciana Echazu, Martin Heintzelman, Diego Nocetti, Alasdair Turnbull, Allan Zebedee; Assistant Professors, Bebonchu Atems, Gilberto Marquez-Illescas, Mohamed Mekhaimer, Jose Vega, Linying Zhou, Joseph Andriano, Instructors Gasper Sekelj

Engineering & Management
Professor Amy Zander; Assistant Professor Muhammad Usman Ahmed, H. Cecilia Martinez Leon, Seyedamirabbas Mousavian, R. John Milne, Marshall Issen

Operations and Information Systems
Professors Boris Jukic, Farzad Mahmoodi; Associate Professors Weiling Ke, Santosh Mahapatra, Somendra Pant, Dennis Yu; Assistant Professors William MacKinnon, Chester Xiang; Instructors Jesse Sherman
Undergraduate Business Programs

Common First- & Second-Year Curricula

The program's first two years are designed to provide flexibility so students are exposed to a variety of courses. Students will have formal and informal opportunities to learn about the majors, minors and career opportunities so that a student can make a good decision about choosing an academic path in which he or she is interested. With the exception of Engineering and Management, courses students take are virtually identical for all School of Business students during those first two years, so a student need not declare a major until the sophomore year. Freshmen who enroll as undecided business majors are considered to be fully matriculated in the School of Business. Within the first two years, students will select a specific program of interest.

We have undergraduate integrated majors that result in the Bachelor of Science degree:

• Global Supply Chain Management
• Innovation & Entrepreneurship
• Financial Information & Analysis
• Information Systems & Business Processes
• Engineering & Management

We also offer a range of minors including Economics, Law Studies, Human Resource Management and Project Management. These are explained below. All Bachelor of Science degree candidates must successfully complete the Clarkson Common Experience, all requirements of their major and 120 credits. Additionally, all Bachelor of Science degree candidates must complete an international educational experience and an internship.

The Common First- and Second-Year Curriculum
(non-Engineering and Management majors)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC150</td>
<td>Principles of Microeconomics</td>
<td>3</td>
<td>EC151</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>SB113</td>
<td>Entrepreneurship and Business Innovation I*</td>
<td>3</td>
<td>SB114</td>
<td>Entrepreneurship and Business Innovation II*</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td></td>
<td>Non-Business Elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science Course</td>
<td>3</td>
<td></td>
<td>to satisfy Clarkson Common Experience Knowledge</td>
<td></td>
</tr>
<tr>
<td>MA180</td>
<td>Intro to College Math or Non-Business Elective **</td>
<td>4/3</td>
<td></td>
<td>Area requirement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective **</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>16/17</td>
<td></td>
<td>TOTAL</td>
<td>15</td>
</tr>
</tbody>
</table>

**Note:** Course numbers with an asterisk (*) indicate courses that are offered every semester. All other courses are offered once a year.
## Second Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS211</td>
<td>Introduction to ERP</td>
<td>3</td>
<td>OS286</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>AC205</td>
<td>Accounting for Decision Analysis</td>
<td>3</td>
<td>MK320</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>LW270</td>
<td>Law and Society I</td>
<td>3</td>
<td>OM331</td>
<td>Operations and Supply</td>
<td></td>
</tr>
<tr>
<td>PHIL243</td>
<td>Business Ethics (recommended or other non-business elective)</td>
<td>3</td>
<td>EC311</td>
<td>Introduction to Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>STAT282</td>
<td>Statistics</td>
<td>3</td>
<td></td>
<td>Non-Business Elective to satisfy Clarkson</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 15

## Second Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS237</td>
<td>Intro. to Programming and Application Development</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Science I***</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL** 15

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*Transfer students are required to take upper-level School of Business electives in place of SB113/SB114.

** Students must complete a basic calculus course. MA131 can be substituted for MA181.

*** Students wishing to major in Information Systems and Business Processes should take IS237 Introduction to Programming and Application Development in the sophomore year, or CS141 Introduction to Computer Science (4 credits) or EE261 Introduction to Programming and Software Design.
B.S. in Global Supply Chain Management (GSCM)

The principles behind supply chain management focus on developing seamless flows of raw materials, products/services, information and financial capital. The supply chain starts at the initial design process and includes raw material sourcing, logistics and continues through the delivery of that product or service to the end customer, with a goal of creating customer satisfaction at optimal cost. The GSCM curriculum takes a systems approach, which includes concepts and faculty from operations management, marketing, information systems, human resource management, strategic management and economics woven together in a seamless curriculum. Concepts emphasized include:

- Integration through ERP (Enterprise Resource Planning)
- A process management approach to quality
- A global orientation
- E-commerce based strategies
- Employing IT as a decision-making tool
- People and organizational skills for implementing GSCM solutions
- Incorporating environmental sustainability perspectives

Students earning a degree in Global Supply Chain Management must complete the Clarkson Common Experience and complete 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 27 credits of specialized business courses to satisfy the major requirements; and 18 credit hours of electives. Since 50% of coursework must be taken outside the School of Business (no more than 3 economics and 2 statistics courses can count as non-business courses), most electives, depending on courses chosen to fulfill the requirements of the Clarkson Common Experience, will be non-business courses taken in other schools at Clarkson University.

Required courses include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>EC451</td>
<td>Industrial &amp; Supply Chain Economics</td>
</tr>
<tr>
<td>IS428</td>
<td>Information Systems for Supply Chain Management</td>
</tr>
<tr>
<td>SB361</td>
<td>Supply Chain Environmental Management</td>
</tr>
<tr>
<td>SB381</td>
<td>Logistics Management</td>
</tr>
<tr>
<td>OM341</td>
<td>Global Sourcing &amp; Supply Chain Design</td>
</tr>
<tr>
<td>OM351</td>
<td>Quality Management &amp; Lean Enterprise</td>
</tr>
</tbody>
</table>

Students choose one professional elective from the following list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS314</td>
<td>Database Management</td>
</tr>
<tr>
<td>LW471</td>
<td>Law &amp; Society II</td>
</tr>
<tr>
<td>MK332</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>MK431</td>
<td>Supply Chain Distribution Channels</td>
</tr>
<tr>
<td>MK436</td>
<td>Creativity, Innovation &amp; New Product Development</td>
</tr>
<tr>
<td>MK437</td>
<td>Retail Marketing</td>
</tr>
<tr>
<td>OM476</td>
<td>Management of Technology</td>
</tr>
<tr>
<td>SB305</td>
<td>Cost Management</td>
</tr>
</tbody>
</table>
The following would be the typical Third- and Fourth-Year Plan. There is enough flexibility so that students studying abroad during the third year should still be able to complete the degree requirements.

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM351</td>
<td>Quality Management &amp; Lean Enterprise</td>
<td>3</td>
<td>IS428</td>
<td>Information Systems for Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management</td>
<td>3</td>
<td>OM341</td>
<td>Global Sourcing and Supply Chain Design</td>
<td>3</td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management I</td>
<td>3</td>
<td></td>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free or Non-Business Elective</td>
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<td></td>
<td>Professional Elective</td>
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<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area Requirement</td>
<td>3</td>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area Requirement</td>
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</tr>
<tr>
<td></td>
<td>TOTAL</td>
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<td></td>
<td>TOTAL</td>
<td>15</td>
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</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS466</td>
<td>Negotiations &amp; Relationship Management</td>
<td>3</td>
<td>SB441</td>
<td>Advanced Topics in Global Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SB381</td>
<td>Logistics Management Channels</td>
<td>3</td>
<td>EC451</td>
<td>Industrial and Supply Chain Economics</td>
<td>3</td>
</tr>
<tr>
<td>OS432</td>
<td>Organizational Policy and Strategy</td>
<td>3</td>
<td>SB361</td>
<td>Supply Chain Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience</td>
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<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowledge Area Requirement</td>
<td>3</td>
<td></td>
<td>Area Requirement</td>
<td>3</td>
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<td></td>
<td>Non-Business Elective</td>
<td>3</td>
<td></td>
<td>Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>15</td>
<td></td>
<td>TOTAL</td>
<td>15</td>
</tr>
</tbody>
</table>
B.S. in Engineering & Management
Amy K. Zander, Program Director
Misty Spriggs, Associate Director
Adrienne Boswell, Academic Advisor/Office Manager

Clarkson’s Engineering & Management (E&M) program is ideal for those who desire breadth and flexibility in a career centered on leadership and technology. The major was established in 1954 to meet the growing needs of industry for individuals with strong skill sets in both engineering and business. Graduates are prepared to integrate the rapidly changing technical and managerial aspects of an organization.

The E&M program utilizes Clarkson’s traditional strengths, stressing engineering principles and technical problem solving in conjunction with quantitative and qualitative managerial decision making. Students receive a balanced education involving course requirements from each of the major disciplines of engineering, business, science and liberal arts. The carefully planned curriculum is taught by faculty within their respective areas of expertise.

The Program Educational Objectives of the E&M program are to prepare students who within a few years of graduation:

• Apply technical problem solving skills to develop innovative, effective, and sustainable solutions to complex problems;
• Lead multi-disciplinary teams to success by managing team dynamics;
• Effectively communicate information for decision–making both orally and in writing to both technical and non-technical audiences;
• Continuously balance simultaneous demands of today’s global environment through multi-tasking capabilities of planning, organizing, managing and controlling resources;
• Combine engineering and business core knowledge and apply quantitative and qualitative methods to process analysis in business systems;
• Make timely, ethical and useful decisions in response to organizational challenges.

Typically, E&M students are people oriented, at ease with science and mathematics, and anticipate increasing managerial responsibilities over the course of their careers. Problem solving, communication and teamwork permeate the E&M curriculum. By design, the environment is one of collaborative teamwork and is known for strong mutual support among students. E&M graduates are recognized as leaders and facilitators who possess the ability to initiate new ideas and change.

The E&M program maintains two professional organizations and an E&M Student Advisory Council. Sigma Tau Iota, the E&M honorary society, consists of students enrolled in the program who display consistent academic excellence. The Engineering & Management Society regularly hosts business leaders and representatives who engage students in discussions that range from career opportunities to current industry trends and issues. The Student Advisory Council serves as a curricular advisory group and aids in assessment of the program outcomes.

Curriculum
The Engineering & Management program confers the Bachelor of Science (B.S.) degree upon completion of the 120 credit-hour program requirements. A candidate for the bachelor’s degree must not only pass all prescribed courses in the E&M curriculum, but must also meet all other graduation requirements and Clarkson Common Experience requirements stated in the Academic Requirements section of this catalog.

The Engineering & Management student is encouraged to use program professional electives to focus on specific career objectives. Students work closely with their advisor to select electives that best suit these objectives. Students often choose to pursue a minor in project management, a concentration in
global supply chain management, or courses in construction management or manufacturing management.

**Employment**
Due to the program’s unique nature, and the quality and versatility of students attracted to it, E&M graduates are some of the most heavily recruited at Clarkson. For example, while the program’s enrollment represents roughly 10 percent of the student population, E&M seniors are typically invited to interview with nearly half of all companies recruiting at the on-campus Career Fair.

The career paths of E&M alumni reflect the breadth of the program’s curriculum and include:

- Supply Chain Management
- Quality Systems Management
- Consulting
- Entrepreneurship
- Manufacturing and Production
- Applications Engineering
- Project Management
- Field Service Engineering
- Marketing and Technical Sales
- Construction Management

**Engineering & Management Curriculum**

### FIRST YEAR

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM205</td>
<td>Accounting for Decision Analysis</td>
<td>3</td>
<td>EM211</td>
<td>Intro to Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>EM120</td>
<td>Team-Based Design &amp; Innovation</td>
<td>3</td>
<td>EM121</td>
<td>Information Systems²</td>
<td>2</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td>PY151</td>
<td>Intro to Psychology</td>
<td>3</td>
</tr>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
<td>MA132</td>
<td>Calculus II</td>
<td>3</td>
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<tr>
<td>CM131</td>
<td>Chemistry I</td>
<td>4</td>
<td>CM132</td>
<td>Chemistry II or</td>
<td>4</td>
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<tr>
<td>FY100</td>
<td>First-Year Seminar</td>
<td>1</td>
<td>BY160</td>
<td>Cellular and Molecular Biology⁵</td>
<td>3</td>
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</table>

**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC350</td>
<td>Economic Principles &amp; Engineering Economics</td>
<td>3</td>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>LW270</td>
<td>Law &amp; Society</td>
<td>3</td>
<td>EM480</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>STAT383</td>
<td>Applied Statistics I</td>
<td>3</td>
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</table>

**SOPHOMORE YEAR**

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC350</td>
<td>Economic Principles &amp; Engineering Economics</td>
<td>3</td>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>LW270</td>
<td>Law &amp; Society</td>
<td>3</td>
<td>EM480</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>STAT383</td>
<td>Applied Statistics I</td>
<td>3</td>
</tr>
</tbody>
</table>

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC350</td>
<td>Economic Principles &amp; Engineering Economics</td>
<td>3</td>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>LW270</td>
<td>Law &amp; Society</td>
<td>3</td>
<td>EM480</td>
<td>Project Management</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>STAT383</td>
<td>Applied Statistics I</td>
<td>3</td>
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</tbody>
</table>


### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES330</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>FN361</td>
<td>Financial Management</td>
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<tr>
<td>EM333</td>
<td>Operations Research</td>
<td>3</td>
<td>EM331</td>
<td>Operations &amp; Supply Chain Management</td>
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</tr>
<tr>
<td>MK320</td>
<td>Principles of Marketing</td>
<td>3</td>
<td>ES250</td>
<td>Electrical Science</td>
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<tr>
<td>MA231</td>
<td>Calculus III</td>
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<td>EM351</td>
<td>Quality Management &amp; Lean Enterprise</td>
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</tr>
<tr>
<td>ES260</td>
<td>Materials Science or</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES222</td>
<td>Strength of Materials or</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EE264</td>
<td>Digital Design(^1)</td>
<td>3</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<th>Cr. Hrs.</th>
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<th>Cr. Hrs.</th>
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<tr>
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<td>EM432</td>
<td>Organizational Policy &amp; Strategy(^1)</td>
<td>3</td>
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<tr>
<td></td>
<td>Knowledge Area</td>
<td>3</td>
<td>Free Elective</td>
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<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
<td>EM456 Process Engineering &amp; Design(^1,3,4)</td>
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<td>COMM217</td>
<td>Public Speaking</td>
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15

\(^1\) Communications intensive (CI) – Students must earn a minimum of six (6) CI points outside of UNIV190 to meet graduation requirements.

\(^2\) Information technology-based courses

\(^3\) Technology course that meets CCE requirement

\(^4\) Students must take EM456 or another senior capstone design course approved by the Director of E&M.

\(^5\) Students who take BY160 rather than CM132 will need to complete one more credit of coursework to reach 120 credits.

A professional elective in Engineering & Management is a 3-credit course (or equivalent) that predominantly covers engineering or engineering management knowledge. Examples of such courses include: any sophomore, junior or senior-level course in engineering; any junior or senior level course in a topical knowledge area(s) in the Guide to the Engineering Management Body of Knowledge, 3rd edition, ASEM, 2013; courses focused on information technology.

At Clarkson University, the E&M professional electives are:

1. ...
· Any course in the Wallace H. Coulter School of Engineering of 200-level or higher (prefix ES, ME, AE, CE, CH, EE, BR) for which the student has the prerequisites, except for ES 238 Introduction to Energy Systems, ES 300 Engineering for Non-engineers, EE 268 Machine Intelligence or Stupidity, and BR 200 Intro to Biomedical and Rehabilitation Engineering, Science and Technology;
· Any 300-level or higher EM course;
· HP 390 (3 credits), HP 490 (3 credits), if the research is Engineering & Management based.
Transfer courses from other universities will be assessed against the definition above by the Director of E&M, or course faculty member(s) designated by the Director, for their professional elective status.

Course designations:
ES – Engineering Science
ME – Mechanical Engineering
AE – Aeronautical Engineering
CE – Civil and Environmental Engineering
CH – Chemical and Biomolecular Engineering
EE – Electrical and Computer Engineering
BR – Biomedical and Rehabilitation Engineering
EM – Engineering Management
HP – Honors Program

See Academic Requirements for details of the Clarkson Common Experience including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements. Students are required to take five courses which cover four of the six specified CCE knowledge areas; one University course (UC) must span two Knowledge Areas.

Professional Experience Requirement is met when student completes EM120, EM121, EM432 and EM456 or the recognized equivalents of these courses. Beginning with the Class of 2017, all students will participate in a project-based professional experience such as co-op, internship, directed research or community project related to the student’s professional goals

B.S. in Innovation and Entrepreneurship
This major is designed to leverage existing strengths in Innovation and Entrepreneurship by offering students a cross-disciplinary, flexible major that provides students with the knowledge and skills to:
• Develop and manage the innovation process;
• Plan and commercialize innovations;
• Evaluate and manage innovation opportunities;
• Participate in and manage ideation and the new product development process;
• Understand the legal and policy issues associated with new ventures; and
• Stimulate and manage the creation of new business enterprises both within and existing corporate structure and as start-up enterprises.

Toward this end, students are required to have fundamental knowledge of the creative process, market analysis and research, consumer behavior, commercialization and organizational design. Students may then also choose to deepen their knowledge by further study in negotiations, e-business, venture finance, management of technology and project management.

Students earning a degree in Innovation and Entrepreneurship must complete the Clarkson Common Experience and complete 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 30 credits of specialized business
courses to satisfy the major requirements; and 15 credit hours of electives. Since 50% of coursework must be taken outside the School of Business (no more than 3 economics and 2 statistics courses can count as non-business courses), most of the electives, depending on courses chosen for the Clarkson Common Experience, will need to be taken in other schools within Clarkson University.

Required courses include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>EC370</td>
<td>Economics of Innovation</td>
<td></td>
<td>MK436</td>
<td>Creativity, Innovation and New Product Development</td>
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<tr>
<td>SB322</td>
<td>Designing and Leading Innovative Ventures</td>
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<td>SB437</td>
<td>Commercializing Innovation</td>
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<tr>
<td>MK321</td>
<td>Consumer and Buyer Behavior</td>
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<td>SB440</td>
<td>Innovation and Entrepreneurship</td>
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<tr>
<td>MK332</td>
<td>Marketing Research</td>
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Students choose three Professional Electives:

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<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>SB305</td>
<td>Cost Management</td>
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<td>FN455</td>
<td>Venture Capital and Private Equity</td>
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<tr>
<td>LW471</td>
<td>Law and Society II</td>
<td></td>
<td>MK431</td>
<td>Supply Chain Distribution Channels</td>
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<tr>
<td>OM476</td>
<td>Management of Technology</td>
<td></td>
<td>AC407</td>
<td>Taxation of Business Entities</td>
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<td>Project Management</td>
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The following would be the typical Third- and Fourth-Year Plan. There is enough flexibility so that students studying abroad during the third year should still be able to complete the degree requirement.

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>MK321</td>
<td>Consumer and Buyer Behavior</td>
</tr>
<tr>
<td>EC370</td>
<td>Economics of Innovation</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management (or SB322)</td>
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<tr>
<td>FN361</td>
<td>Financial Management I</td>
</tr>
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<td>Non-Business Elective</td>
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### SENIOR YEAR

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<tr>
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</thead>
<tbody>
<tr>
<td><strong>Course Title</strong></td>
<td><strong>Course Title</strong></td>
</tr>
<tr>
<td>MK436 Creativity, Innovation and New Product Development</td>
<td>SB437 Commercializing Innovation</td>
</tr>
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<td>Professional Elective</td>
<td>SB440 Innovation and Entrepreneurship Strategy</td>
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<tr>
<td>3 Hrs.</td>
<td>3 Hrs.</td>
</tr>
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<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
<td>OS432 Organizational Policy and Strategy</td>
</tr>
<tr>
<td>3 Hrs.</td>
<td>3 Hrs.</td>
</tr>
<tr>
<td>Free or Non-Business Elective</td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
</tr>
<tr>
<td>3 Hrs.</td>
<td>3 Hrs.</td>
</tr>
<tr>
<td>Non-Business Elective</td>
<td>Professional Elective</td>
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<td>3 Hrs.</td>
<td>3 Hrs.</td>
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<tr>
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<td><strong>Total</strong></td>
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<tr>
<td>15 Hrs.</td>
<td>15 Hrs.</td>
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</tbody>
</table>
B.S. in Financial Information and Analysis

The field of Financial Information and Analysis (FI&A) provides students with expertise in the wide range of issues common to both finance and accounting. This includes the role of accounting as the basic language of business, the importance of accounting information systems in organizational decision making, and the use of this information by financial decision makers in managing assets and investments. The knowledge and skills developed through our unique curriculum provide graduates with the abilities to succeed in a workplace that is integrating the traditional functions of finance and accounting. The FI&A curriculum gives each student a fundamental knowledge of managerial and cost accounting, and financial statement analysis. Career opportunities for graduates in FI&A include fields such as management accounting, accounting information systems design, financial management, investment management, financial services, and corporate financial planning.

Students earning a degree in Financial Information and Analysis must complete the Clarkson Common Experience and complete 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 27 credits of specialized business courses to satisfy the major requirements; and 18 credit hours of electives. Since 50% of coursework must be taken outside the School of Business (no more than 3 economics and 2 statistics courses can count as non-business courses), most of the electives, depending on courses chosen for the Clarkson Common Experience, will need to be taken outside the School of Business.

An undergraduate student who successfully earns a degree in Financial Information and Analysis can apply to the Masters of Business Administration program at Clarkson. Successful completion of the MBA program, with an emphasis on accounting, allows a student to fulfill the 150 credit hour requirement necessary to sit for the certified public accounting licensure examination.

Required courses include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB305</td>
<td>Cost Accounting</td>
<td>FN464</td>
<td>Financial Management II</td>
</tr>
<tr>
<td>AC311</td>
<td>Financial Reporting &amp; Analysis I</td>
<td>FN470</td>
<td>Strategic Financial Management</td>
</tr>
<tr>
<td>AC312</td>
<td>Financial Reporting &amp; Analysis II</td>
<td>FN462</td>
<td>Investments</td>
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</table>

Students choose three Professional Electives:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>AC407</td>
<td>Taxation of Business Entities</td>
</tr>
<tr>
<td>AC421</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td>AC431</td>
<td>Advanced Accounting: Investment and Ownership Interests</td>
</tr>
<tr>
<td>FN/EC468</td>
<td>Financial Markets and Institutions</td>
</tr>
<tr>
<td>AC436</td>
<td>Auditing</td>
</tr>
<tr>
<td>FN575/576</td>
<td>Professional Fund Management 1 and 2 (must total at least 3 credits) *</td>
</tr>
</tbody>
</table>

• FN575/576 may be used for only one professional elective.
The following would be the typical Third- and Fourth-Year Plan. There is enough flexibility so that students studying abroad during the third year should still be able to complete the degree requirements.

**First Semester**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN361 Financial Management I</td>
<td>3</td>
<td>AC311 Fin. Reporting &amp; Analysis I</td>
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<td>3</td>
<td>OS352 Strategic Human Resource Management</td>
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<tr>
<td>SB305 Cost Management</td>
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<td>Non-Business Elective</td>
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<td>Non-Business Elective</td>
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**First Semester**

<table>
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<th>Course Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>FN462 Investments</td>
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<td>OS432 Org. Policy &amp; Strategy</td>
<td>3</td>
</tr>
<tr>
<td>FN464 Financial Management II</td>
<td>3</td>
<td>FN470 Strategic Fin. Management</td>
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<tr>
<td>AC312 Fin. Reporting &amp; Analysis II</td>
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<td>Professional Elective</td>
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<td>Professional Elective</td>
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<td>Non-Business Elective: Clarkson Common Experience Knowledge Area Requirement</td>
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<td>Total</td>
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</tbody>
</table>
B.S. in Information Systems & Business Processes

The Information Systems & Business Processes (ISBP) major provides students with the knowledge and skills to integrate information technologies into the business environment. This includes an understanding of current trends in information technology as well as an ability to work with people. Together, these proficiencies provide the ability to optimize business processes and solve business problems with the power of technology. Clarkson is at the forefront of utilizing and developing information systems. Required courses in the ISBP major impart fundamental concepts like business process analysis, enterprise resource planning fundamentals, e-Business tools and models, project management, and information systems analysis and design. Students can then tailor their study plan to their career interests by choosing their professional elective courses and projects in areas such as supply chain systems modeling, enterprise resource planning, or accounting information systems.

Students graduating with the ISBP major will have the following knowledge and skills:

1. An understanding of the components of an information system: the OSI network reference model (the seven basic layers of information systems communication), network operating systems, database platforms and emerging technologies and innovations in the field.
2. A working knowledge of database, including structure and usage in multiple business contexts across disciplines, industries and organizations, and fundamental knowledge of SQL (Structured Query Language).
3. The ability to understand and map business processes across disciplines and organization.
4. The ability to analyze and design basic information systems. Students should effectively contribute to the implementation of systems that are aligned with business processes.
5. Knowledge of a variety of system platforms including .Net, SAP, Oracle and Web. Students should be aware of strengths and limitations of these platforms vis-à-vis common business processes and should be familiar with the user interface, navigation and basic administrative functions.
6. Fundamental understanding of web development and the relationship of various web-based systems with business processes, supply chain management, and e-commerce in general.
7. The ability to communicate across functional areas and across organizations with respect to information systems challenges, specifications, problem solving, and user requirements.
8. An understanding of current practices in IT outsourcing, including project specification, contracting, project management, bridging national and organizational cultures, and managing outsourcing relationships.

Knowledge of information technology, business processes and management foundations combined with skill in communicating with customers, co-workers, and vendors place ISBP students in great demand upon graduation. Graduates with backgrounds in information systems typically start their careers in the areas of database design, information analysis, or ERP consulting. With experience, graduates in this field often advance to management positions, managing consultants or marketing and project planning with information technology vendors.

Students earning a degree in Information Systems & Business Processes must complete the Clarkson Common Experience and complete 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 27 credits of specialized business courses to satisfy the major requirements; and 18 credit hours are electives. Note that 50% of coursework must be taken outside the School of Business (no more than 3 economics and 2 statistics courses can count as non-business courses), so most of the electives will need to be taken outside the School of Business, depending on courses chosen for the Clarkson Common Experience.
Required courses include:

- IS237  Intro. To Programming and Application Development or IS415  Data Warehousing and Data Mining
- CS141  Intro to Computer Science or IS437  Business Application Development and Applications: Analysis & Design
- EE261  Intro to Programming and Software Design or OM480  Project Management
- IS314  Database Design and Management
- IS400  Business Processes

Students choose four professional electives, in consultation with their academic advisor, from the following list:

- COMM340  Client Side Interactive Design - TECH
- COMM341  Introduction to Web Design-IA:C2
- EE361  Fundamentals of Software Engineering
- COMM345  Information Architecture
- EE408  Software Design for Visual Environments
- IS426  Enterprise Architecture and Integration
- COMM440  PHP/My SQL Interactive Design
- COMM442  Advanced Worldwide Web
- CS460/EE468  Database Systems
- CS459  Human-Computer

The following would be the typical Third- and Fourth-Year Plan. There is enough flexibility so that students studying abroad during the third year should still be able to complete the degree requirements. Note that for this major, IS237 Introduction to Programming and Application Development, or CS141 Introduction to Computer Science I or EE261 should be taken prior to the junior year.
### JUNIOR YEAR

#### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>IS400</td>
<td>Business Processes and Applications: Analysis and Design</td>
<td>3</td>
<td>IS415</td>
<td>Data Warehousing and Data Mining</td>
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<td>IS314</td>
<td>Database Management</td>
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<td>OS352</td>
<td>Strategic Human Resource Management</td>
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#### Second Semester

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<td></td>
<td>Data Warehousing and Data Mining</td>
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<td>Clarkson Common</td>
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<td>Experience Knowledge Requirement/Non-Business Elective</td>
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### SENIOR YEAR

#### First Semester

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<td></td>
<td>Non-Business Elective: Clarkson Common</td>
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<tr>
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<td>Experience Knowledge Requirement</td>
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#### Second Semester

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<td></td>
<td>Business Application &amp; Development</td>
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<td></td>
<td>Organization Policy and Strategy</td>
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<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common</td>
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<tr>
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<td>15</td>
</tr>
</tbody>
</table>
Undergraduate Minors & Concentrations in Business

Minor in Business
The minor in Business is designed for students with a major outside of the school of Business who wish to pursue a collateral area in Business. Completion of the minor provides broad exposure to the foundations of major business functions. These areas include accounting, economics, finance, law, organizational behavior, operations management and marketing. All students choosing to minor in Business must complete 18 credit hours, or six courses, from among the following:

- EC150 or EC350* Principles of Microeconomics or Economic Principles and Engineering Economics
- EC151 or EC350* Principles of Macroeconomics or Economic Principles and Engineering Economics
- AC205 Introduction to Accounting for Decision Analysis
- LW270 Law and Society I
- OS286 Organizational Behavior
- FN361 Financial Management I
- OM331 Operations & Supply Chain Management**
- MK320 Principles of Marketing**

*A student may not take EC150 or EC151 if a student has taken EC350. Entry to EC350 is limited to students who have declared a major in Engineering and Management or a major in the School of Engineering.

**IS200 is a 1-credit required corequisite.

Minor in Economics
The development of an understanding in economics is not only necessary for all managers but also for all those seeking to understand how and why economic forces affect and shape the society and the world we live in. The success of any business ultimately depends on the decisions its managers make concerning the allocation of resources under differing market and economic conditions. Successful decision making requires a good understanding of markets and the central role that economic incentives play within and outside the firm. The Clarkson economics minor is designed to give students the basic tools and analytical background in economic analysis. The minor in economics can complement almost any major, whether in arts and sciences, business or engineering. The minor in economics consists of 18 credit hours of economic courses as follows:

- Principles of Microeconomics (EC150, EC350* or equivalent)
- Principles of Macroeconomics (EC151, EC350* or equivalent)
- **Econometrics and Business Statistics (EC311 or equivalent)

Three electives (9 credit hours) of 300- or 400-level EC designated courses if a student has taken EC150 and EC151. Four electives (12 credit hours) of 300- or 400-level EC designated courses if a student has taken EC350.
*A student may not take EC150 or EC151 if a student has taken EC350. Entry to EC350 is limited to students who have declared a major in Engineering and Management or a major in the School of Engineering.

** Students who have completed Stat 383 – Probability and Statistics are exempt from EC311 but will have to complete another upper level Economics course to replace EC 311.

**Minor in Human Resource Management**

The minor in Human Resource Management consists of the following courses totaling 15 credits:

- OS286/PY286/EM286 Organizational Behavior
- OS352 Strategic Human Resource Management
- OS452 Advanced Human Resource Management
- And two of the following courses:
  - EC475 Personnel Economics
  - EHS330 Safety Analysis - Environmental, Health, and Safety Assessment
  - LW 466 Law of the Workplace
  - OS466 Negotiations and Relationship Management

**Minor in Law Studies**

The minor in Law Studies is designed for students with an interest in studying law. The minor is beneficial for students who wish to structure their academic program to help prepare for law school. The minor will also serve the needs of students such as those who have an interest in human resources management, political science, construction management and supply chain management who want to learn more about the field of law and its many diverse issues and perspectives. All students choosing to minor in Law Studies must complete 18 credit hours (six courses) and satisfy requirements indicated below.

The following courses are required:

LW270             Law and Society I
LW/POL499        Law Studies Minor Portfolio (no credit)

Students choose two courses from the following list of courses with substantive law content:

LW466             Law and the Workplace
LW471             Law and Society II
POL375            Environmental Law
POL400            Constitutional Law

Students choose two courses related to social and policy issues. The current list includes such courses as the following. For the complete list, contact either the Associate Dean of Arts & Sciences at 315-268-6411 or the Associate Dean of Business at 315-268-2300.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>ANTH332</td>
<td>Cities and Social Justice</td>
</tr>
<tr>
<td>PHIL240</td>
<td>Contemporary Moral Issues</td>
</tr>
<tr>
<td>PHIL/POL380</td>
<td>Law and Bioethics</td>
</tr>
<tr>
<td>COMM428</td>
<td>Public Debate and the Environment</td>
</tr>
<tr>
<td>COMM310</td>
<td>Mass Media and Society</td>
</tr>
<tr>
<td>PHIL405</td>
<td>Sustainability Theory and Practice</td>
</tr>
</tbody>
</table>
PHIL243  Business Ethics
LW490    Internship (subject to availability)
PHIL341  Professional Ethics
EC320    Social and Political Issues in the Adirondacks
PHIL310  World Religions & Contemporary Issues
SOC330   Health, Wealth, Integrity & Environment

Students must complete one communication course. The current list includes such courses as the following. For the complete list, contact either the Associate Dean of Arts & Sciences at 315-268-6411 or the Associate Dean of Business at 315-268-2300.

COMM210  Theory of Rhetoric for Business, Science and Engineering
COMM410  Theory and Philosophy of Communication
COMM217  Introduction to Public Speaking
PHIL330  Logic for Critical Thinking

Minor in Quality-based Project Management
Clarkson University offers a minor in Project Management that is available to all undergraduate students. This minor is intended for students in all majors who want to prepare themselves for potential careers in project-centered work. A unique benefit of this minor is that students can pursue certification through the Project Management Institute (PMI)™ after completing the requirements of minor. PMI’s Certified Associate of Project Management (CAPM)® is considered the pathway to the Project Management Professional (PMP)® certification that is rapidly emerging as one of the fastest growing professional certifications in many industries and career areas. Additionally, certain students may opt to sit for the American Society for Quality’s “Certified Quality Improvement Associate” exam since the OM485 course covers the body of knowledge for that particular certification. Students who pursue the minor are under no obligation to sit for the CAPM® or CQIA®, which require an application and separate fee, completed and paid for by the student.

To achieve a minor in “Quality-based Project Management,” students must maintain a 2.0 average in the five (5) three-credit courses, distributed in the following fashion:

A. All three (3) of these courses:
   OM/EM480  Project Management (Prerequisite: statistics course)
   OM/EM351  Quality Management and Lean Enterprise (Prerequisite: statistics)
   SB305     Cost Management

B. Elective Courses (Choose any pair):
   OS/EM286  Organizational Behavior (Prerequisite: sophomore standing)
   OS352     Strategic Human Resource Management
              (Co/Prerequisite: IS211 or IS200, Prerequisite: OS286)
   OS/EM286  Organizational Behavior (Prerequisite: sophomore standing)
Concentration in Global Supply Chain Management for E&M Majors

The principles behind supply chain management focus on developing seamless flows of raw materials, products/services, information, and financial capital. The supply chain starts at the initial design process and includes raw material sourcing, logistics and continues through the delivery of that product or service to the end customer, with a goal of creating customer satisfaction at optimal cost.

A concentration in Global Supply Chain Management offered through the School of Business is available to E&M students. It requires 15 or more credit hours of specified coursework. Completion of an approved concentration is indicated on a student’s transcript.

Students must take these classes:

- EM 341 Global Sourcing & Supply Chain Design
- EM 381 Logistics Management
- IS 428 Info. Systems for Supply Chain Mgmt.

Additionally, students must two courses from the following:

- EM 351 Quality Mgmt. & Lean Enterprise
- OS 466 Negotiations & Relationship Mgmt.
- EM 361 Supply Chain Environmental Mgmt.

Pre-Occupational Therapy Plan

Students may earn a degree in any major program and also prepare for careers in health sciences. Students interested in preparing for entrance into Clarkson’s Master of Occupational Therapy Graduate Program should contact the department at 315-268-2161.

Pre-Law

Pre-law advising is available for students in the School of Business to help them develop academic programs that will serve as a strong foundation for future legal studies. A list of pre-law advisors is available through the dean’s office in the School of Business. The advisors provide counseling and information about law schools and careers in law.

Global Study Requirement

All business majors area required to complete a global student requirement. Students interested in cultural and trade relations between the United States and other countries may participate in the University International Student Exchange Program. It is expected that qualified students will complete a study exchange for at least one semester. Please refer to University Outreach and Student Affairs for more details on this program. If a student is not eligible for the Student Exchange Program, there are other options available for the student to fulfill the global study requirement including participation in a two-three week faculty led trip (UNIV399 Global Business Experience) to a foreign country.
Co-ops, Internships and Professional Experience
Students interested in gaining work experience and fulfilling their professional experience requirement while in college are encouraged to participate in the University Co-op or Internship Program. Please refer to University Outreach and Student Affairs for more details on these programs. Additionally, the School of Business may approve internships arranged by a student as fulfilling the professional experience requirement.

Honors Program
Clarkson offers a four-year undergraduate University Honors Program for exceptionally talented students in any major. For more information call the director at 315-268-2290.
Graduate Business Programs

The School of Business offers graduate work leading to the Master of Business Administration (MBA). The MBA program offers various options regarding delivery methods and length of time. The MBA degree can be obtained on either a full time or part time basis.

No specific undergraduate major is required for admission; however, applicants must demonstrate high promise for success as indicated by several components of student’s application profile which include (but is not limited to) undergraduate grade point average, score on GMAT or the GRE, work experience, and references. A typical graduate class includes recent college graduates, people with work experience, and men and women from many geographic regions of the world. The breadth and diversity of the student body serve to enrich the educational experience. Merit based scholarships are awarded on a competitive basis. Full time residential MBA students are also eligible to apply for a graduate assistant position working with a faculty/staff member.

The School of Business at Clarkson is accredited by the Association to Advance Collegiate Schools of Business (AACSB, an internationally recognized accrediting agency for graduate and undergraduate programs in business administration.

More information about the following programs can be obtained from the Graduate Business Programs office: telephone 315 268 6613; toll free for U.S. and Canadian 866 333. 6613; fax 315 268 3810; e mail busgrad@clarkson.edu; or Internet www.clarkson.edu/business/graduate.

The Master of Business Administration - Residential Program

The MBA degree is meant to provide students with the skills to be effective business leaders. At Clarkson, the program offers small class sizes and close faculty student interaction. Integrated core courses ensure that students share common experiences, while elective courses provide an opportunity for specialized study.

The MBA consists of foundation courses in ten specified areas and 38 credit hours of advanced graduate work. The foundation includes courses from the following subjects: financial and managerial accounting, information technology, corporate finance, microeconomics, macroeconomics, ethics, organizational behavior, marketing, operations and production management, quantitative methods/statistics. Through careful planning, students with backgrounds in engineering, liberal arts, or science may complete the foundation courses as part of an undergraduate minor or through pursuing the Summer Business Concepts program offered by our school, lasting from mid-May to end of July, preceding the start of the regular Fall semester. Some students may require overloading of courses and/or summer school to complete all required foundation courses. Articulation agreements, which specify acceptable foundation courses, exist for Clarkson’s engineering and science programs and a number of universities in the United States and Canada.

Beyond the foundation, the 38 credits of the residential MBA degree program consist of ten two-credit interrelated core modules, five three-credit graduate elective courses, and a three credit experiential course. The core modules stress business functions, emphasizing the development of communication, interpersonal, and managerial skills.

The core module titles are:

AC603       Management Accounting
OM606       Supply Chain Management
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EC604</td>
<td>Applied Economics</td>
</tr>
<tr>
<td>OS608</td>
<td>Organizational Behavior &amp; Performance Management</td>
</tr>
<tr>
<td>FN607</td>
<td>Financial Management</td>
</tr>
<tr>
<td>OS610</td>
<td>Strategic Planning</td>
</tr>
<tr>
<td>IS605</td>
<td>Information Systems</td>
</tr>
<tr>
<td>MK609</td>
<td>Marketing Management</td>
</tr>
<tr>
<td>OM602</td>
<td>Decision Analysis and Supply Chain Modeling</td>
</tr>
<tr>
<td>SB609</td>
<td>Corporate Ethical Decision Making</td>
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</table>

A Strategic Planning module (2 credits) is offered as a 12 week course during the spring semester or as an accelerated winterim semester on-line course. The other modules are taught for seven weeks each during the fall semester.

Graduate elective courses in residential program are available in several functional areas, and they include:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AC623</td>
<td>Financial Statement Analysis</td>
</tr>
<tr>
<td>AC636</td>
<td>Auditing</td>
</tr>
<tr>
<td>AC648</td>
<td>Seminar in Accounting Information Systems and Auditing</td>
</tr>
<tr>
<td>AC650</td>
<td>Accounting Research and Theory</td>
</tr>
<tr>
<td>EC660</td>
<td>Environmental Economics</td>
</tr>
<tr>
<td>EC651</td>
<td>Industrial Organization in Supply Chain</td>
</tr>
<tr>
<td>FN655</td>
<td>Venture Capital and Private Equity</td>
</tr>
<tr>
<td>FN672</td>
<td>Investments</td>
</tr>
<tr>
<td>FN680</td>
<td>Strategic Financial Management</td>
</tr>
<tr>
<td>IS629</td>
<td>Global Outsourcing of Information Systems and Services</td>
</tr>
<tr>
<td>MK689</td>
<td>New Product Marketing</td>
</tr>
<tr>
<td>MK696</td>
<td>Marketing Methods</td>
</tr>
<tr>
<td>OM676</td>
<td>Developing and Managing Technology</td>
</tr>
<tr>
<td>OM680</td>
<td>Strategic Project Management</td>
</tr>
<tr>
<td>OM685</td>
<td>Quality Management and Process Improvement</td>
</tr>
<tr>
<td>OM671</td>
<td>Supply Chain Environmental Management</td>
</tr>
<tr>
<td>OS657</td>
<td>Leading Organizational Change</td>
</tr>
<tr>
<td>OS666</td>
<td>Negotiations and Relationship Management</td>
</tr>
<tr>
<td>SB611</td>
<td>Clarkson Consulting Group</td>
</tr>
<tr>
<td>SB693</td>
<td>Seminar in International Business</td>
</tr>
<tr>
<td>SB696</td>
<td>Advanced Topics in Supply Chain Management</td>
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</tbody>
</table>

In the course of their MBA program of study, students can earn a certificate in Global Supply Chain Management, Environmental Management, Innovation and New Venture Management or Accounting, by taking a certain set of electives as determined by the requirements of each certificate.

Experiential learning is a strong part of Clarkson's culture so each student participating in the residential MBA program is required to take a three credit hour experiential course. Currently, the experiential requirement can be satisfied by participating in global business program, or by taking the SB696 Global Business Strategies course. Through the Global Business Programs, there are several options that are designed to give you knowledge and new perspectives regarding international business, helping you develop critical skills necessary to compete and succeed in the global market. The most popular Global
Business Program option is the course that includes a 2-3 week trip to an international destination, often led by the faculty from that area. This course offers a unique opportunity to explore business outside the traditional classroom boundaries and to provide a unique experience to your resume. This course also helps you explore the global management issues facing business leaders and organizations in different parts of the world.

There are three length-of-study options for the residential MBA program:

- The Accelerated One-Year study plan, with all 38 credits completed over the course of two consecutive semesters
- 1.5 Years study plan with core modules and electives completed over the three consecutive semesters
- 2 Years, with core modules and electives completed over the four consecutive semesters

While most students begin their MBA residential program in a fall semester, we do allow students to start their program in the spring. The students starting in the spring have their choices of elective courses in that first semester limited to those that do not have core modules as pre-requisites, and the Strategic Planning module cannot be taken during the first spring semester.

The Global Master of Business Administration – Residential Program with one semester abroad at one of the partner AACSB accredited schools
The Global MBA follows the same curriculum structure and has the same foundation requirements as the regular residential MBA program, with students completing up to six courses over the spring semester at one of the partner institutions. The courses taken at the partner institutions need to be approved by the Graduate School of Business as elective courses and/or a substitute course for the Strategic Management core module. Students are allowed to participate in the Global MBA program if they achieve satisfactory performance in the first set of core MBA modules as determined by the Graduate School of Business. The current choices of AACSB accredited partner institutions include the Bordeaux School of Management, in Bordeaux, France and Griffith University, in Brisbane, Australia. These elective classes meet the elective requirement and experiential unit requirement of the residential MBA program. Students starting in the spring semester cannot participate in the Global MBA program in their first semester.

Clarkson 4+1 Articulation Agreements
Clarkson has “4+1” articulation agreements with a number of colleges and universities in the United States and Canada that enable students to fulfill the business foundation requirements as undergraduates. Students from any undergraduate discipline can participate in these 4+1 programs by carefully selecting appropriate foundation courses as undergraduate. For further information about specific foundation requirements at our 4+1 partners, please visit our Web site at www.clarkson.edu/business/graduate.
Online MBA Program

The online MBA program is a 42 credit hour program. This program is designed to be completed part time, taking up to two credit courses during of the four 12 week periods. If this plan of study is followed, the students can complete all the degree requirements in 21 months. Maximum time to complete the program will be five years. All students are required to take nine (three credit hours each) MBA core courses which correspond to the residential core modules, as well as a Leadership Development course split into a 1.5 credit campus seminar style classes at the beginning of each academic year, followed by an online 1.5 credit class. The remaining 12 credits are comprised of four elective courses.

The Online MBA program does not require any business foundation courses prior to enrollment. The foundation requirement for the Online MBA program is satisfied by offering extended versions of the nine core advanced courses which carry three credits each (as well as two 1.5 credit Leadership development courses), compared to the ten core advanced courses in the Residential MBA program which are two credits each.

The core module course numbers and titles in the on-line program are:

AC604 Management Accounting
OM607 Supply Chain Management
EC605 Managerial Economics
FN608 Financial Management
OS610 Strategic Planning
IS606 Information Systems
MK611 Marketing Management
OM603 Decision Analysis and Supply Chain Modeling
SB610 Corporate Ethical Decision Making
OS 602: Leadership Development I: Foundations of Leadership and Organizational Behavior (1.5 credits)
OS 603 Leadership Development II: Leading Organizational Change (1.5 cr.)

Graduate elective courses in the on-line MBA program include:

EC652 Industrial Organization in Supply Chain
OM681 Strategic Project Management
OM686 Quality Management and Process Improvement
OS656 Leading Organizational Change
OS667 Negotiations and Relationship Management
SB640 Advanced Topics in Supply Chain Management

The Reh Center for Innovation and Entrepreneurship
The Entrepreneurship Center
Erin Draper, Director

A resource center located within the Clarkson University School of Business, the Entrepreneurship Center helps small business owners and entrepreneurs develop and manage sustainable micro enterprises through partnerships with universities and government support programs.

The Center builds upon the University’s nationally recognized expertise in entrepreneurial education and long-standing commitment to boost regional economies through small business development.
The goal of the Center is to serve as a national model for enhancing regional economic development by focusing on micro enterprises. Additionally, increased hands-on learning opportunities provide students with tremendous learning opportunities in marketing, management and finance.

WALLACE H. COULTER SCHOOL OF ENGINEERING
“Technology Serving Humanity”

Goodarz Ahmadi, Distinguished University Professor; John Moosbrugger, Associate Dean for Academic Programs

In our modern technological society, engineers and scientists must work together with a variety of other professionals in seeking solutions to complex problems. Revolutionary advances in applied science and technology have broadened the horizons of engineering. At the same time, these advances have created a multitude of challenging multidisciplinary problems in virtually every sphere of human activity.

The role of engineers in today’s society has become more and more critical. Engineers require not only a knowledge of fundamentals for finding solutions to problems, but they must be aware of the broad social, economic, political, and environmental implications of their ventures. The engineering programs at Clarkson are designed to provide students with a foundation in science, engineering, humanities, and management. Our goal is to make sure Clarkson graduates are highly competent in their chosen fields while at the same time they are alert on their responsibilities to society and truly practice “technology serving humanity.”

In preparing students to become effective contributors to society and industry, Clarkson University has developed an award-winning program called SPEED (Student Projects for Engineering Experience and Design). The current seventeen SPEED projects, including FIRST Robotics and Mini-Baja, encompass multidisciplinary and socially responsible approaches to solving real-world problems. Not only do the SPEED projects involve design and fabrication, they also incorporate marketing, public relations, communications, and management resulting in teams being made up of engineering, business, science, and liberal arts students. The Coulter School also provides opportunities for research experience for undergraduates (REU) involving participation of students in faculty research labs. These programs offer opportunities for students to amass the necessary “real-world” experiences and professional skills through several engineering design projects and research experiences.

In spring 2002, Clarkson announced that the Wallace H. Coulter Foundation had made a $30 million commitment to the University in support of ongoing excellence in its engineering and science programs. This gift reinforces and broadens Clarkson’s most successful learning and research activities in support of the theme “Technology Serving Humanity.”

Clarkson’s School of Engineering has been named the Wallace H. Coulter School of Engineering in recognition of the Foundation’s generous gift and the late Wallace Coulter’s dedication to the University as a trustee. Wallace H. Coulter was a renowned inventor and entrepreneur. He became acquainted with Clarkson through his collaboration with colloid scientists on the faculty. In 1979 he received an honorary doctorate, and he served as a trustee of the University from 1983 to 1989. Through the years he maintained close connections with Clarkson, supporting research projects and establishing an endowed scholarship.

The grant funds five key areas: team project-based learning activities; endowed chairs and endowed fellowships; a new program in rehabilitation engineering; upgrades of laboratory facilities; and scholarships...
for both minority students and women pursing a degree in engineering. Growth in these evolving areas will complement and reinforce the programs and curricula described in this catalog.

The Coulter School of Engineering comprises the Departments of Chemical and Biomolecular, Civil and Environmental, Electrical and Computer, and Mechanical and Aeronautical Engineering.

UNDERGRADUATE PROGRAMS

The eight-semester undergraduate degree granted in engineering is the Bachelor of Science (B.S.), with specialization in one of the eight programs are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org:

• Aeronautical Engineering
• Chemical Engineering
• Civil Engineering
• Computer Engineering
• Electrical Engineering
• Engineering & Management
• Mechanical Engineering
• Software Engineering
• Environmental Engineering

A candidate for the bachelor’s degree must not only pass all prescribed courses in one of the eight-semester engineering curricula, but must also meet all of the other graduation requirements and Clarkson Common Experience requirements. See Clarkson’s homepage at www.clarkson.edu/engineering.

Minors and Professional Concentrations

Clarkson’s engineering curricula contain a number of elective courses. Furthermore, many students have room for additional courses through advanced placement, overloading, and by taking courses in the summer. Therefore, engineering students, in consultation with their advisors, have an opportunity to formulate academic programs that reflect individual interests, career goals, and areas of professional specialization. See Professional Concentrations in Engineering and Minors and Concentrations.

Engineering Studies

Some students entering the School of Engineering are not sure which academic discipline to pursue. These students may choose the Engineering Studies Program. A Director of Engineering Studies and support faculty serves as advisors to these students and assists them in selecting curricula. For additional information, consult with the Associate Dean of Engineering for Academic Programs at 315-268-6446. The Engineering Studies classification provides students with an opportunity to learn more about various programs within the School of Engineering prior to selecting a specific program. Undergraduates may choose between; Aeronautical Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, Mechanical Engineering and Software Engineering.

Combined B.S. Engineering /MBA or ME/MBA Programs

By proper selection of electives, in five years a Clarkson student can receive a B.S. in engineering and a master’s degree in business administration. This may require course overloads in some semesters and/or attendance at summer school. Interested students should contact the School of Business regarding the five-year BS/MBA option. Students with a B.S in engineering also have an option to earn both a master’s degree in engineering and a master’s degree in business administration in two years. For information on the two-
year joint ME/MBA program, see the description of the program in the Graduate Engineering Programs section of the Catalog.

Pre–Law
Pre-law advising is available for engineering students to help them develop academic programs that will serve as a strong foundation for future legal studies. For information contact the Pre-Law Adviser at 315-268-2300.

Honors Program
Clarkson offers a four-year undergraduate University Honors Program for exceptionally talented students in any major. For more information, call the director at 315-268-2290.

Engineering Student Organizations and Design Competitions
In addition to the University organizations, Clarkson has student-led chapters of the following professional organizations:

- American Institute of Chemical Engineers
- American Society of Civil Engineers
- Institute of Electrical and Electronic Engineers
- American Society of Mechanical Engineers
- Society of Women Engineers
- Association of General Contractors
- American Institute of Aeronautics and Astronautics
- American Indian Science and Engineering Society
- National Society of Black Engineers
- Society of Automotive Engineers
- New York Water Environment Association
- Society for Hispanic Professional Engineers.

Each department has an honorary society, and there is an all-engineering honorary society. Students can participate in national competitions, often for course credit through the Multidisciplinary Project (MP) or Multidisciplinary Team (MT) course system, via the following:

- Concrete Canoe
- Construction Management
- Clean Snowmobile
- Zero Emission Snowmobile
- Chem E Car
- Design, Build, Fly
- Engineers Without Borders
- Environmental Design
- FIRST Robotics
- Formula SAE
- Mini-Baja
- Steel Bridge
- Timber Bridge
- Revolutionary Aerospace Systems Concepts Academic Linkage (RASCAL)

Transfer Programs
Both 2+2 and 3+2 transfer programs are available at Clarkson.
GRADUATE PROGRAMS
Clarkson offers master of science, master of engineering and doctoral degrees through the departments of chemical & biomolecular engineering, civil & environmental engineering, electrical & computer engineering, and mechanical & aeronautical engineering. Several interdisciplinary graduate programs are also available in engineering science, engineering and global operations management, environmental science & engineering and information and materials science and engineering technology. The graduate program is designed to prepare students for careers in research, development, design and education.

Faculty
Chemical and Biomolecular Engineering John B. McLaughlin — Chair; Professors S.V. Babu, Ruth Baltus, John B. McLaughlin, David Mitlin, Eunsu Paek, Don H. Rasmussen, Marco Aurelio Satyro, R. Shankar Subramanian, Ross Taylor, William R. Wilcox; Associate Professors Richard J. McCluskey, Sitaraman Krishnan; Assistant Professors, Selma Mededovic, Zijie Yan; Adjunct Professor Ian I. Suni; Research Professor Raghunathan Rengasamy, Research Associate Professor Xinli Jia;

Civil and Environmental Engineering
James Edzwald, Professor and Chair of Civil and Environmental Engineering; Professors James S. Bonner, John P. Dempsey, Andrea R. Ferro, Stefan J. Grimberg, Thomas M. Holsen, Feng-Bor Lin, Kerop D. Janoyan, Levon Minneyan, Susan E. Powers, Weiming Wu, Poojitha D. Yapa; Associate Professors Narutoshi Nakata, Sulapha Peethamparan, Shane Rogers, Steven Wojtkiewicz; Assistant Professors Christopher Kelson, Kenneth Meding, William Olsen; Ian Knack, Milani Sureka Sumanasooriva, Tyler Smith, Khiem Tran; Distinguished Research Professor Hung Tao Shen; Research Professor Hayley H. Shen; Research Assistant Professor Jong Kwon Choe; Adjunct Associate Professors Spencer F. Thew, Brooks Washburn; Adjunct Instructor Cory McDowell, Jared Heinl; Professor Emeritus Norbert L. Ackermann, Gordon B. Batson

Electrical and Computer Engineering
William Jemison — Professor and Chair of Electrical and Computer Engineering; Professors Cetin Cetinkaya, Paul B. McGrath, Thomas H. Ortmeyer, Ming-Cheng Cheng, Charles Robinson, Stephanie Schuckers; Associate Professors, James J. Carroll, Chuan He, Daqing Hou, Abul N. Khondker, Jack Koplowitz, Lei Wu, Jeanna Mathews, James A. Svoboda; Assistant Professors, Mahesh Krishna Banavar, Melike Erol Kantarci, Burak Kantarci, Jie Li, Chen Liu, Sanjib Kumar Banerjee; Distinguished Research Professor Liya L. Regel; Visiting Instructor Timothy Fanelli, Daniel Rissacher, Ajay Sonar

Mechanical and Aeronautical Engineering— Daniel Valentine Professor and Chair of Mechanical and Aeronautical Engineering; Professors Goodarz Ahmadi, , Cetin Cetinkaya, Suresh Dhaniyala, Brian Helenbrook, John C. Moosbrugger, Kenneth Willmert; Associate Professors Ajit Achuthan, Daryush K. Aidun, Doug Bohl, Kevin Fite, Kathleen Issen, Ratneshwar Jha, Ronald S. LaFleur, Marcias Martinez, Kenneth D. Visser, Steven W. Yurgartis; Assistant Professors Byron Erath, Laurel Kuxhaus, Ioannis Mastorakos, Arthur Michalek, Parisa Mirbod, Philip Yuya, Rashid Aidun, Ronald Buckingham; Adjunct Professor William Arnold, David Wells; Research Professor Piergiovanni Marzocca
Undergraduate Engineering Programs
Common First-Year Engineering Curriculum

For all majors except Engineering & Management, the first two semesters are identical in the undergraduate engineering curricula. Therefore, students may defer the selection of a major field of study until the sophomore year. Beginning with the junior year, a significant amount of specialized material is incorporated into each curriculum. In the senior year, coursework is concentrated in the student’s chosen field. Courses in humanities and social sciences are taken throughout the four-year program as part of the Clarkson Common Experience.

The Common First-Year Curriculum in Engineering*

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM131</td>
<td>Chemistry I</td>
<td>4</td>
<td>CM132</td>
<td>Chemistry II (or BY 160 Biology II**)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I</td>
<td>4 (3)</td>
<td>PH132</td>
<td>Physics II</td>
<td>4</td>
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<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
<td>MA132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td>ES110</td>
<td><em>Engineering and Society or Equivalent</em>**</td>
<td>3</td>
</tr>
<tr>
<td>FYPE100</td>
<td>First-Year Seminar</td>
<td>1</td>
<td>ES100</td>
<td>Introduction to Engineering Use of the Computer</td>
<td>2</td>
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</table>

15 (14)  16 (15)

*This is a typical curriculum sequence, listing courses that are required of all engineering majors, except Engineering and Management. Not all students will complete these courses in the first year. For example some students will take ES 110 in lieu of PH 131 in the first semester, then PH 131 in the second semester and PH 132 in the third semester.

**Mechanical, Aeronautical, Electrical, Computer, and Software Engineering majors can substitute BY 160 for CM 132. Chemical, Civil and Environmental Engineering require CM132. Students who do not also take BY 162 (Biology II Laboratory) should consult with their advisor to insure they will meet the 120 credit hour requirement.

*** ES 110 or equivalent is a required Knowledge Area course. A total of five Knowledge Area courses must be taken, and these five courses must cover at least four of the six knowledge areas. At least one of these courses must be a university course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the knowledge area electives must be an economics course, EC350 is required for most degrees.
B.S. in Aeronautical Engineering

The objectives of the Aeronautical Engineering program are that graduates

1. will competently apply engineering methods to solve professional problems associated with the design, manufacture, and maintenance of aircraft and related systems and understand the social, ethical, and environmental context of their work;
2. will communicate clearly, collaborate competently in teams, and assume leadership roles;
3. will have the habit of continuous professional development.

The program outcomes are the generic abilities that graduates will demonstrate that they have acquired. The defining characteristics of professional problems1 and the process used to solve them lead directly to these generic program outcomes.

1 See Mechanical & Aeronautical Engineering Department Student Handbook.

- An ability to apply knowledge of mathematics, science, and engineering, an ability to design and conduct experiments, as well as to analyze and interpret data. (ABET a& b)
- An ability to design a system, component, or process to meet desired needs with realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, and an ability to function on multidisciplinary teams. (ABET c & d)
- An ability to identify, formulate, and solve engineering problems, and an understanding of professional and ethical responsibility. (ABET e & f)
- An ability to communicate effectively, and the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context. (ABET g & h)
- A recognition of the need for, and an ability to engage in life-long learning, and a knowledge of contemporary issues. (ABET i & j)
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. (ABET k)

The Aeronautical engineering program expects that graduates have a knowledge of aerodynamics, aerospace, structures, propulsion, flight mechanics, and stability and control. It is also expected that graduates have design competence that includes integration of various disciplines within aeronautical engineering.

Curriculum Overview: The 120-credit program contains 87 credit hours of required technical courses, 33 credit hours of electives (including two professional electives, one undesignated elective and five Knowledge Area/University Course, KA/UC, electives).

Required Technical Courses: The first two years of the curriculum cover mathematics, physics, chemistry and engineering science courses (including basic principles of statics, dynamics, solid mechanics, electrical circuits, materials and the use of computers).

In the third and fourth years, students take specialized courses on topics such as aerodynamics and flight mechanics. These courses provide knowledge and skills that strongly support the second outcome listed above, which is a key element in aircraft design. The laboratory components of the first-year physics and chemistry courses introduce study of the relationship between theory and reality. This fosters the development of the student’s technical intuition. Aeronautical engineering laboratory courses add to this development.

Training in professional problem-solving begins in the spring of the second year, with the first course in engineering design. The first course to train students formally in the solution process, it lays the foundation for the fourth-year capstone design course. In the capstone course, students work in teams to design an aircraft. Thus, they learn to apply the solution process to a real professional problem. Students may acquire additional professional experience by participating in the Design, Build, and Fly Competition
team. Or they may participate in the Formula SAE, Mini-Baja, Clean Snowmobile, or other team competitions, which are open to any student.

Common Curriculum Requirements: Plans of study must include a total of five Knowledge Area (KA) courses. Students will select these so that at least one is a designated University Course, and so that together these five courses cover four knowledge areas. Communication intensive course requirement will be fulfilled by a combination of courses having one or two communication points each, with a total of six points required for graduation. At least two of these six points will be earned through 300- or 400-level courses required in the major.

Professional and Undesignated Electives: The professional electives must meet criteria in the Mechanical and Aeronautical Engineering (MAE) Department Student Handbook. The undesignated elective may be any college-level course that does not contain a significant amount of material already covered in other courses. It could be chosen to enrich the student’s technical or nontechnical background. Advanced (200-level or above) Aerospace Studies or Military Science courses may be used as undesignated electives.

### Curriculum

#### FIRST YEAR
(See Common First-Year Curriculum in Engineering)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>First Semester</th>
<th>Second Semester</th>
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<tr>
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<tr>
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<td>Aerospace Studies</td>
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<td></td>
<td>(if elected)</td>
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<td>Aerospace Studies</td>
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#### SOPHOMORE YEAR

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<td>Electrical Science</td>
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<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
<td>AE/ME212</td>
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<td>MA232</td>
<td>Elementary Differential</td>
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<td>MA231</td>
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<td>Equations</td>
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<td>AE201</td>
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<td>KA/UC Elective</td>
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<td>Lab I</td>
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<td>Fluid Mechanics</td>
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<td>Aerodynamics</td>
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<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
<td>AE429</td>
<td>Aircraft Performance</td>
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<td>AE/ME350</td>
<td>Aircraft Structures</td>
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<td>AE429</td>
<td>and Flight Mechanics</td>
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<td>MA330</td>
<td>Advanced Engineering Math**</td>
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<tr>
<td>AE/ME455</td>
<td>Mechanical Vibrations and Control</td>
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<td>AE401</td>
<td>Mechanical Engineering Lab III</td>
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<td>AE301</td>
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<td>Professional 1 Elective</td>
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<td>AE430</td>
<td>Stability Control of Aerospace Vehicles</td>
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<tr>
<td>AE/ME431</td>
<td>Gas Dynamics</td>
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<td>Economics Elective</td>
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### SENIOR YEAR

#### First Semester

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<td>AE430</td>
<td>Stability Control of Aerospace Vehicles</td>
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<tr>
<td>AE/ME431</td>
<td>Gas Dynamics</td>
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<tr>
<td></td>
<td>Economics Elective</td>
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#### Second Semester

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<tbody>
<tr>
<td>AE51</td>
<td>Aircraft Design II</td>
<td>3</td>
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<tr>
<td>AE427</td>
<td>Design of Propulsion Systems</td>
<td>3</td>
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<td>KA/UC Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>**</td>
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</tbody>
</table>

** or MA331 and STAT383

1 Mechanical & Aeronautical Engineering Department Student Handbook.
For professional concentrations see Professional Concentrations in Engineering.
B.S. in Chemical Engineering
A B.S. degree in Chemical Engineering is a good foundation for many diverse careers. The objectives of the program are to produce graduates who:

• are able to practice chemical engineering in traditional and emerging fields,
• are prepared to pursue advanced degrees,
• develop their knowledge and skills after graduation, and
• contribute to society and maintain ties to the University.

Chemical engineers deal with many aspects of an industrial society, especially those challenges involving chemistry. Chemical engineers engage in a spectrum of manufacturing, sales, and research activities in a variety of industries ranging from specialty chemicals to semiconductors and food processing. Therefore, it is essential that they master the fundamentals of chemistry, physics, mathematics, and engineering science. Courses in these fundamentals constitute most of the first year and sophomore year. Junior-year courses concentrate on the application of mathematics, physics, and chemistry to the physical operations and chemical processes required to obtain a desired product on an industrial scale. The senior year is composed chiefly of capstone design and laboratory courses plus electives, permitting students to concentrate on areas in which they have developed a special interest. In the capstone courses, students work in teams on open-ended projects that illustrate how engineering design concepts, introduced in the sophomore- and junior-year chemical engineering courses, are applied in professional practice.

The basic four-year curriculum prepares graduates for immediate employment in a large number of industrial and government organizations as well as for graduate work in chemical engineering or related fields. The positions traditionally filled by chemical engineers involve the design, construction, and management of chemical, petrochemical, pharmaceutical, biochemical and electronics manufacturing plants; research and development of new processes and products; improvement of existing processes and products; design and development of control systems; economic evaluation of new plants and processes; air and water pollution control; energy conservation and energy resource development; and materials engineering. The student is encouraged to develop a special interest and to take a concentration of courses in that area. Typical chemical engineering elective concentrations.

The chemical engineering curriculum is designed to offer sufficient flexibility to satisfy the interests and needs of many different individuals. The curriculum provides students with a solid background for continuing their education to the M.S., M. Eng. or Ph.D. degree in chemical engineering, environmental engineering, materials science, and other technical areas. By appropriate selection of electives, the student can also use the chemical engineering program as preparation for graduate work in law, management, medicine, or biotechnology. Personal faculty advising is provided to assist students in the selection of electives that best suit their career goals.

Chemical Engineering Curriculum

FIRST YEAR
(See Common First-Year Curriculum in Engineering )

First-year students in chemical engineering may substitute CM103, 104, and 105 for CM131 and 132. This enables them to take chemistry and chemistry laboratories with the first-year students majoring in chemistry.
### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>CH210</td>
<td>Chemical Engineering Principles I: Molecular Properties &amp; Processes</td>
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<tr>
<td>CH210</td>
<td>Chemical Engineering Principles II: Material Balances</td>
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<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
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<td>MA231</td>
<td>Calculus III Elective (ES)</td>
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<tr>
<td>ES499</td>
<td>Prof Experience</td>
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<tr>
<td><strong>Total</strong></td>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>CH330</td>
<td>Transfer Process Fundamentals</td>
</tr>
<tr>
<td>CH340</td>
<td>Thermodynamics &amp; Energy Balances</td>
</tr>
<tr>
<td>CM244</td>
<td>Organic Chemistry Lab</td>
</tr>
<tr>
<td>EC350</td>
<td>Micro &amp; Engr. Economics Elective (Engineering)</td>
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<td><strong>Total</strong></td>
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### SENIOR YEAR

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<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>CH410</td>
<td>Chemical Engineering Lab</td>
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<tr>
<td>CH420</td>
<td>Process Economics &amp; Conceptual Design Elective (ES)</td>
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<td><strong>Total</strong></td>
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</table>
The eight elective courses must be approved by the student’s faculty advisor and must be distributed as follows:

Two courses (each from a different field) among materials science, electrical science, and mechanics; one course in mathematics; three courses in engineering, two courses in engineering, science, or mathematics; two undesignated electives. An “undesignated elective” is any course that does not contain a significant amount of material already covered in the student’s program.

Six credits of Military Science or Aerospace Studies may be used to satisfy the requirement for two of the undesignated electives.

Professional Specializations
Students can develop a specialty by proper selection of electives. One very effective choice is a concentration or a minor in another field such as Biomolecular Engineering, Chemistry, Environmental Health Science, Biomedical Engineering, Sustainable Energy System, Communication, Environmental Engineering, Materials Engineering, or Business. Not all courses listed are offered every year. See Professional Concentrations in Engineering.

CHEMICAL ENGINEERING HONORS PROGRAM
Chemical engineering students with a GPA of 3.5 or better and aiming for an academic or industrial research career may apply to the Honors Program at the end of the sophomore year. Course requirements in addition to the regular curriculum include:

1. CH490 Transport Phenomena
2. Two math electives (the present elective plus one more) to be chosen from the following list:
   - CH561 Chemical Engineering Analysis
   - ES505 Design of Experiments and Analysis of Data
   (only one of the above two may be chosen)
   - MA331 Fourier Series and Boundary Value Problems
   - MA339 Applied Linear Algebra
   - MA377 Numerical Methods
   - MA381 Probability
   - STAT383 Applied Statistics
B.S. in Civil Engineering

Civil engineers plan, design, and construct our nation’s physical infrastructure and take a leadership role in the responsible development and protection of our natural resources. Accordingly, the field of civil engineering encompasses several distinct disciplinary themes, including architectural engineering, construction engineering, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering, among others.

Civil engineers always have been at the forefront of such activities as designing and constructing bridges, buildings, water and wastewater treatment facilities, hydropower stations, storm drainage systems, airports, aerospace structures, and other public works. They also have taken a leadership role in eliminating the hazardous and solid wastes of society, responsibly developing surface and groundwater resources for beneficial use, managing environmental quality and minimizing the effects of pollutants, mitigating earthquake damage in large structures, and using artificial intelligence to improve the operation of transportation systems.

Within the context provided by the broad profession of civil engineering described above, the mission of the Civil and Environmental Engineering Department, formally stated, is to educate talented and motivated men and women to become successful professionals through quality undergraduate and graduate programs that place a high priority on student access and interaction with faculty. This mission statement establishes the educational framework for the civil engineering degree program at Clarkson, and the curriculum objectives given below provide more detail about the program.

CURRICULUM OBJECTIVES

With an appreciation for the disciplinary diversity of Civil Engineering, Clarkson’s Department of Civil and Environmental Engineering actively pursues the educational goal of providing talented and motivated men and women with the knowledge and intellectual tools required to become successful civil engineers. It does so by permitting students to pursue individual disciplinary interests or to remain broadly based in all areas of Civil Engineering while obtaining an accredited BSCE degree (Bachelor of Science in Civil Engineering).

The program objectives may be stated as shown below:

- Develop students whose engineering knowledge can meet the challenges of a successful professional career.
- Ensure students acquire good communication and leadership skills.
- Foster an intellectually stimulating environment for professional development.
- Develop a relationship between students and faculty that produces a personal interest in the student’s education and professional development.

Moreover, the Department’s approach to the achievement of these objectives may be summarized as:

- Offering a quality undergraduate program that places a high priority on student access and faculty interaction within an environment that is intellectually stimulating and encourages professional development,
- Providing its graduates with the engineering knowledge needed to meet the life-long challenges of a successful professional career, and valuing good communication and leadership skills.

It is expected that graduates from the BSCE program will demonstrate achievement of these objectives within a few years after completing the program. Science and engineering-science courses form the majority of the curriculum in the first two years. These courses provide the base for the professionally oriented courses in the junior and senior years. The curriculum is designed to provide all graduates with a theoretical foundation as well as design experiences in structural, geotechnical, water resources, and environmental engineering. This foundation is typically achieved in the junior year, enabling students to use the senior year to select elective courses in areas where their particular interests have developed. In the
senior year a capstone design course culminates the development of design skills that were first introduced in the sophomore year and enhanced in subsequent courses.

Students can select elective courses in areas beyond the required courses, such as construction and transportation, or can use the elective portion of the curriculum to concentrate in selected areas such as architectural engineering, construction engineering, structural engineering, environmental engineering, materials engineering, or communications.

The guiding principle is that the student and faculty advisor together create a program of study that best satisfies the student’s individual career objectives.

Civil Engineering Curriculum

FIRST YEAR
(See Common First-Year Curriculum in Engineering)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
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<td>Intro. to Engineering Design</td>
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<td>Calculus III</td>
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<td>MA232</td>
<td>Elem. Differential</td>
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<td>Fluid Mechanics</td>
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15 15

JUNIOR YEAR

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<td>Water Resources w/lab</td>
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<td>Geospatial Science w/lab</td>
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SENIOR YEAR

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<td>15</td>
</tr>
</tbody>
</table>

1 Eligible ES electives are: ES223 Rigid Body Dynamics, ES250 Electrical Science, ES260 Material Science, ES340 Thermodynamics I.

A total of 16.5 design credits are required to be accumulated. Required courses provide 11.5 design credits.

**Professional Specializations**

Through the selection of electives, students can achieve proficiency in particular areas of interest. Elective courses can be selected from those offered by the Civil and Environmental Engineering Department and by other departments. Those electives considered especially appropriate to the various areas of specialization in civil engineering are provided in the following topical listings. Not all courses are offered each year or each semester (see annual Courses publication). All 500-numbered courses are graduate level.

Undergraduate students enrolled in 500-level courses must have a cumulative grade-point average of at least 3.0, and permission of their advisor and their department chair. To enroll in a 600-numbered course, undergraduates must have a cumulative grade-point average of at least 3.0, and must have permission of their advisor, department chair, and the dean of Engineering. See Professional Concentrations in Engineering.

**Professional Concentrations in Civil Engineering:**

**Architectural Engineering**

CE448 Introduction to Architectural Engineering
E445 Timber Design or CE446 Reinforced Masonry Design
CE 415/515 Foundation Design
CE 441 Reinforced Concrete Design
CE 442 Steel Design
CE 492 Senior (Building, Architectural) Design

*And at least two of the following courses:*

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 405 Construction Management</td>
<td>CE 455/555 Structural Damage, Rehabilitation, and Repair</td>
<td>CE 408 Building Information Modeling and Integrated Product Delivery</td>
<td>CE 457/557 Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE 411 Construction Materials</td>
<td>ME310 Thermodynamic System Engineering</td>
<td>CE 420/520 Advanced Structural Analysis</td>
<td>ME411 Introduction to Heat Transfer</td>
</tr>
<tr>
<td>CE 421/521 Composite Mechanics and Design</td>
<td>ME 444 Computer Aided Engineering</td>
<td>CE542 Advanced Steel Design</td>
<td>CE 438 or CE 538 Finite Element Methods</td>
</tr>
<tr>
<td>CE 544 Advanced Concrete Design</td>
<td>CE 486/586 Intro to Industrial Ecology</td>
<td>CE 453/553 Properties and Performance of Concrete Mat’ls</td>
<td>EHS406 Industrial Hygiene Control Methods</td>
</tr>
</tbody>
</table>
Or other course as designated by CEE Department Chair

**Construction Engineering Management**

CE411 Construction Materials  
CE415/515 Foundation Design  
CE441 Concrete Design  
CE442 Steel Design

*at least two of the following CE courses:*

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE405 Construction Planning</td>
<td>CE409 Fund. Of Building Systems</td>
</tr>
<tr>
<td>CE406 Construction Engineering</td>
<td>CE410/510 Sustainable Infrastructure and Building</td>
</tr>
<tr>
<td>CE407 Construction Estimating and Scheduling</td>
<td>CE445 Timber Design</td>
</tr>
<tr>
<td>CE408 BIM/IPD</td>
<td>CE446 Masonry Design</td>
</tr>
</tbody>
</table>

*at least two of the following non-CE courses:*

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS446 Negotiations &amp; Relationship Management</td>
<td>EHS330 Safety Analysis</td>
</tr>
<tr>
<td>FN361 Financial Management</td>
<td>LW270 Law &amp; Society 1</td>
</tr>
<tr>
<td>EM/OM 351 Quality Management &amp; Lean Enterprise</td>
<td>LW446 Law of the Work Place</td>
</tr>
<tr>
<td>EM/OM480 Project Management</td>
<td>COMM417 Business &amp; Professional Speaking</td>
</tr>
</tbody>
</table>

**Structural Engineering**

CE 420/520 Advanced Structural Analysis  
CE 415/515 Foundations Design  
CE 441 Reinforced Concrete Design  
CE 442 Steel Design  
CE 490 or CE 492 Senior Design

*Choose at least TWO of the following*

<table>
<thead>
<tr>
<th>Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 401/501 Fracture Mechanics of Concrete Structures</td>
<td>CE 455/555 Structural Damage, Rehabilitation, and Repair</td>
</tr>
<tr>
<td>CE 411 Construction Materials</td>
<td>CE 438 or CE 538 Finite Element Methods</td>
</tr>
<tr>
<td>CE 421/521 Composite Mechanics and Design</td>
<td>CE 444/544 Advanced Concrete Design</td>
</tr>
<tr>
<td>CE 453/553 Properties and Performance of Concrete Materials</td>
<td>CE 457/557 Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>ME 444 Computer Aided Engineering</td>
<td>CE512 Fundamentals of Dynamics and Vibrations</td>
</tr>
</tbody>
</table>

**Environmental Engineering**

*Choose one of:*

CE340 Introduction to Environmental Engineering  
CH220 Chemical Engineering Principles II: Material Balances

*Choose one of:*

CH210 Chemical Engineering Principles I: Material Balances  
CM241 Organic Chemistry I  
CM371 Physical Chemistry I

*Choose one of:***
BY222 Ecology and BY224 Ecology Laboratory
BY240 Environmental Science and Policy of American Rivers
BY320 Microbiology

Choose one of:
CE491 Senior (Water Resources/Environmental) Design
MP401 Multidisciplinary Course (Environmental Remediation Design)

Plus any two courses from the following

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>CE430 Water Resources Engineering II</td>
<td>CE486 Industrial Ecology</td>
</tr>
<tr>
<td>CE435 Groundwater Hydrology and Geochemistry</td>
<td>CE580 Environmental Chemistry</td>
</tr>
<tr>
<td>CE477 Atmospheric Chemistry</td>
<td>CE584 Chemodynamics</td>
</tr>
<tr>
<td>CE478 Solid Waste Management and Landfill Design</td>
<td>BY531 Limnology and BY532 Limnology Laboratory</td>
</tr>
<tr>
<td>CE479 Water and Wastewater Treatment Processes</td>
<td>CH434/ES434 Air Pollution Control</td>
</tr>
<tr>
<td>CE480 Chemical Fate and Transport in the Environment</td>
<td>ES432 Risk Analysis</td>
</tr>
<tr>
<td>CE481 Hazardous Waste Management Engineering</td>
<td>ES436 Global Climate Change: Science, Engineering &amp; Policy</td>
</tr>
<tr>
<td>CE482 Environmental Systems Analysis Design</td>
<td>ES464 Corrosion Engineering</td>
</tr>
<tr>
<td>EHS406 Industrial Hygiene Control Methods or EHS416 Principles of Toxicology and Epidemiology</td>
<td></td>
</tr>
</tbody>
</table>

Course Descriptions
Descriptions of all undergraduate and graduate courses will be supplied upon request or may be viewed online at www.clarkson.edu/sas.
B.S. in Computer Engineering

The objective of the undergraduate program in computer engineering is to prepare students for productive careers as professional engineers and to provide a base for graduate study and for lifelong learning in new and developing specialties. We expect graduates will have attained the following achievements within a few years after completing the program:

1. Contributing Professionals
   Graduates are expected to have advanced their careers as contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications.

2. Well-Rounded Citizens
   Graduates are expected to have advanced their careers as contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications.

3. Effective and Responsible Collaborators
   Graduates are expected to have become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field.

4. Intellectual Growth
   Graduates are expected to have exhibited intellectual growth and pursue continual innovation in their field. Those graduates who are especially talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

The degree program in computer engineering fosters the achievement of these objectives in two ways. First, the curriculum as a whole is comprised of:

- a coherent program of required courses in basic science, mathematics, and engineering science, including laboratory experience in the use of modern equipment for measurement and design;
- education in the humanities, social sciences, ethical principles and management, with special attention to the development of effective written and oral communication skills;
- elective coursework in several of the major subdisciplines of electrical, computer and software engineering, to encourage individual interests and to provide opportunity to gain further knowledge in these subdisciplines; and
- experiences that facilitate the development of problem-solving, teamwork and engineering design skills with the aid of modern analysis and design tools, and experiences that encourage students to become active alumni and to develop a commitment to lifelong learning.

Basic and required courses are taken during the first two years, along with some introductory professional courses, including an engineering laboratory. Laboratory courses are required in both of these years with a strong emphasis on engineering design. The third and fourth years include both required and elective technical courses.

The Clarkson Common Experience is addressed in the first year with the Clarkson Seminar and ES110 Engineering and Society. Five knowledge area courses including a university course are required over the four years of study. One of these knowledge area courses must be in economics and one must be ES110. The Clarkson Common Experience is designed, in part, to develop communication, problem-solving, and critical-thinking skills and an understanding of the social, ethical and economic implications of an engineer’s work.
Second, the computer engineering program is constructed so that each student develops a working knowledge of engineering design based on a broad spectrum of concepts, principles, and techniques balanced in hardware, software, and systems, along with a strong set of communication and teamwork skills. This is done through a program of study with the following characteristics:

- In the required courses, students are expected to master fundamentals of hardware and software design. Sound software engineering principles are introduced and reinforced with required courses that treat object-oriented design, data structures, standardized components, and system software. Hardware design principles are introduced in a course that treats hardware concepts and analysis that is followed by work in logic design and laboratory experiences in which students must design and build small systems using standard logic circuits and programmable logic devices. Elements common to hardware and software are stressed and hardware/software tradeoffs are addressed in this segment of the curriculum.

- Students gain experience working in modern software development environments and using modern design tools. In the required course sequence, students learn C/C++ and Java in the context of modern integrated development environments, gain experience with VHDL and modern simulation environments in hardware design, and use programmable logic devices in their design projects.

- Students develop their teamwork and communication skills. They do so in part through course work that requires them to communicate effectively in written form and in part through course-work involving team-based design, written communication of their design decisions, and oral presentation of their work. The design experiences require that students work in teams of varying size, collaborating with others on teams whose composition is determined by their instructors. By participating in team-based problem solving of this kind, with individuals whom they did not choose as teammates, students learn to work with a diverse group of individuals in multiple situations, thereby developing their teamwork skills.

- Students develop the ability to design an integrated hardware/software system to meet desired specifications. They engage in a major design experience that emulates an industrial design environment. In this design experience, students design and implement the hardware and software components of a digital system. This team-oriented task demands that students learn to work with others in completing a system design that meets specifications on time. The system specifications often require that students interact with individuals from other disciplines to design an acceptable product.

- Students engage in activities that foster development of an appreciation for the importance of extracurricular and community involvement. They are actively encouraged to become involved with professional societies, service organizations, and other extracurricular activities and are also encouraged to take advantage of the close interpersonal environment that the department fosters. We also encourage our students to obtain significant industrial level experience prior to graduation, either through an internship or by participating in the Co-op program. Further, we encourage our students to participate in engineering projects on campus, through undergraduate research, suitable on-campus work experience, and technical extracurricular activities such as the US First Robotics competition.

Computer Engineering Curriculum
**FIRST YEAR**
*(See Common First-Year Curriculum in Engineering)*

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>MA2 Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>ES25 Electrical Science</td>
<td>3</td>
</tr>
<tr>
<td>ES26 Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>EE26 Intro to Programming and Software Design</td>
<td>3</td>
</tr>
<tr>
<td><strong>KA/UC Elective</strong></td>
<td><strong>EE361</strong></td>
</tr>
<tr>
<td>3</td>
<td>Fundamentals of Software Engineering</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
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</tbody>
</table>

**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>EE321 Systems and Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>EE341 Microelectronics</td>
<td>3</td>
</tr>
<tr>
<td>EE363 Generic Programming &amp; Software Components</td>
<td>3</td>
</tr>
<tr>
<td>EE365 Advanced Digital Circuit Design</td>
<td>3</td>
</tr>
<tr>
<td>STAT383 Probability and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>
Knowledge Area or University Course Electives

There are a total of five courses which must be taken to cover at least four knowledge areas. At least one of these courses must be a University course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the knowledge area electives must be an economics course, EC350 is recommended, and one must be ER110.

The Computer Science Elective must be selected from computer science courses numbered 300 or higher or CS 242.

The Professional Electives are ECE courses numbered 300 or higher, or other engineering course if approved by the ECE Department.

The Undesignated Electives are fulfilled by college level courses that do not contain a significant amount of material already covered elsewhere in the student's program.

See Academic Requirements for details of the Clarkson Common Experience including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements and professional experience.

Professional Specializations

The courses offered by the Department of Electrical and Computer Engineering can be grouped into the following subdisciplines, with each subdiscipline including a combination of required and elective courses at the undergraduate level. Note that a number of these courses cross subdiscipline boundaries. A complete description of all courses, including graduate-level courses, can be found online on the Student Administrative Services website. Qualified undergraduate students are encouraged to take graduate level courses within their area of interest. Undergraduate students enrolled in 500-level courses must have a cumulative grade-point average of at least 3.0, and permission of their advisor and their department chair.

To enroll in a 600-numbered course, undergraduates must have a cumulative grade-point average of at least 3.0, and must have permission of their advisor, department chair, and the dean of Engineering. See Professional Concentrations in Engineering.
BIOMEDICAL ENGINEERING
BR400 Introduction to Biomedical Rehabilitation Engineering and Science
EE485 Neural Engineering

COMMUNICATIONS SYSTEMS AND SIGNAL PROCESSING
EE401 Digital Signal Processing
EE404 Wireless Networks
EE407 Computer Networks
EE427 Introduction to Digital Image Processing
EE470 Coding and Information Transmission
EE471 Principles of Digital and Data Communications

COMPUTER ENGINEERING
EE360 Microprocessors
EE361 Fundamentals of Software Engineering
EE363 Software Components and Generic Programming
EE365 Advanced Digital Circuit Design
EE368 Software Engineering
EE404 Wireless Networks
EE407 Computer Networks
EE408 Software Design for Visual Environments
EE410 Computer and Network Security
EE461 Many-Core Architecture and Programming Model
EE462 Software Systems Architecture
EE464 Digital System Design
EE465 Computer Graphics
EE466 Computer Architecture
EE468 Database Systems

CONTROL SYSTEMS
EE450 Control Systems
EE451 Digital Control
EE452 Optimization Techniques in Engineering

ELECTRONICS AND CIRCUITS
EE345 Microelectronic Circuit Fabrication
EE441 Electronic Devices for IC Simulation
EE442 CMOS IC Design
EE446 Instrumentation
EE447 VLSI Design
EE448 Solar Cells
EE449 Fundamental of Antenna Engineering

POWER ENGINEERING
EE333 Power System Engineering
EE430 High-voltage Techniques and Measurements
EE431 Power Distribution and Utilization
EE436 Electric Machines and Drives
EE438 Alternate Energy Systems
EE439 Dielectrics
B.S. in Electrical Engineering

The objective of the undergraduate program in electrical engineering is to prepare students for productive careers as professional engineers and to provide a base for graduate study and for lifelong learning in new and developing specialties. We expect that within a few years after completing the program:

1. Contributing Professionals
Graduates are expected to have advanced their career as contributing professionals who apply fundamental engineering knowledge and analytical problem-solving skills in a wide variety of practical applications.

2. Well-Rounded Citizens
Graduates are expected to have become well-rounded citizens who rely on their engineering education to serve society with an understanding of their professional and ethical responsibilities.

3. Effective and Responsible Collaborators
Graduates are expected to have become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field.

4. Intellectual Growth
Graduates are expected to have exhibited intellectual growth and pursue continual innovation in their field. Those graduates who are especially talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

The degree program in electrical engineering fosters the achievement of these objectives in two ways. First, the curriculum as a whole is comprised of:

- a coherent program of required courses in basic science, mathematics, and engineering science, including laboratory experience in the use of modern equipment for measurement and design;
- education in the humanities, social sciences, ethical principles and management, with special attention to the development of effective written and oral communication skills;
- elective coursework in several of the major subdisciplines of electrical and computer engineering, to encourage individual interests and to provide opportunity to gain further knowledge in these subdisciplines;
- experiences that facilitate the development of problem solving, teamwork, and engineering design skills with the aid of modern analysis and design tools; and
- experiences that encourage students to become active alumni and to develop a commitment to lifelong learning.

Basic and required courses are taken during the first two years, along with some introductory professional courses, including an engineering laboratory. The third and fourth years include both required and elective technical courses.

The Clarkson Common Experience is addressed in the first year with the Clarkson Seminar and ES110 Engineering and Society. Five knowledge area courses including a university course are required over the four years of study. One of these knowledge area courses must be in economics and one must be ES110. The Clarkson Common Experience is designed, in part, to develop communication, problem-solving, and critical-thinking skills and an understanding of the social, ethical and economic implications of an engineer’s work.

Second, the electrical engineering program is constructed so that each student develops depth of knowledge in the discipline that is built upon mastery of material in fundamental required courses, a base of experience using state of the art software and engineering tools, the ability to design an engineering system to meet desired specifications, and the ability to communicate effectively and work effectively as a member of an engineering team. This is done through a program of study with the following characteristics:
In the required courses, students are expected to master the essential topics that are needed in the courses that follow. In these courses, students are expected to gain a firm grounding in basic electrical and computer engineering (reinforced with laboratory experience) and then take a set of intermediate courses that treat topics in and systems signals, energy conversion, electromagnetic fields, and microelectronics. Each student then develops his or her own interests further by taking a set of three advanced courses in some area of the discipline to gain depth in that area while also taking at least two courses in other areas of the discipline to ensure breadth of coverage.

- Students gain experience in using state-of-the-art software and engineering tools. They encounter modern tools such as MATLAB and Pspice early in their program of study and continue to use these tools through several of the required courses. They are exposed to tools such as LabView and are required to gain experience in C/C++ programming.

- Students develop their teamwork and communication skills. They do so in part through course work that requires them to communicate effectively in written form and in part through course work involving team-based design, written communication of their design decisions, and oral presentation of their work. The design experiences require that students work in teams of varying size, collaborating with others on teams with diverse membership. By participating in team-based problem solving of this kind, with individuals whom they may not have chosen as teammates, students learn to work with a diverse group of individuals in multiple situations, thereby developing their teamwork skills.

- Students develop the ability to design an engineering system to meet desired specifications. They engage in a major design experience in which they design and build an engineering system. The specific type of system varies, as projects are chosen from various application areas relevant to the discipline. These team-oriented tasks demand that students learn to work with others in completing a system design that meets specifications on time. The system specifications may require that students interact with individuals from other disciplines to design an acceptable product.

- Students engage in activities that foster development of an appreciation for the importance of extracurricular and community involvement. They are actively encouraged to become involved with professional societies, service organizations, and other extracurricular activities and are also encouraged to take advantage of the close interpersonal environment that the department fosters. We encourage our students to obtain significant industrial level experience prior to graduation, either through an internship or by participating in the co-op program. Additionally, we encourage our students to participate in engineering projects on campus, through under-graduate research, suitable on-campus work experience, and technical extracurricular activities such as the US First Robotics competition.

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**Electrical Engineering Curriculum**

**FIRST YEAR**
*(See Common First-Year Curriculum in Engineering)*

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Title</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
</tr>
<tr>
<td>ES260</td>
<td>Materials Science</td>
</tr>
<tr>
<td>EE261</td>
<td>Intro to Programming and Software Design</td>
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<tr>
<td></td>
<td>KA/UC Elective¹</td>
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</tbody>
</table>

**JUNIOR YEAR**

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>STAT383</td>
<td>Probability and Statistics</td>
<td>3</td>
<td>EE381</td>
<td>Electromagnetic Fields</td>
<td></td>
</tr>
<tr>
<td>EE311</td>
<td>EE Junior Lab</td>
<td>3</td>
<td></td>
<td>and Waves</td>
<td>3</td>
</tr>
<tr>
<td>EE321</td>
<td>Systems and Signal Processing</td>
<td>3</td>
<td></td>
<td>Math Elective⁴</td>
<td>3</td>
</tr>
<tr>
<td>EE331</td>
<td>Energy Conversion</td>
<td>3</td>
<td></td>
<td>Area Electives²</td>
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<tr>
<td>EE341</td>
<td>Microelectronics</td>
<td>3</td>
<td></td>
<td>KA/UC Elective¹</td>
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**Second Semester**

<table>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>EE412</td>
<td>EE Senior Design or Professional Elective³</td>
<td>3</td>
<td></td>
<td>Area Elective²</td>
<td>3</td>
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<tr>
<td>ES Elective</td>
<td></td>
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<td>EE412</td>
<td>Senior Design</td>
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<tr>
<td>Area Electives²</td>
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<td></td>
<td>KA/UC Elective¹</td>
<td>3</td>
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<tr>
<td>ES499</td>
<td>Professional Experience</td>
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<td>Undesignated Electives</td>
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</table>

**SENIOR YEAR**

**First Semester**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE412</td>
<td>EE Senior Design or Professional Elective³</td>
<td>3</td>
<td></td>
<td>Area Elective²</td>
<td>3</td>
</tr>
<tr>
<td>ES Elective</td>
<td></td>
<td>3</td>
<td>EE412</td>
<td>Senior Design</td>
<td>3</td>
</tr>
<tr>
<td>Area Electives²</td>
<td></td>
<td>6</td>
<td></td>
<td>KA/UC Elective¹</td>
<td>3</td>
</tr>
<tr>
<td>ES499</td>
<td>Professional Experience</td>
<td>0</td>
<td></td>
<td>Undesignated Electives</td>
<td>6</td>
</tr>
<tr>
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</tbody>
</table>

¹ Knowledge Area or University Course electives.

There are a total of five courses which must be taken to cover at least four knowledge areas. At least one of these courses must be a University course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the knowledge area electives must be an Economics course, EC350 is recommended and one must be ES110.

² There are five Area Electives which must be selected as follows: Three from a single area of concentration within the electrical and computer engineering discipline, and one each from two other areas of electrical and computer engineering. A list of appropriate courses within those areas is available from the ECE Department and is contained in the ECE Undergraduate Student Handbook.
3 The Professional Electives are ECE courses numbered 300 or higher, or other engineering course if approved by the ECE Department.
4 The Mathematics Elective must be numbered 300 level or higher and must include a significant amount of mathematical theory.
5 The Engineering Science Elective is satisfied by ES 220 Statics, ES 340 Thermodynamics, or other ES course approved by the ECE Department.
6 The Undesignated Electives are fulfilled by college level courses that do not contain a significant amount of material already covered elsewhere in the student’s program.

See Academic Requirements for details of the Clarkson Common Experience including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), Professional Experience, and related requirements.

**Professional Specializations**
The courses offered by the Department of Electrical and Computer Engineering can be grouped into the following subdisciplines, with each subdiscipline including a combination of required and elective courses at the undergraduate level. A complete description of all courses, including graduate-level courses, can be found online on the Student Administrative Services website. Undergraduate students enrolled in 500-level courses must have a cumulative grade-point average of at least 3.0, and permission of their advisor and their department chair. To enroll in a 600-numbered course, undergraduates must have senior standing, a grade-point average of at least 3.5, and must have permission of their advisor, department chair, and the Dean of Engineering. See Professional Concentrations in Engineering.

### BIOMEDICAL ENGINEERING
- BR400 Introduction to Biomedical Rehabilitation Engineering and Science
- EE485 Neural Engineering

### COMMUNICATIONS SYSTEMS AND SIGNAL PROCESSING
- EE401 Digital Signal Processing
- EE404 Wireless Networks
- EE407 Computer Networks
- EE427 Introduction to Digital Image Processing
- EE470 Coding and Information Transmission
- EE471 Principles of Digital and Data Communications

### ELECTRONICS AND CIRCUITS
- EE345 Microelectronic Circuit Fabrication
- EE441 Electronic Devices for IC Simulation
- EE442 CMOS IC Design
- EE446 Instrumentation
- EE447 VLSI Design
- EE448 Solar Cells
- EE449 Fundamental of Antenna Engineering

### COMPUTER ENGINEERING
- EE360 Microprocessors
- EE361 Fundamentals of Software Engineering

### CONTROL SYSTEMS
- EE450 Control Systems
- EE451 Digital Control
- EE452 Optimization Techniques in Engineering

### ELECTRONICS AND CIRCUITS
- EE345 Microelectronic Circuit Fabrication
- EE441 Electronic Devices for IC Simulation
- EE442 CMOS IC Design
- EE446 Instrumentation
- EE447 VLSI Design
- EE448 Solar Cells
- EE449 Fundamental of Antenna Engineering

### POWER ENGINEERING
- EE333 Power System Engineering
- EE430 High-voltage Techniques and
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EE363</td>
<td>Software Components and Measurements</td>
</tr>
<tr>
<td></td>
<td>Generic Programming</td>
</tr>
<tr>
<td>EE365</td>
<td>Advanced Digital Circuit Design</td>
</tr>
<tr>
<td>EE368</td>
<td>Software Engineering</td>
</tr>
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<td>EE404</td>
<td>Wireless Networks</td>
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<td>EE407</td>
<td>Computer Networks</td>
</tr>
<tr>
<td>EE408</td>
<td>Software Design for Visual Environments</td>
</tr>
<tr>
<td>EE410</td>
<td>Computer and Network Security</td>
</tr>
<tr>
<td>EE461</td>
<td>Many-Core Architecture and Programming Model</td>
</tr>
<tr>
<td>EE462</td>
<td>Software Systems Architecture</td>
</tr>
<tr>
<td>EE464</td>
<td>Digital System Design</td>
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<td></td>
<td>EE431</td>
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<td>EE436</td>
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<td>EE438</td>
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<td>EE439</td>
</tr>
</tbody>
</table>
**B.S. in Environmental Engineering**

Environmental engineers provide the knowledge, leadership, and guidance needed to improve the quality and insure the sustainability of our natural world — from the water we drink, to the air we breathe, to the soil that produces our life-sustaining vegetation. Environmental engineers play a major — and increasingly proactive — role in prevention and control of pollution of all kinds and in efforts to deal with global warming.

Environmental engineers develop and implement technologies to solve problems like meeting clean water supply needs and protecting public health, addressing the air pollution issues of acid rain and global warming, and reducing pollution while maintaining and improving the quality of life we enjoy.

The mission of the Civil and Environmental Engineering Department, formally stated, is to *educate talented and motivated men and women to become successful professionals through quality undergraduate and graduate programs that place a high priority on student access and interaction with faculty.* This mission statement establishes the educational framework for the environmental engineering degree program at Clarkson, and the curriculum objectives given below provide more detail about the program.

**CURRICULUM OBJECTIVES**

The Environmental Curriculum is designed for a career in environmental research, system modeling, or process design. All Environmental Engineering majors are provided with a theoretical foundation as well as design experience in the area of water resources, environmental quality, systems, hazards and treatment processes. This foundation is typically achieved in the junior year and enables students to use the senior year to select elective courses in areas where their particular interests have developed. In the senior year a capstone design course culminates the development of design skills.

The BSEnvE degree (Bachelor of Science in Environmental Engineering) program objectives may be stated as shown below:

- Develop students whose engineering knowledge can meet the challenges of a successful professional career.
- Ensure students acquire good communication and leadership skills.
- Foster an intellectually stimulating environment for professional development.
- Develop a relationship between students and faculty that produces a personal interest in the student's education and professional development.

Moreover, the approach to the achievement of these objectives may be summarized as:

- offering a quality undergraduate program that places a high priority on student access and faculty interaction within an environment that is intellectually stimulating and encourages professional development;
- providing its graduates with the engineering knowledge needed to meet the lifelong challenges of a successful professional career; and
- valuing good communication and leadership skills.

It is expected that graduates from the BSEnvE program will demonstrate achievement of these objectives within a few years after completing the program.

Science and engineering-science courses form the majority of the curriculum in the first two years. These courses provide the base for the professionally oriented courses in the junior and senior years. Through the selection of electives, students can take courses in an area of environmental engineering that is not covered by required courses, such as Air Pollution Control and Industrial Hygiene. Courses acceptable as professional electives are listed under Professional Concentrations in Engineering. The Environmental Engineering curriculum provides for six professional electives. These electives courses enable students to create programs of study unique to each individual as well as provide both depth and breadth in the
student’s preparation for professional practice. In the senior year a capstone design course culminates the development of design skills that were first introduced in the sophomore year and enhanced in subsequent courses. The guiding principle is that the student and faculty advisor together create a program of study that best satisfies the student’s individual career objectives.

Environmental Engineering Curriculum

FIRST YEAR
(See Common First-Year Curriculum in Engineering)

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
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<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
<td>CE340</td>
<td>Environmental Eng. w/lab (S)</td>
<td>3</td>
</tr>
<tr>
<td>CE212</td>
<td>Intro Eng. Design (F)</td>
<td>3</td>
<td>BY320</td>
<td>Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
<td>MA232</td>
<td>Elem. Differential Equations</td>
<td>3</td>
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<tr>
<td>PH132</td>
<td>Or Elective-UC/KA</td>
<td>3</td>
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<td></td>
<td></td>
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<td>KA/UC Elective</td>
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<td>3</td>
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### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>STAT383</td>
<td>Applied Statistics</td>
<td>3</td>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CM241</td>
<td>Organic Chemistry (F)</td>
<td>3</td>
<td>CE301</td>
<td>Geospatial Science</td>
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<tr>
<td>CE330</td>
<td>Water Resources w/lab (F)</td>
<td>3</td>
<td></td>
<td>Core Professional</td>
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<tr>
<td>CE479</td>
<td>Water &amp; Wastewater Treatment or Electives</td>
<td></td>
<td></td>
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<tr>
<td>CE480</td>
<td>Chemical Fate &amp; Trans. in Envir't</td>
<td>3</td>
<td>KA/UC Elective</td>
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<tr>
<td>CH220</td>
<td>Chemical Engineering Principles II</td>
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<tr>
<td>Course</td>
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<td>Cr. Hrs.</td>
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<tr>
<td>EC350</td>
<td>Engineering Economics</td>
<td>3</td>
<td>CE491</td>
<td>Senior Design</td>
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</tr>
<tr>
<td>CE313</td>
<td>Biochemical Earth Systems (F) or</td>
<td>3</td>
<td>Professional Elective</td>
<td></td>
<td>12</td>
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<tr>
<td>CE435/535</td>
<td>Groundwater Hydrology and Groundwater</td>
<td>3</td>
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<td></td>
<td>Hydrology and Geochemistry (F)</td>
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<td>Core Professional Elective</td>
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<td>Professional Electives</td>
<td>6</td>
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</tbody>
</table>

Core Professional Courses must include three of these courses:
- CE479 (2) or CE480 (1) not previously counted
- CE482/582 Systems (3)
- CE486 Ind Ecology (1)
- ES432 Risk Analysis
- CE481 Haz Waste

Four courses (12 credits) of the Professional Electives must be in Engineering Topics.
A total of 16.5 design credits are required to be accumulated. Required courses provide 9 or 10 design credits.

Course Descriptions
Descriptions of all undergraduate and graduate courses will be supplied upon request or may be viewed online at www.clarkson.edu/sas.
B.S. in Mechanical Engineering

The objectives of the Mechanical Engineering program are that graduates

1. Will competently apply engineering methods to solve professional problems associated with the design, manufacture, and maintenance of electromechanical systems and understand the social, ethical, and environmental context of their work;
2. Will communicate clearly, collaborate competently in teams, and assume leadership roles;
3. Will have the habit of continuous professional development.

The program outcomes are the generic abilities that graduates will demonstrate that they have acquired. The defining characteristics of professional problems\(^1\) and the process used to solve them lead directly to these generic program outcomes.

\(^1\)See Mechanical & Aeronautical Engineering Department Student Handbook.

- An ability to apply knowledge of mathematics, science, and engineering, and an ability to design and conduct experiments, as well as analyze and interpret data. (ABET a & b)
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, and an ability to function on multidisciplinary teams. (ABET c & d)
- An ability to identify, formulate, and solve engineering problems, and an understanding of professional and ethical responsibility. (ABET e & f)
- An ability to communicate effectively, and the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social context. (ABET g & h)
- A recognition of the need for, and an ability to engage in life-long learning, and a knowledge of contemporary issues. (ABET i & j)
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. (ABET k)

The Mechanical engineering program expects the student to graduate with the ability to: apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) to model, analyze, design, and realize physical systems, components or processes; and work professionally in both thermal and electromechanical systems.

**Curriculum Overview:** The 120-credit program contains 84 credit hours of required technical courses, 36 credit hours of electives (including two professional electives, two undesignated electives and five Knowledge Area/University Course, KA/UC, electives).

**Required Technical Courses:** The first two years of the curriculum cover mathematics, physics, chemistry and engineering science courses (including basic principles of statics, dynamics, solid mechanics, electrical circuits, materials and the use of computers).

In the third and fourth years, students take specialized courses on topics such as fluid mechanics and mechanical vibrations and control. These courses provide knowledge and skills that strongly support the second outcome listed above, which is a key element in thermo-mechanical systems design. The laboratory components of the first-year physics and chemistry courses introduce study of the relationship between theory and reality. This fosters the development of the student’s technical intuition. Mechanical engineering laboratory courses add to this development.

Training in professional problem-solving begins in the spring of the second year, with the first course in engineering design. The first course to train students formally in the solution process, it lays the foundation for the fourth-year capstone design course. In the capstone course, students work in teams to design and evaluate thermo-mechanical systems that meet real needs. Thus, they learn to apply the solution process to a real professional problem. Students may acquire additional professional experience by
participating in Formula SAE, Mini-Baja, Clean Snowmobile, or other team competitions, which are open to any student.

**Common Curriculum Requirements:** Plans of study must include a total of five Knowledge Area (KA) courses. Students will select these so that at least one is a designated University Course, and so that together these five courses cover the four knowledge areas. Communication intensive course requirement will be fulfilled by a combination of courses having one or two communication points each, with a total of six points required for graduation. At least two of these six points will be earned through 300- or 400-level courses required in the major.

**Professional and Undesignated Electives:** The professional electives must be advanced-level courses chosen according to criteria in the *Mechanical & Aeronautical Engineering (MAE) Department Student Handbook*. However, the two undesignated electives may be any college-level courses that do not contain a significant amount of material already covered in other courses. They could be chosen to enrich the student’s technical or nontechnical background. Advanced (200-level or above) Aerospace Studies or Military Science courses may be used as undesignated electives.

### Mechanical Engineering Curriculum

#### FIRST YEAR
(See Common First-Year Curriculum in Engineering)

<table>
<thead>
<tr>
<th>Course</th>
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<th>Cr. Hrs.</th>
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<tr>
<td>MS/AS</td>
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<td>MS/AS</td>
<td>Military Science/Aerospace Studies (if elected)</td>
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#### SOPHOMORE YEAR

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<th>Cr. Hrs.</th>
<th>Course</th>
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<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
<td>ES222</td>
<td>Strength of Materials</td>
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<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
<td>ES223</td>
<td>Rigid Body Dynamics</td>
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<td>ES260</td>
<td>Materials Science</td>
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<td>ME212</td>
<td>Intro. to Engineering Design</td>
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<td>MA231</td>
<td>Calculus III</td>
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#### JUNIOR YEAR

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<td>ES330</td>
<td>Fluid Mechanics</td>
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<td>Intermediate Fluid</td>
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<tr>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
<td>ME324</td>
<td>Dynamical Systems</td>
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<td>ME301</td>
<td>Mech. Engineer. Lab II</td>
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<td>ME411</td>
<td>Intro. to Heat Transfer</td>
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<td>ME310</td>
<td>Thermodynamic Sys.</td>
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<td>ME401</td>
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<td>Engineer. or</td>
<td></td>
<td>**</td>
<td>Professional Elective</td>
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<tr>
<td>ME455</td>
<td>Mechanical Vibrations &amp; Control</td>
<td>3</td>
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**SENIOR YEAR**

**First Semester**

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<tr>
<td>ME442</td>
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<td>by FEM</td>
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</tr>
<tr>
<td>ME445</td>
<td>Integrated Design I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AE, ES, or ME Prof. Elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Economics Elective</td>
<td>3</td>
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<tr>
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<td>Undesignated Elective</td>
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**Second Semester**

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<td>**</td>
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<tr>
<td>**</td>
<td>Professional 1 Elective</td>
<td>3</td>
</tr>
<tr>
<td>**</td>
<td>Integrated Design II</td>
<td>3</td>
</tr>
<tr>
<td>**</td>
<td>Undesignated Elective</td>
<td>3</td>
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<tr>
<td>**</td>
<td>Economics Elective</td>
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</tr>
<tr>
<td>**</td>
<td>Undesignated Elective</td>
<td>3</td>
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</tbody>
</table>

15

**or MA331 and STAT383

1See Mechanical & Aeronautical Engineering Department Student Handbook.**
Specializations
Students may select electives from one or more of the following categories. Not all courses are offered each year or each semester\(^4\). Courses required for the aeronautical engineering degree are offered on a regular basis and may be taken by mechanical engineering students as electives.

**COMPUTER APPLICATIONS**
- ME428 Computational Fluid Mechanics
- ME443 Optimal Engineering
- ME444 Computer-Aided Engineering

**MATERIALS AND MANUFACTURING**
- ME390 Manufacturing Processes
- ME492 Welding Metallurgy

**FLUID AND THERMAL SCIENCES**
- AE/ME425 Aerodynamics
- AE/ME427 Design of Propulsion Systems
- AE/ME431 Gas Dynamics
- ME437 Particle Transport, Deposition, and Removal I

**SOLID MECHANICS**
- ME452 Advanced Strength of Materials
- ME455 Mechanical Vibrations and Control
- ME457 Composite Mechanics and Design

\(^4\) See Table 5.3 of the *Mechanical & Aeronautical Engineering Department Student Handbook*.

**Honors Program**
A student admitted to the University Honors Program who is pursuing a mechanical engineering degree should consult the *Mechanical & Aeronautical Engineering Department Student Handbook* for additional information.
B.S. in Software Engineering

The discipline of software engineering is concerned with the application of engineering principles to the construction of computer software. It addresses critical issues across the life cycle of a software product, beginning with a proposal to develop an application that requires computing resources and continuing through the development, testing, operation, and maintenance of the software product until it is retired.

The software engineer plays the role of the architect of a complex system. He or she takes into account the user requirements and needs, feasibility, cost, quality, reliability, safety, and time constraints. To do this, the software engineer has to be able to understand the application area that is the target of the desired software system, develop the software and ensure that it is reliable, and also manage the project so that it is produced in an economical, timely manner.

Objectives of the Clarkson Software Engineering Program

Software engineering graduates should be well prepared for a lifetime of professional activity, and the objective of our program is to build a foundation on which graduates can build successful careers. This means that, within a few years after completing the program, we expect that our graduates will be contributing professionals, effective and responsible collaborators. They should also have continued to grow intellectually and as well rounded citizens. This means graduates are expected to have

- advanced their careers as contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications
- become well-rounded citizens who rely on their engineering education to serve society with an understanding of their professional and ethical responsibilities
- become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field
- exhibited intellectual growth and pursued continual innovation in their field. Those graduates who are especially talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies

To attain these objectives, the curriculum is structured so that when a student graduates from the Software Engineering program, he or she will have gained the knowledge, skills, and attributes that provide a foundation on which a successful career in the Software Engineering profession rests. Our graduates will attain the following student outcome:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
In the context of the software engineering discipline, this means that graduates of the program will:

- have a fundamental understanding of computer systems
- be able to apply engineering principles to software design and construction, having developed the ability to:
  - develop software requirements and functional specifications
  - use proven techniques to design software structure before it is implemented
  - apply established verification and validation techniques
  - understand the importance of constructing large software systems using standardized components and reusing existing code (modules) where possible,
  - use software tools as effective aids in all phases of software development
  - design, develop, and deliver software in a cost effective manner
- have experience with issues encountered at every stage in the software life-cycle
- be able to work on an interdisciplinary team of software components of a system
- have good interpersonal and communication skills
- be able to readily assimilate new technologies
- understand the impact their discipline has on society

**Curriculum**

To accomplish these goals, the curriculum is structured around a group of required courses in science, mathematics, computer science, and engineering. A variety of courses in the engineering sciences are included in the curriculum in order to provide exposure to application areas. Although there is ample opportunity for students to participate in team-based activities throughout the curriculum, each student’s program of study includes a major design experience in the senior year in which the student is required to bring together knowledge gained in a wide variety of courses to solve realistic problems, building significant applications in a team-based environment.

**An Interdisciplinary Approach**

Software Engineering is distinctive at Clarkson because it is interdisciplinary: we combine the expertise, knowledge, and experience of faculty from both the Electrical and Computer Engineering and the Mathematics and Computer Science Departments. That benefits the students because they master the application of theory as well as knowledge and understanding of processes software process as they gain the ability to develop effective and cost-efficient software systems. Clarkson’s program is also designed to help students build interpersonal and communication skills that can launch a successful career in today’s world.
Software Engineering Curriculum

FIRST YEAR
(See Common First-Year Curriculum in Engineering)

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Title</td>
</tr>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>MA211</td>
<td>Foundations</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
</tr>
<tr>
<td>EE261</td>
<td>Intro. to Programming and Software Design or</td>
</tr>
<tr>
<td>CS141</td>
<td>Computer Science I</td>
</tr>
<tr>
<td></td>
<td>KA/UC Elective</td>
</tr>
<tr>
<td></td>
<td>18 or 19</td>
</tr>
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</table>

JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Title</td>
</tr>
<tr>
<td>STAT383</td>
<td>Probability and Statistics or</td>
</tr>
<tr>
<td>MA381</td>
<td>Probability</td>
</tr>
<tr>
<td>EE407</td>
<td>Computer Networks</td>
</tr>
<tr>
<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
</tr>
<tr>
<td>EE408</td>
<td>Software Design for Visual Environments</td>
</tr>
<tr>
<td></td>
<td>KA/UC Elective*</td>
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<tr>
<td>Course</td>
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</tr>
<tr>
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</tr>
<tr>
<td>EE418</td>
<td>Senior Design</td>
</tr>
<tr>
<td>EE466</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>CS341</td>
<td>Programming Languages</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
</tr>
<tr>
<td></td>
<td>KA/UC Elective</td>
</tr>
</tbody>
</table>

|       |                               |          |                       |          |
|       |                               |          |                       |          |

15  

15

* One of the KA/UC electives must be in economics.
Undergraduate Minors in Engineering

Minor in Biomedical Engineering
As various fields of medicine and health care increasingly depend upon advances in technology, graduates who possess combined expertise in engineering principles and knowledge of biological sciences at all levels will be in high demand. The minor in Biomedical Engineering enhances opportunities for Clarkson's students to meet this need. This minor is connected closely with the minor in Biomedical Science and Technology. Students from both minors participate in shared core courses along with a multidisciplinary capstone design course. Students can take only one (not both) of the two minors.

A foundation knowledge of Calculus I & II (MA131/132), Physics I & II (PH131/132), and Biology II: Cell and Molecular Biology (BY160) is required for this minor.

Requirements:

**Physiology/Anatomy Requirement**

BY471 Anatomy and Physiology I
BY473 Anatomy and Physiology I Laboratory
OR
BYBY472 Anatomy and Physiology II
BY474 Anatomy and Physiology II Laboratory
OR
BY360 Human Physiology
BY362 Human Physiology Laboratory
BR200 Introduction to Biomedical and Rehabilitation Engineering, Science and Technology
BR450 Biomedical Engineering, Science, and Technology Capstone Design I or equivalent engineering design course with a BEST approved project
BR400 Biomedical Engineering

**Engineering Depth Elective**

Choose 1 (3 credits) from approved list of upper division courses.

**Breadth Elective**

Choose 1 (3 credits) from approved list of upper division courses.

The latest approved list of courses is available at the Center for Rehabilitation Engineering and Science (CREST) office, or call 315-268-6528.
Minor in Biomedical Science and Technology

As various fields of medicine and health care increasingly depend upon advances in technology, graduates who possess combined expertise in engineering principles and knowledge of biological sciences at all levels will be in high demand. The minor in Biomedical Science and Technology enhances opportunities for Clarkson's students to meet this need. This minor is connected closely with the minor in Biomedical Engineering. Students from both minors participate in shared core courses along with a multidisciplinary capstone design course. **Students can take only one (not both) of the two minors.**

A foundation knowledge of Biology II: Cell and Molecular Biology (BY160) is required for this minor.

**Biology Fundamentals: Required (4 credits):**

**Physiology/Anatomy Requirement**
BY471 Anatomy and Physiology I
BY473 Anatomy and Physiology I Laboratory
OR
BY472 Anatomy and Physiology II
BY474 Anatomy and Physiology II Laboratory
OR
BY360 Human Physiology
BY362 Human Physiology Laboratory

**Engineering Fundamentals (3 credits)**
BR200 Introduction to Biomedical and Rehabilitation Engineering, Science and Technology

**Intersecting BEST courses, Required (3 credits)**
(team taught, interdisciplinary)
BR450 BEST Capstone Design I (3 credits) or equivalent engineering design course with a BEST approved project

**Specialty Tracks:**
Choose one (2 course - 6 credits) track

**Track I Genetic Engineering**
BY214 Genetics
And choose one of
BY412 Molecular Biology Laboratory (4 credits)
BY/CM314 Bioinformatics

**Track II Kinesiology**
PT360: Kinesiology I - Concepts of Human Movement
PT460: Kinesiology II - Functional Anatomy (PT360)

**Track III Neuroscience**
BY/CM460 Neurobiology (BY160 or BY360 or consent)
PY458 Cognitive Neuroscience (PY151 or junior/senior standing)

**Breadth Elective:**
Choose 1 (3 credits) from approved list of upper division courses
Total: 19 credits (plus the 3 credits cell biology)
The latest approved list of courses is available at the Center for Rehabilitation Engineering and Science (CREST) office, or call 315-268-6528.

**Minor in Electrical Engineering**
A minor in Electrical Engineering is available to students in any degree program. To obtain the Electrical Engineering minor, a student must complete the four required courses and two of the six elective courses from the following list:

**Required Courses: 4**
- EE211 ECE Laboratory I
- EE331 Energy Conversion
- EE381 Electromagnetic Fields and Waves
- ES250 Electrical Science

**Elective Courses: 2 of 6**
- EE221 Linear Circuits
- EE264 Introduction to Digital Design
- EE321 Systems and Signal Processing
- EE324 Dynamical Systems
- EE341 Microelectronic Circuits
- EE450 Control Systems

**Minor in Engineering Science**
The School of Engineering offers a minor in Engineering Science for students who satisfy a minimum of 20 credit hours as outlined below:

- Satisfy prerequisites (MA131, MA132, PH131, PH132, MA232, CM131 or equivalents) for the three core ES courses — ES220, ES250, ES260
- 1 Scientific Programming Course (minimum two Cr. Hrs. ES100 or equivalent)
- 3 Engineering Electives (minimum nine Cr. Hrs. — any ES, ME, AE, CE, CH, EE courses for which the candidate has the prerequisites, except ES238, ES300, EE268, BR200)

*not open to School of Engineering majors or Engineering & Management majors

**Minor in Environmental Engineering**
A minor in Environmental Engineering is available to all students except those majoring in Civil or Environmental Engineering. To obtain a minor, a student must successfully complete the following courses:

**Required courses**
1. **Choose one of:**
   - CE340 Introduction to Environmental Engineering (3 cr.)
   - CH220 Chemical Engineering Principles II: Material Balances (3 cr.)
   - CH250 Chemical Process Calculations (3 cr.) (class of 2011 and 2012 only)
2. **Choose one of:**
   - CH210 Chemical Engineering Principles I: Material Balances (3 cr.)
   - CM241 Organic Chemistry I (3 cr.)
   - CM371 Physical Chemistry I (3 cr.)
3. **Choose one of:**
BY222 Ecology (3 cr.) and BY224 Ecology Laboratory (2 cr.)
or
BY320 Microbiology (3 cr.)
or
BY240 Environmental Science and Policy of American Rivers (3 cr.)

4. Choose one of:
   CE491 Senior (Water Resources/Environmental) Design (3 cr.)
   MP401 Multidisciplinary Course (Environmental Remediation Design) (3 cr.)
   MP444 EPA P3 Sustainable Design Competition (3 cr.)

Plus any two courses from the following:

CE430 Water Resources Engineering II (3 cr.)
CE477 Atmospheric Chemistry (3 cr.)
CE435 Groundwater Hydrology and Geochemistry
CE478 Solid Waste Management and Landfill Design (3 cr.)
CE479 Water and Wastewater Treatment Processes (3 cr.)
CE480 Chemical Fate and Transport in the Environment
CE481 Hazardous Waste Management Engineering (3 cr.)
CE482 Environmental Systems Analysis Design (3 cr.)
CE486 Industrial Ecology (3 cr.)
CE580* Environmental Chemistry (3 cr.)
CE583* Modeling Natural Aquatic Systems (3 cr.)
CE584* Chemodynamics (3 cr.)
BY531* Limnology (4 cr.) Limnology (4 cr.) and BY531 Limnology Laboratory
CH434/ES434 Air Pollution Control (3 cr.)
ES432 Risk Analysis (3 cr.)
ES436 Global Climate Change: Science, Engineering & Policy (3 cr.)
ES464 Corrosion Engineering (3 cr.)
either
HS406 or Industrial Hygiene Control Methods (3 cr.)
HS416 Principles of Toxicology and Epidemiology (3 cr.)

*undergraduate students must have at least a 3.0 GPA and permission of their academic advisor to enroll in a 500 level course

Total Credit hours for the Minor: 18-20
A minimum grade-point average of 2.0 is required in the courses taken for the minor. At least one quarter of the total credit hours required must be completed at Clarkson, unless the Dean of the Coulter School of Engineering approves an exception.

**Minor in Sustainable Energy Systems Engineering**
Clarkson University offers a minor in Sustainable Energy Systems Engineering to all students who meet the prerequisite requirements. Our reliance on energy-rich sources of fossil fuels has enabled growth of modern society, increasing our mobility, industrial growth, domestic comfort, abundant food supply, and economic prosperity. Engineers are among the many types of professionals that need to understand the
limits of our present energy systems and lead us to a future in which we can continue to provide reasonable energy resources for human quality of life. This minor emphasizes that all engineering disciplines are necessary to develop and assess technologies to both increase the efficiency of our energy use and advance renewable and alternative energy sources. http://www.clarkson.edu/cses/pdf/Energy_Minor.pdf

A total of 21 credits is required for this minor. Depending upon the student’s major, between 9 – 12 hours of this 21 credit total are in addition to the major’s core requirements. A student must complete the course requirements as follows:

**Required Courses (3 credits each)**

- Introduction to Energy Systems  
  ES238
- Thermodynamics  
  ES340 or CH260
- Capstone Design (or energy related research)  
  (one of: AE451, AE451, CE491, CE492, CH481
  EE412, ES456, ME446, ES443**

**Environmental Impacts Choice, one of:**

- Industrial Ecology  
  CE486*
- Global Climate Change: Science  
  ES436 *
- Engineering and Policy
- Sustainability and the Environment  
  EV305

**Policy Choice, one of:**

- Environmental Law  
  POL375
- Biofuels and Farm Policy  
  POL372
- Environmental Policy  
  POL470
- Environmental Economics  
  EC360
- Energy Policy  
  POL471
- Sustainability Theory and Practice  
  PHIL405
- Environmental Ethics  
  PHIL370

**Technology Choice, TWO of: (at least one must focus on energy technologies (including efficiency) as designated with the *)**

- * Energy technology related research project  
  e.g. ES443
- * Alternative Energy Systems  
  EE438**
- * Energy Conversion  
  EE331
- * Renewable Energy Storage (CHXXX) (new class - pending approval)  
  CE409**
- * Fundamentals of Building Systems (new class - pending approval )
- * Sustainability Project Experience (applicability of this class changes annually based on specific class topic)  
  EV390**, ***
- * Thermodynamic System Engineering  
  ME310**
Industrial Ecology  CE486*
Global Climate Change: Science  ES436
Engineering and Policy
Air Pollution Control  CH434
Technology Choice  CH421, ME324, CE410,

* if not taken as an environmental impacts choice
** at least one of the two technology choice classes must have this designator
*** applicability of this course varies from year to year

Minor in Software Engineering
A minor in Software Engineering is available to students in any degree program with the exception of the Software Engineering and Computer Science degree programs. See full description under Interdisciplinary Programs.

Minor in Sustainable Solutions for the Developing World  A minor in Sustainable Solutions for the Developing World is available to students in any degree program. The minor seek to employ humanitarian principles toward sustainable solutions that address the conflict that often occurs between economic development and environmental justice predominant in the developing world. A goal of the curriculum is to provide students with the tools to understand issues concerning social justice and sustainability to be used when designing and implementing solutions for the developing world. To obtain the minor, a student must complete the following courses.

Required Courses:

1. **Three credit total from the following list of courses1 (3cr. total):**

   ANTH 381  Consumption and Culture (3 cr.)
   EV 305  Sustainability and the Environment (3cr.)
   PHIL 370  Environmental Ethics (3 cr.)
   POL 471  Energy and Policy (3cr.)
   PHIL 405  Sustainability Theory and Practice: A Critical Assessment (3cr.)
   POL 350  International Development and Social Change (3cr.)

2. **Two of the following courses 2 (6 cr. total)**

   ANTH 201  Introduction to Anthropology (3cr.)
   ANTH 351  Global Forces, Local Outcomes (3 cr.)
   ANTH 335  Understanding the Contemporary Middle East (3 cr.)
   COMM 428  Public Debate and the Environment: Reading & Writing Environmentally (3 cr.)
   LIT 250  World Literature (3 cr.)
   LIT 251  Understanding Vietnam (3 cr.)
   LIT 353  African Literature (3cr.)
PHIL 310  World Religious and Contemporary Issues (3 cr.)
POL 250  Politics in Cross National Perspective (3 cr.)
POL 251  Introduction to International Politics (3 cr.)
POL 362  Human Rights Law and Politics (3 cr.)
SOC 330  Health, Wealth, Inequality, and the Environment (3cr.)

3. Two of the following courses 3 (6 cr. total)

    MK 436  Creativity, Innovation and New Product Development (3cr.)
    SB 396  Global Business Strategies (3cr.)
    MK 320  Principles of Marketing (3 cr.)
    OM 476  Management of Technology (3 cr.)
    OM 480  Project Management (3 cr.)
    EC 360  Environmental Economics (3 cr.)
    ES 438  Alternative Energy Systems (3 cr.)

4. ONE of the following courses (3 cr.)

UNIV 399 Global Experience (with Sustainable Solutions for the Developing World emphasis), recommended for all students; OR A Multidisciplinary project course (with Sustainable Solutions for the Developing World emphasis) if approved by the director of the minor and the chair or advisor for the student’s major program of study.

The purpose of this category of course work is for students to develop a comprehensive understanding of sustainability principles. This list reflects courses available as of 10/2011 to fit its context. It is recognized that this list may evolve over time with availability of instructors or Development of new courses. A student may substitute a relevant course upon approval of the minor director.

The purpose of this category of course work is for students to develop an understanding of the cultural, political, and social character of countries around the world. This list reflects courses available as of 10/2011 to fit this context. It is recognizes that this list may evolve over time with availability of instructors or development of new courses. A student may substitute a relevant course upon approval of the minor director.

The multidisciplinary project is intended to serve as the Capstone, Senior Design, or other culminating project based experience that is normally completed within the student’s major program of study. Students participating in the minor will engage in a multidisciplinary project developed by students with the minor faculty who support the minor OR the student may participate in related experiences and opportunities within the student’s major program of study that are thematically linked to this minor. For example, if a student’s senior design course within their major has a multidisciplinary them and relates to strategies employable in develop9ng world, the student can obtain approval from the director of the minor for the course to serve as the minor required course.
Undergraduate Professional Concentrations in Engineering

Architectural Engineering

A professional concentration in Architectural Engineering is available to students who are planning a career in building design, including architectural, structural, construction, foundation and environmental aspects. The professional concentration allows students to satisfy the accreditation requirements in civil engineering while pursuing a concentration in architectural engineering.

Courses required for a concentration in architectural engineering are listed below. The total number of credits required for the concentration is 24, of which 18 credits have to be selected as professional electives.

CE448 Introduction to Architectural Engineering
E445 Timber Design or CE446 Reinforced Masonry Design
CE 415/515 Foundation Design
CE 441 Reinforced Concrete Design
CE 442 Steel Design
CE 492 Senior (Building, Architectural) Design

And at least two of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 405</td>
<td>Construction Management</td>
</tr>
<tr>
<td>CE 455/555</td>
<td>Structural Damage, Rehabilitation, and Repair</td>
</tr>
<tr>
<td>CE 408</td>
<td>Building Information Modeling and Integrated Product Delivery</td>
</tr>
<tr>
<td>CE 457/557</td>
<td>Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE 411</td>
<td>Construction Materials</td>
</tr>
<tr>
<td>ME 310</td>
<td>Thermodynamic System Engineering</td>
</tr>
<tr>
<td>CE 420/520</td>
<td>Advanced Structural Analysis</td>
</tr>
<tr>
<td>ME 411</td>
<td>Introduction to Heat Transfer</td>
</tr>
<tr>
<td>CE 421/521</td>
<td>Composite Mechanics and Design</td>
</tr>
<tr>
<td>ME 444</td>
<td>Computer Aided Engineering</td>
</tr>
<tr>
<td>CE 542</td>
<td>Advanced Steel Design</td>
</tr>
<tr>
<td>CE 438 or CE 538</td>
<td>Finite Element Methods</td>
</tr>
<tr>
<td>CE 544</td>
<td>Advanced Concrete Design</td>
</tr>
<tr>
<td>CE 486/586</td>
<td>Intro to Industrial Ecology</td>
</tr>
<tr>
<td>CE 453/553</td>
<td>Properties and Performance of Concrete Mat'l's</td>
</tr>
<tr>
<td>EHS 406</td>
<td>Industrial Hygiene Control Methods</td>
</tr>
</tbody>
</table>

Or other course as designated by CEE Department Chair

In addition to the required number of credits, it is recommended that students in the architectural engineering concentration take relevant liberal arts courses, as well as writing intensive communication (COMM) courses. Architecture related liberal arts courses such as History of World Architecture, Architecture and Culture, Idea and Image, Greek Art and Architecture, Roman Art and Architecture may also be taken by cross-registration at an Associated College. A minimum grade-point average of 2.0 is required in the courses taken for this professional concentration. At least nine of the credit hours required in the concentration must be completed at Clarkson University unless the dean of the Coulter School of Engineering approves an exception. By successfully completing the requirements above, upon graduation students will receive a Dean’s Certificate in Architectural Engineering.
Biomolecular Engineering

A professional concentration in Biomolecular Engineering has been designed for chemical engineering majors who desire a strong background in biochemical engineering and biology. This will benefit students pursuing careers in medicine, biomedical engineering or in the following industries: consumer products, food processing, and pharmaceuticals. The decision to obtain this concentration is made optimally in the sophomore year.

The professional concentration in Biomolecular Engineering offers a chemical engineering major an alternative path for obtaining a B.S. degree in Chemical Engineering. Students in the classes of 2011 and 2012 must take BY160 Cellular & Molecular Biology (3 Cr. Hrs.) and BY162 Cellular & Molecular Biology Lab (2 Cr. Hrs.) in spring semester of sophomore year. BY160 is a requirement for all chemical engineering students in the classes of 2013 and later; students pursuing the concentration must also take the BY162 laboratory course. For all students, the required mathematics elective must be a suitable statistics course (STAT383 Applied Statistics) and science and engineering electives are replaced with the required courses CM460 Biochemistry I and CH465 Biochemical Engineering. An undesignated elective is replaced with a course selected from the following list of courses relevant to biomolecular engineering: BR400 Introduction to Biomedical Rehabilitation Engineering and Science, BY214 Genetics, BY312 Advanced Cell Biology, BY316 Immunobiology, BY320/322 Microbiology with Lab, BY360/362 Physiology with Lab, BY412 Molecular Biology Laboratory, CM426 Intro to Biophysics, CM453 Intro to Biomaterials, CM464 Physical Biochemistry, ES380 Biomechanics or ES452 Biomaterials and Biomedical Engineering Applications. Further information on this concentration is available in the Department of Chemical Engineering office.

By successfully completing the courses recommended above, upon graduation, students receive a bachelor’s degree in Chemical Engineering with a Dean’s Certificate indicating a “Professional Concentration in Biomolecular Engineering” and a notation to that effect on their transcript.

Construction Engineering Management

A professional concentration in Construction Engineering Management is available to permit civil engineering majors to focus their electives on courses pertinent to the field of construction engineering and management. Electives used to satisfy the requirements of the concentration include a set of courses that reflect the subdiscipline of Construction Engineering as defined by the Accreditation Board of Engineering and Technology (ABET).

To obtain a Professional Concentration in Construction Engineering Management, a student must choose required and professional electives in order to complete the following seven courses:
CE411 Construction Materials
CE415/515 Foundation Design
CE441 Concrete Design
CE442 Steel Design

at least two of the following CE courses:

<table>
<thead>
<tr>
<th>CE405 Construction Planning</th>
<th>CE409 Fund. Of Building Systems</th>
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</thead>
<tbody>
<tr>
<td>CE406 Construction Engineering</td>
<td>CE410/510 Sustainable Infrastructure and Building</td>
</tr>
<tr>
<td>CE407 Construction Estimating and Scheduling</td>
<td>CE445 Timber Design</td>
</tr>
<tr>
<td>CE408 BIM/IPD</td>
<td>CE446 Masonry Design</td>
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</tbody>
</table>
at least two of the following non-CE courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS446</td>
<td>Negotiations &amp; Relationship Management</td>
</tr>
<tr>
<td>EHS330</td>
<td>Safety Analysis</td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management</td>
</tr>
<tr>
<td>LW270</td>
<td>Law &amp; Society 1</td>
</tr>
<tr>
<td>EM/OM 351</td>
<td>Quality Management &amp; Lean Enterprise</td>
</tr>
<tr>
<td>LW446</td>
<td>Law of the Work Place</td>
</tr>
<tr>
<td>EM/OM480</td>
<td>Project Management</td>
</tr>
<tr>
<td>COMM417</td>
<td>Business &amp; Professional Speaking</td>
</tr>
</tbody>
</table>

In addition to the required courses, it is recommended that MA383 Applied Statistics I be taken as a mathematics elective course for this concentration.

By successfully completing the courses recommended above, upon graduation, students receive a bachelor’s degree in their major with a Dean’s Certificate indicating a “Professional Concentration in Construction Engineering Management” and a notation to that effect on their transcript.

**Electric Power Engineering**

Clarkson University offers a professional concentration in Electric Power Engineering that is available to electrical engineering majors. The concentration consists of:

1. EE 331 Energy Conversion
2. EE 333 Power System Engineering
3. EE 431 Power Transmission and Distribution
4. 2 Power elective courses
5. 1 Breadth elective course

Typical power electives:
- EE 430 High Voltage Techniques and Measurements
- EE 439 Dielectrics
- EE 438 Alternate Energy Systems
- ES 340 Thermodynamics
- Any power engineering graduate course w/dept. approval

Typical Breadth electives:
- EE 450 Control Systems
- EE 451 Digital Control
- EE 401 Digital Signal Processing
- EE 446 Instrumentation
- EE 407 Computer Networks
- EE 365 Advanced Digital Circuit Design

Electives not on these lists must be approved by the ECE Department.

By successfully completing the concentration, upon graduation, students receive a BS in Electrical Engineering with a Dean’s Certificate indicating a “Professional Concentration in Electric Power Engineering” and a notation to that effect on their transcript.
Environmental Engineering

A professional concentration in Environmental Engineering is available to all civil engineering students. Electives used to satisfy requirements of the concentration include a set of science and engineering courses that reflect the sub-disciplines of Environmental Engineering as defined by the Accreditation Board of Engineering and Technology (ABET). Students receive a Bachelor of Science degree in civil engineering with a professional concentration in Environmental Engineering.

*Choose one of:*

CE340 Introduction to Environmental Engineering
CH220 Chemical Engineering Principles II: Material Balances

*Choose one of:*

CH210 Chemical Engineering Principles I: Material Balances
CM241 Organic Chemistry I
CM371 Physical Chemistry I

*Choose one of:*

BY222 Ecology and BY224 Ecology Laboratory
BY240 Environmental Science and Policy of American Rivers
BY320 Microbiology

*Choose one of:*

CE491 Senior (Water Resources/Environmental) Design
MP401 Multidisciplinary Course (Environmental Remediation Design)

*Plus any two courses from the following:*

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Course 2</th>
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<tbody>
<tr>
<td>CE430 Water Resources Engineering II</td>
<td>CE486 Industrial Ecology</td>
</tr>
<tr>
<td>CE435 Groundwater Hydrology and Geochemistry</td>
<td>CE580 Environmental Chemistry</td>
</tr>
<tr>
<td>CE477 Atmospheric Chemistry</td>
<td>CE584 Chemodynamics</td>
</tr>
<tr>
<td>CE478 Solid Waste Management and Landfill Design</td>
<td>BY531 Limnology and BY532 Limnology Laboratory</td>
</tr>
<tr>
<td>CE479 Water and Wastewater Treatment Processes</td>
<td>CH434/ES434 Air Pollution Control</td>
</tr>
<tr>
<td>CE480 Chemical Fate and Transport in the Environment</td>
<td>ES432 Risk Analysis</td>
</tr>
<tr>
<td>CE481 Hazardous Waste Management Engineering</td>
<td>ES436 Global Climate Change: Science, Engineering &amp; Policy</td>
</tr>
<tr>
<td>CE482 Environmental Systems Analysis Design</td>
<td>ES464 Corrosion Engineering</td>
</tr>
<tr>
<td>EHS406 Industrial Hygiene Control Methods or EHS416 Principles of Toxicology and Epidemiology</td>
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</tbody>
</table>

CE majors that are in the Environmental concentration are recommended to take ES 250 Electrical Science rather than ES 223 Rigid Body Dynamics for their Sophomore ES elective. In addition to the required courses, it is recommended that MA 383 Applied Statistics be taken as a mathematics elective course for this professional concentration. A minimum grade point average of 2.0 is required in the courses taken for their professional concentration. At least one-fourth of the credit hours required must be completed at Clarkson University, unless the Dean of the Coulter School of Engineering approves and exception.
Materials Engineering

Many engineers and scientists are employed in the materials processing and manufacturing industries. Increasing demands on the mechanical and environmental durability of national infrastructure require improving the strength and useful life of steels, concrete, ceramics and other engineering/structural materials. Space exploration and miniaturization of electronic devices, for example, are made possible by the development and processing of nanostructured composite materials through nanotechnology.

To help students improve employment opportunities in materials-related areas, Clarkson University is offering concentration in Materials Engineering.

A Clarkson student can qualify for a Certificate from the dean of the Coulter School of Engineering verifying satisfactory completion of the coursework necessary to create a Professional Concentration in Materials Engineering. To attain this, the student must complete five (5) courses, which include two (2) required courses and three (3) electives from the list given. The required courses are:

- ES260 Materials Science and Engineering I (Fall or Spring)
- ES360 Materials Science and Engineering II (Spring only)

The three elective courses must be chosen from the following list of materials engineering and science courses:

- CE411 Construction Materials Eng.
- CM430 Colloids and Interfaces
- CM450 Introduction to Polymer Chemistry
- EE439 Dielectrics
- ES357 Microelectronic Circuit Fabrication
- ES365 Polymer Materials
- ES452 Biomaterials and Biomedical Engineering Applications
- ES464 Corrosion Engineering
- ME390 Manufacturing Processes
- ME393 Analysis of Materials Processing
- ME457 Composite Mechanics
- ME591 Selected Topics in Materials Engineering: “Micro- & Nano-Systems Eng.” (Spring)

One of the following laboratory elective courses must be chosen:

- ES361 Fine Particle Technology
- ME492 Welding Metallurgy

Application forms may be obtained online or from any engineering department office.

Structural Engineering

A professional concentration in Structural Engineering is available to civil engineering students to increase their ability to modernize and increase the effectiveness of the nation’s physical infrastructure. This challenge involves the design and construction of new physical systems such as our highways, harbors and waterways, bridges, buildings, and water treatment facilities. This effort requires a variety of specialized talents that can in part be developed through the selection of professional electives.

To obtain a Professional Concentration in Structural Engineering, a student must choose required and professional electives in order to complete the following seven courses:

- CE 420/520 Advanced Structural Analysis
- CE 415/515 Foundations Design
- CE 441 Reinforced Concrete Design
CE 442 Steel Design
CE 490 or CE 492 Senior Design

Choose at least TWO of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CE 401/501</td>
<td>Fracture Mechanics of Concrete Structures</td>
</tr>
<tr>
<td>CE 411</td>
<td>Construction Materials</td>
</tr>
<tr>
<td>CE 421/521</td>
<td>Composite Mechanics and Design</td>
</tr>
<tr>
<td>CE 453/553</td>
<td>Properties and Performance of Concrete Materials</td>
</tr>
<tr>
<td>ME 444</td>
<td>Computer Aided Engineering</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CE 455/555</td>
<td>Structural Damage, Rehabilitation, and Repair</td>
</tr>
<tr>
<td>CE 438 or CE 538</td>
<td>Finite Element Methods</td>
</tr>
<tr>
<td>CE 444/544</td>
<td>Advanced Concrete Design</td>
</tr>
<tr>
<td>CE 457/557</td>
<td>Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE 512</td>
<td>Fundamentals of Dynamics and Vibrations</td>
</tr>
</tbody>
</table>

It is of particular importance for transfer students to be aware of the sequence of prerequisite courses required to complete Steel and Concrete Design for the Structural Engineering concentration. This sequence consists of ES220, ES222, CE320, CE441 (Fall), CE442 (Spring) and requires five semesters if transfer students have not taken ES220 Statics before entering Clarkson. In special circumstances ES222 and CE320 can be taken concurrently.

By successfully completing the courses recommended above, upon graduation, students receive a bachelor’s degree in their major with a Dean’s Certificate indicating a “Professional Concentration in Structural Engineering” and a notation to that effect on their transcript.
Graduate Programs in Engineering
The Coulter School of Engineering offers Master of Science, Master of Engineering, and Ph.D. degrees in each department. There is also an interdisciplinary Engineering Science graduate program managed by the dean of the School of Engineering.

The graduate programs are designed to prepare students for careers in research, development, design, and education. Admission to graduate study will be granted to qualified applicants who hold a baccalaureate degree in engineering from an accredited institution or who have equivalent qualifications. Complete details of the Coulter School of Engineering graduate programs and opportunities are available at http://www.clarkson.edu/engineering/graduate/index.html.

M.S. and Ph.D. Programs
Through the Coulter School of Engineering, Clarkson offers the following Master of Science (M.S.) degrees: chemical, civil and environmental, electrical, and mechanical engineering, and engineering science. At the Ph.D. level, students may pursue chemical, civil and environmental, electrical and computer, and mechanical engineering, and engineering science. Interdisciplinary information technology (IT), computer science (MS) and environmental science and engineering (MS, PhD) degrees are also available. For those interested in an academic or industrial research career, Clarkson’s M.S. and Ph.D. programs in engineering provide an opportunity to pursue leading-edge research and a high degree of specialization. An off-campus Ph.D. program provides opportunity for fully employed students to pursue a Ph.D. in conjunction with their professional work.

For information regarding the admission process, application procedure, degree requirements, and financial assistance, see the Graduate School. To learn more about faculty members and research areas, contact the appropriate department or e-mail enggrad@clarkson.edu. Additional information is also available at http://www.clarkson.edu/engineering/graduate/index.html.

RESEARCH OPPORTUNITIES
The University offers a wide range of opportunities to pursue research interests. See details for each department and the Research and Academic Centers.

Financial Assistance
A wide range of financial assistance is available to full-time graduate students. Full Research and Teaching Assistantships are available on a limited basis for M.S. and Ph.D. students in engineering. This includes a stipend and full-tuition waiver. Partial tuition scholarships are also available in all areas.
**Master of Engineering Program**

The Master of Engineering program provides a flexible mixture of engineering practice, design, and specialized coursework. The program includes a minimum of 30 semester hours of graduate credit and is structured to be completed by full time students within one calendar year. The 21 hours minimum of required coursework must include at least 12 credits earned from the Coulter School of Engineering.

Two seminar credits and from 1 - 7 credit hours of project work will count toward the 30 credit-hour minimum requirement. Students pursuing a dual ME/MBA degree complete all degree requirements in the first year and then move on to the MBA program requirements. Partial tuition scholarships are available for students in the Master of Engineering program.

**ME/MBA Dual Degree Option**

Students have the opportunity to earn two master’s degrees in two years, developing both engineering and management skills in a stimulating, project-based environment.

Students first complete a program leading to a 30-credit hour, non-thesis Master of Engineering degree. This program focuses on practical engineering applications in an environment that can span the boundaries between traditional disciplines. The Business Concepts Program is then offered to students during the summer between earning the Master of Engineering and beginning the nine-month MBA program to cover pre-requisites for the MBA. Up to 10 1.5 credit “Business Concepts” courses can be completed at no tuition cost to participants in this dual degree program. MBA courses completed during the second year emphasize teamwork, leadership and managerial skills. In addition to the ME requirements and management concept courses, the MBA component of this option requires:

**35 credit hours total**

- 10 modules (20 credits)
- 4 electives taken in the spring semester (12 credits)
- Experiential learning or study abroad option available (3 credits)

For more information on the one-year MBA program, visit http://www.clarkson.edu/business/mba/curriculum/index.html.

Application to the dual ME/MBA is initiated through the Coulter School of Engineering admission process. The applicant will be reviewed by both schools. The personal statement should include two parts, one related to desire the ME program and the one related to the MBA program (more details).
INSTITUTE FOR A SUSTAINABLE ENVIRONMENT

Susan Powers, Interim Director and the Spence Professor in Sustainable Environmental Systems; Alan Rossner, Associate Director

The Clarkson Institute for a Sustainable Environment (ISE) is home to Clarkson's environmental activities associated with research, interdisciplinary graduate and undergraduate degree programs, and outreach programs. The Institute was established to support Clarkson's long-standing expertise in this field and to increase collaboration among faculty.

The Institute for a Sustainable Environment is a collaborative and multidisciplinary community that serves as the hub for the University’s drive toward a sustainable world. We facilitate high impact learning experiences, foster transformative scholarship, and engage the campus and broader community in order to understand and address environmental and sustainability challenges.

Recognizing that environmental problems increasingly require the expertise of many disciplines and points of view, the Institute promotes partnerships and interdisciplinary activities that enable the integration of basic and applied research, providing the increased understanding about environmental systems that is needed for informed decisions and policies.

The Clarkson Institute for a Sustainable Environment sponsors workshops, seminars, and a small grants program to foster links among its members and facilitate environmental activities.

Academic Programs

Interdisciplinary Undergraduate Programs
The Institute houses two interdisciplinary undergraduate degree programs: the BS in Environmental Health Science and the BS in Environmental Science & Policy. For information about these programs see the Undergraduate Interdisciplinary Programs section of the Catalog.

The Adirondack Semester
The Adirondack Semester is a 15-credit domestic study program for undergraduates pursuing an off-campus experience that is enriching both academically and culturally. Students from any major who are committed to learn about environmental science, policy, economics and the human history and contemporary issues of the Adirondack Region are encouraged to apply.

The largest park in the contiguous states has been called one of the great experiments in large-scale conservation and regulated economic development. Our mission is to deliver a blend of traditional and experiential education where by students acquire “real world” skills and content knowledge to analyze complex problems related to environmental, social, and economic sustainability.

Students accepted in this program will learn from Clarkson faculty, all of whom are distinguished scholars who have worked in the Adirondacks. Students will be in session with Adirondack Park leaders, policy makers, residents and business owners and learn from peers in mentored team projects. Focus is on the Adirondack Park’s social and natural sciences: its expansive wilderness, residents, governing agencies, economics, organizations and businesses that shape policies and commerce.

Our Adirondack Center for Education and Sustainability in Saranac Lake is comprised of housing and a separate classroom. As well a teaching/resident assistant to support and supervise students. Students can attend a fall or spring semester that is comprised
of 5 three credit courses concentrating in social, economic and environmental aspects of the Adirondack park, plus a final comprehensive team project presentation.

Demand for green collar jobs is growing and our semester in the park will provide professional advantages for students interested in becoming environmental scientists, environmental resource and conservation managers, lawyers, politicians, lobbyists and more.

For additional information see the Adirondack Semester web site at http://www.clarkson.edu/adksemester/.

**ISE Undergraduate Minors**

The Institute houses several interdisciplinary undergraduate minors: Environmental Health Science, Environmental Policy, Environmental Science, and Sustainable Solutions for the Developing World. For information about these programs see the Undergraduate Minors section of the Catalog.

**Interdisciplinary Graduate Programs**

The Institute houses several interdisciplinary graduate programs: the M.S. and Ph.D. in Environmental Science & Engineering, an M.S. in Environmental Politics and Governance and a Master’s International program. In addition, a double degree: Masters in Business Administration (MBA)/Master of Science in Environmental Politics and Governance is offered in conjunction with the School of Business. Clarkson also offers both M.S. and Ph.D. degrees in Environmental Science and Engineering and an M.S. in Environmental Politics and Governance. For information about these programs see the Graduate Interdisciplinary Programs section of the Catalog.

**Research**

Three of Clarkson University’s interdisciplinary research Centers are housed in the Institute: Center for Air Resources Engineering and Science (CARES), Center for Sustainable Energy Systems (CSES), and the Great Rivers Center. For information about the major research initiatives in the Institute, see http://www.clarkson.edu/ise/research.html.

**Contact Information**

Institute for a Sustainable Environment
Clarkson University
8 Clarkson Avenue
122 TAC
PO Box 5715
Potsdam, NY 13699-5715
Phone: 315-268-3856
Fax: 315-268-4291
Email: Theresa Ferero - fererotl@clarkson.edu
PROGRAMS IN HEALTH PROFESSIONS

Master of Science in Occupational Therapy (MSOT)
The Occupational Therapy Department at Clarkson University in Potsdam, N.Y., serves the health needs of the community through preparation of occupational therapy graduates who engineer solutions that enable health and wellbeing throughout an individual’s lifespan.

We believe in the right for all individuals to live their lives with dignity regardless of any disability or barriers to living life to the fullest.

Our graduates will use occupations as both interventions and outcomes to promote an individual’s adaptation to biological, psychological and contextual factors that have interrupted the ability to engage in occupations that have meaning and purpose in the individual’s life.

Our program is designed to change the world through occupational therapy. We develop professionals with deep cultural sensitivity toward the unique needs of rural and underserved populations living with disability. Our graduates will have advanced interprofessional competencies in areas of technology, innovation and education.

Our Occupational Therapy Program is committed to graduating therapists who are prepared to respond to both current and emerging societal needs that influence individual’s occupations. We integrate experiential learning to help students develop internalized working models for activating occupational therapy in culturally diverse, innovative practice settings.

The Occupational Therapy Program at Clarkson is committed to expanding the knowledge of the profession through interprofessional scholarship and practice.

Our curricular goals for our program

Goal 1: Design and deliver humanistic, ethical and high-quality, individualized occupational therapy services to individual clients and their family/caregivers in both individual and group treatment.

Goal 2: Students will understand and be able to respond with occupation-based programs to contemporary and global issues affecting health, wellbeing and disability, with specific focus on unmet and emerging needs in rural and underserved populations.

Goal 3: Integrate innovative, technological, imaginative art and educational resources into program planning, design, management and intervention.

Goal 4: Demonstrate the ability to reflect on science and technology, including their relationship to society, their impact on the environment, and occupation and demonstrate the capacity and commitment to grow both as an individual professional.

Goal 5: Collaborate skillfully with clients, interprofessional team members and non-professional colleagues, families and community members and demonstrate the important contribution of occupational therapy by doing good work.

Curricular Threads
Clarkson's Occupational Therapy Program's "curricular threads" represent the themes that are interwoven throughout all of the coursework. They reflect the values and priorities of our program, as well as the unique philosophy and mission of Clarkson University.
**Professional Identity**
Students will value and assume an identity of service and contribution, by promoting occupation and participation in multiple contexts through the identification of barriers to and providing supports for occupational roles and performance patterns.

**Innovation**
Students will develop the ability to meet the needs of local, regional, and global society, including a focus on rural communities, through research and scholarship.

**Technology**
Students will learn to engineer solutions through technology including telehealth, assistive technology, and virtual contexts.

**Education & Research**
Students will develop problem-solving abilities through science-driven practice and the use of practice-based evidence, with a focus on occupation as both intervention and outcome.

**Interprofessional Practice**
Students will exhibit strong leadership and collaborative skills as they assume roles of advocacy and activism for both clients and the profession.

**Master of Science in Occupational Therapy (MSOT) Requirements**
- Complete a baccalaureate degree; cumulative GPA should be greater than or equal to 3.0.
- Take the necessary pre-requisite courses. The overall grade-point average should be greater than or equal to 3.2 in all pre-requisite courses and no grade lower than a C in these courses. (see list below)
- Submit documentation of a minimum of 40 hours of observation/volunteer or work experience under the supervision of an occupational therapist or occupational therapy assistant.
- Submit three letters of recommendation. At least one must be from a faculty member who can speak to your academic or professional character. At least one from an occupational therapy professional is preferred. Letters from family, friends or clergy will not be accepted.
- An essay stating your interest in the field of Occupational Therapy Satisfactorily complete an on-campus interview requirement (may be satisfied via tele-meeting technology)
Course must include actual hands-on manipulation of media/materials. Examples: knitting, 3-dimensional science or engineering project, woodwork, sculpting, loom work, fly-tying, boat making, electric car construction, ceramics, sewing, beading, et al (portfolio will be reviewed by Graduate Admissions Coordinator to determine if fulfills this pre-req)

**Application**
Applications are made via the Centralized Application Service for Occupational Therapy (OTCAS) [https://portal.otcas.org](https://portal.otcas.org). A supplemental Clarkson University OT program application will be required for qualified OTCAS applicants. Applications from OTCAS are valid until June 15th of that same year applying. A rolling acceptance policy is being used. The class size will be approximately 30 students.

**Supplemental Application**
The supplemental application is in addition to the OTCAS application. After verification of the OTCAS application, the program will review and invite qualified applicants to complete a supplemental application. Supplemental applications received that have not been requested by the program will be disregarded and will not be considered for admission to the program. The supplemental application is to be completed only at the request of the program.

For the supplemental application to be completed, it will include:

- Application
- Signed statement of Meeting Technical Standards
- Personal Statement: describe why you would like to be part of the Occupational Therapy Program at Clarkson University. *If your personal essay submitted on OTCAS already reflects our supplemental personal statement question, you may resubmit that essay.
- Official transcripts for grades not verified in OTCAS
- Reference letter – a total of 3 is required, one of which must be from an Occupational Therapist. A letter must come from a faculty member who can speak to your academic or professional character. If OTCAS has 3 letters and one is from an Occupational Therapist no letter is required with supplemental application
- $50.00 application fee (made payable to Clarkson University)

**Pre-requisites for the MSOT Program at Clarkson University**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>General Psychology</td>
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<tr>
<td>Abnormal Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Development Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Biology (in addition to A&amp;P)</td>
<td>3</td>
</tr>
<tr>
<td>Physics or Kinesiology</td>
<td>3</td>
</tr>
<tr>
<td>Recommended but not required:</td>
<td></td>
</tr>
<tr>
<td>Communication/Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>credits Scientific Writing</td>
<td>3</td>
</tr>
<tr>
<td>Human Anatomy</td>
<td>3 credits</td>
</tr>
<tr>
<td>Human Physiology</td>
<td>3 credits</td>
</tr>
<tr>
<td>English Composition/Critical Thinking</td>
<td>6 credits</td>
</tr>
<tr>
<td>3D skill / craft**</td>
<td>3 credits or portfolio</td>
</tr>
<tr>
<td>Social Sciences (Anthropology, Humanities, Philosophy, Sociology)</td>
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</tbody>
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by Graduate Admissions Coordinator to determine it if fulfills this pre-req)

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All materials are to be mailed directly to Clarkson University at:
Clarkson University
Department of Occupational Therapy
Box 5883, 8 Clarkson Avenue
Potsdam, NY 13699-5883

For questions about completing the Clarkson University supplemental application, contact the Clarkson University Department of Occupational Therapy at ot@clarkson.edu or 315-268-2161.

Program Curriculum
Clarkson's Occupational Therapy Program taps the University's core strengths in engineering, science, entrepreneurship and the arts to provide students with an expansive knowledge base. This specialized Master of Science in Occupational Therapy helps our students embrace the field's essential points:

- Engaging in meaningful occupation and finding purpose are profound curatives.
- A thorough knowledge of human anatomy and psychology — tied to an appreciation for creativity — lead to recovery and unique paths of productivity.
- Neither disabilities nor perceived differences can violate an individual's dignity or self-determination.

Specialty Tracks
Students will have the opportunity to pursue one of three Clarkson OT Specialty Tracks of study, which will allow them to become immersed in advanced study in their area of interest.

- **Technology for Health Related Quality of Life Track**: Students will become clinicians who can design and implement individual, organization and population based programs that leverage the promise of technology.
- **Occupational Therapist as an Educator Track**: Students will become clinicians who can design and implement individual, organization and population based programs in academia, clinical research and/or intervention directed to the current and emerging needs of children and youth.
- **Innovative Practitioner Track**: Students will become clinicians who can design and implement individual, organization and population based programs in innovative practice to include but not limited to primary care practitioner, product designer or entrepreneur.

Fieldwork
At Clarkson University, experiential learning plays a fundamental role in helping students make connections between the classroom and real-life practice. Initially, this will begin informally through service-based learning projects, volunteerism and class assignments. As students enter the second year of the program, they will complete several required fieldwork placements that provide them with strategic learning opportunities that will prepare them for transitioning from the role of student to that of occupational therapist.

Our students will have the opportunity to complete two 1-week Level I Fieldwork Periods during the third trimester of the program (summer). Level I Fieldwork is intended to provide exposure to different populations and settings, to further develop professional behaviors, and to build the comfort and confidence that will be essential to success in Level II Fieldwork. Level I assignments may be with an occupational therapist or with other related professionals. Upon completing all other coursework, students will be required to complete two 12-week Level II Fieldwork placements, which reflect Clarkson’s commitment to innovation. Students will have the opportunity to immerse themselves in OT practice in both traditional settings, as well as those where OT is new or emerging. Students’ unique interests, skills and areas of specialty are taken into account when assigning Level II placements to ensure a good fit. Examples of Level II learning experiences include (but are not limited to):
• Assessment, treatment and progress monitoring
• Individual, agency or community-wide needs assessments
• Innovative program development within existing service delivery models or within underserved settings
• Provide education and training to consumers, colleagues or community members
• Product development and interprofessional collaboration
• Research and advanced study

<table>
<thead>
<tr>
<th>Semester I</th>
<th>Course #</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tr>
<td>OT 500</td>
<td>Case Base Reasoning 1: Gross Anatomy, Neurorehabilitation and Human Occupation</td>
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<tr>
<td>OT 510</td>
<td>Foundations in Occupation Based Practice</td>
<td>3</td>
<td></td>
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<tr>
<td>OT 520</td>
<td>Experiential Learning Lab 1: Health, Disability and Occupation</td>
<td>3</td>
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<tr>
<td>OT 600</td>
<td>Engineering Occupational Performance during Transitions across the lifespan</td>
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<td>OT 540</td>
<td>Professional Seminar A: Professionalism in Occupational Therapy</td>
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<td>OT 530</td>
<td>Optional: Independent Study in Occupational Therapy (1-3 credits)</td>
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<tr>
<td>OT 503</td>
<td>Case Base Reasoning 2: Applied Neuroscience, Human Health and Human Occupation</td>
<td>6</td>
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<tr>
<td>OT 513</td>
<td>Foundations in Intervention: Health-Related Quality of Life (HRQoL)</td>
<td>3</td>
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<tr>
<td>OT 523</td>
<td>Experiential Learning Lab 2: Applied Neuroscience and Human Occupation: Conditions and Function</td>
<td>3</td>
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<tr>
<td>OT 610</td>
<td>Engineering Health through Creativity, Craft and Analysis of Occupation</td>
<td>3</td>
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<tr>
<td>OT 543</td>
<td>Professional Seminar B: Theory and Practice</td>
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<td>OT 530</td>
<td>Optional: Independent Study in OT (1-3 credits)</td>
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<th>Course #</th>
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<tr>
<td>OT 700</td>
<td>Fieldwork Level I</td>
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<tr>
<td>OT 620</td>
<td>Engineering Pathway to Clinical Practice: Technology for Health-Related Quality of Life I</td>
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### Semester IV

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<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OT 505</td>
<td>Case Base Reasoning 3: Kinesiology, Social Determinants of Health &amp; Participation</td>
<td>4</td>
</tr>
<tr>
<td>OT 515</td>
<td>Foundation in Evidence Based Practice: Applied Research I</td>
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</tr>
<tr>
<td>OT 525</td>
<td>Experiential Learning Lab 3: Development of Intervention Across the Lifespan</td>
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<tr>
<td>OT 630</td>
<td>Engineering Pathway to Clinical Practice: Technology for Health-Related Quality of Life II; OR</td>
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<tr>
<td>OT 631</td>
<td>Engineering Pathway to Clinical Practice: Occupational Therapist as an Educator II; OR</td>
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<td>OT 632</td>
<td>Engineering Pathway to Clinical Practice: Innovative Practitioner I</td>
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<tr>
<td>OT 545</td>
<td>Professional Seminar C: Clinical Scholarship</td>
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<tr>
<td>OT 530</td>
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Total 15

### Semester V

<table>
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<tr>
<th>Course #</th>
<th>Course Name</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OT 507</td>
<td>Case Base Reasoning 4: Innovations in Practice</td>
<td>4</td>
</tr>
<tr>
<td>OT 517</td>
<td>Foundations in Evidence Based Practice: Applied Research II</td>
<td>3</td>
</tr>
<tr>
<td>OT 527</td>
<td>Experiential Learning Lab 4: Professional Practice, Leadership, Management &amp; Activism</td>
<td>3</td>
</tr>
<tr>
<td>OT 640</td>
<td>Engineering Pathway to Clinical Practice: Technology for Health-Related Quality of Life III; OR</td>
<td>3</td>
</tr>
<tr>
<td>OT 641</td>
<td>Engineering Pathway to Clinical Practice: Occupational Therapist as an Educator III; OR</td>
<td>3</td>
</tr>
<tr>
<td>OT 642</td>
<td>Engineering Pathway to Clinical Practice: Innovative Practitioner III</td>
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<tr>
<td>OT 547</td>
<td>Seminar D: Guided Practice in Scholarly Activity</td>
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<tr>
<td>OT 530</td>
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Total 15

### Semester VI

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OT 705</td>
<td>Fieldwork Level IIA</td>
<td>9</td>
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<tr>
<td>OT 530</td>
<td>Optional: Independent Study in OT (1-3 credits)</td>
<td>9</td>
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Total 9
Semester VII

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Name</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>OT 710</td>
<td>Fieldwork Level IIB</td>
<td>9</td>
</tr>
<tr>
<td>OT 530</td>
<td>Optional: Independent Study in OT (1-3 credits)</td>
<td></td>
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<td></td>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credit Hours</strong></td>
<td><strong>92</strong></td>
</tr>
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</table>

**Length of Program**
Students must complete the program in 27 months unless granted a leave of absence for health or personal reasons. Any student that requests and is granted a leave of absence must complete the program in 40 months (27 months plus 1 year).

**Program sequence and Advance Standing**
Students are expected to complete the designated professional curriculum in the sequence specified. Each semester's course work is to be considered pre-requisite to the next semester.
1. Students may not enter the program with advanced standing.
2. Students are required to successfully complete, in sequence, all course work as full-time students.
3. There is no opportunity to progress into an advanced semester.
4. There is no opportunity to change the order of pre-clinical course work.
5. Elective courses are limited to the clinical year.
Students are expected to complete each semester on time as a cohort. Student progression will be a function of successfully passing all required courses in a semester.

**Graduation Requirements**
To graduate from the OT Program, and earn the Master of Science in Occupational Therapy degree (MSOT) candidates must:
- Achieve a grade of C or better for all courses in the program
- Achieve a minimum overall GPA of 3.00 or better at program completion
- Successful completion of both levels of fieldwork
- Successful completion of the comprehensive written final exam by score or remediation
- Be recommended for graduation by the Program Chair and Clarkson University Faculty
- Student must have paid all debts to the school and be in good standing

**Clarkson Pre-OT Plan**
Clarkson University offers a pre-Occupational Therapy program to highly qualified and motivated incoming high school students who wish to pursue a career in occupational therapy. The Pre-OT plan is not a major or a minor. Students must declare a major in an area of interest. Students accepted into the pre-Occupational Therapy program will be invited to participate in activities in the OT department and will be granted preferential consideration as long as they demonstrate successful completion of the pre-requisites and meet all admission requirements of the Master of Science in Occupational Therapy to include:
- Complete a baccalaureate degree at Clarkson University with an overall grade-point average greater than or equal to 3.0.
- Overall grade-point average greater than or equal to 3.2 in all pre-requisite courses and no grade lower than a C in these courses.
• Submit documentation of a minimum of 40 hours of observation/volunteer or work experience under the supervision of an occupational therapist or occupational therapy assistant.
• Submit three letters of recommendation. At least one must be from a faculty member who can speak of your academic or professional character. At least one from an occupational therapy professional is preferred. Letters from family, friends or clergy will not be accepted.
• Provide an essay stating your interest in the field of Occupational Therapy.
• Satisfy the on-campus interview requirement.
• Submit an application to the MSOT program through the Occupational Therapy Common Application Service (OTCAS) by September 20 of your senior year as an undergraduate at Clarkson University.

If you have any specific questions regarding our Pre-OT plan, you can contact our Pre-Health Sciences Advisor, Carolyn Zanta. She advises all of our Pre-OT students. You can contact her at czanta@clarkson.edu or 315-268-3968. Please do not hesitate to contact us directly if you have any other questions or concerns! You can email us at ot@clarkson.edu or call 315-268-4412.

Accreditation
The Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA) has granted “Candidacy Status” to the Occupational therapy Program at Clarkson University. Candidacy Status is step 2 of the accreditation process. Although the designation “Candidacy Status” is not a guarantee of accreditation, it does indicate that the resource allocation and plan for development of the proposed program appear to demonstrate the ability to meet the ACOTE Standards for a Master’s-Degree-Level Educational Program for the Occupational Therapist if fully implemented as planned.

Doctor of Physical Therapy (DPT) Program

Mission
The domain of physical therapy is the application of human movement science to maintain or enhance activity level and social participation. Physical therapy is a health profession that includes evaluating, alleviating and preventing impairments, functional limitations, and disability from injuries, disease and other causes. Physical therapists serve a dynamic and comprehensive role in health care engaging in treatment, consultation, education and research.

The mission of the Department of Physical Therapy is:
• To graduate physical therapists who emulate the core values of the profession in their physical therapy practice; and
• For faculty, graduates, and students to contribute to the profession, community, and society through education, scholarship, service or practice.

Pre-Physical Therapy (Pre-PT) Undergraduate Concentration
To prepare candidates for entry into the graduate physical therapy professional curriculum, the University offers an undergraduate Pre-Physical Therapy (Pre-PT) Concentration. The Pre-PT Concentration consists of three unique aspects:
• At least 50% of the available seats in each cohort will be held for Clarkson University pre-PT undergraduate students who successfully complete all of the necessary pre-requisite requirements.
• A physical therapy program adviser. In addition to your major adviser, you'll be assigned a second faculty adviser from the Department of Physical Therapy. This extra mentoring relationship adds another dimension of support to your experience. You and your PT adviser will work together to define your career goals, balance your PT course requirements with major requirements, and make a successful transition to the Doctor of Physical Therapy program.

• A solid foundation in Problem-Based Learning, which is a cornerstone of the graduate program. The pre-physical therapy courses will introduce you to this student-centered, collaborative and self-directed education model. Problem-Based Learning (PBL), based on patient case studies, more closely resembles actual clinical experience. It better prepares you to be a self-motivated lifelong learner, which is essential to being a competent healthcare professional.

The graduate professional curriculum (DPT) emphasizes problem-based learning, technology in education, a strong basic science partnership, and a strong commitment to cultural diversity. The Pre-PT Concentration provides an introduction to problem-based learning.

Pre-PT Concentration Application Requirements
Pre-PT Concentration applicants must complete all the required material for general Clarkson undergraduate admission, and indicate on the undergraduate application that Special Advising - Physical Therapy is desired. Of the required recommendations by the University, applicants to the Pre-PT Concentration should have at least one academic, and preferably one in a health-care field.

Length of Pre-PT Concentration
An undergraduate degree normally takes four academic years. There are plans of study in some undergraduate majors that can be completed in three years.

Doctor of Physical Therapy Application Requirements
• Completion of baccalaureate degree (B.S., B.A., etc.) prior to matriculation into the professional curriculum; with an overall grade point average greater than or equal to 3.2
• Take all the necessary pre-requisite courses with a grade point average greater than or equal to 3.2 in all pre-requisite courses and no grade lower than a C in these courses.
• Submit documentation of a minimum of 50 hours of observation/volunteer or work experience in physical therapy and/or another healthcare setting, of which a minimum of 30 hours must be completed under the supervision of a physical therapist.

All applications to the graduate physical therapy program must be submitted through the Physical Therapy Centralized Application Service (PTCAS - www.ptcas.org).

Prerequisite Courses
• Two Biology courses:
  • Cellular and Molecular Biology/Lab (Clarkson course: BY160/BY162), 5 credits
  • Human Anatomy and Physiology I/Lab (Clarkson course: BY 471/BY 473), 5 credits or Human Anatomy & Physiology II/Lab (Clarkson course: BY 472/BY 474) 5 credits
• Two Chemistry courses:
  • General Chemistry I with lab (Clarkson course: CM 131 or CM 103/105: Structure and Bonding with lab) 4 or 5 credits
  • General Chemistry II with lab (Clarkson course: CM 132 or CM 104/106: Chemical Equilibrium and Dynamics with lab) 4 or 5 credits
• Two Physics courses:
  • Physics I with lab (Clarkson course: PH 131 or PH 141) 4 credits
  • Physics II with lab (Clarkson course: PH 132 or PH 142) 4 credits
• One statistics course:
  • Statistics (Clarkson courses: STAT 282, STAT 284, STAT 318, STAT 383) 3 credits
• Two Psychology Course
  • General Psychology (Clarkson course: PY 151) 3 credits
  • Another 3 credit Psychology course, we recommend Developmental Psychology, life span (Clarkson course: PY 370) 3 credits
• Medical Terminology

**Academic Learning Experiences**
The DPT curriculum utilizes a problem-based learning (PBL) approach to education, providing students an active, exciting and effective way to learn. PBL is student-centered, collaborative, self-directed, and an active learning process based on patient case studies. Students are prepared for clinical practice and lifelong learning.

**Clinical Learning Experiences**
Clinical internships are integrated into the curriculum throughout the educational process. To prepare students optimally for work in a variety of clinical settings, Clarkson continuously develops new clinical internship sites. Contractual relationships exist with many clinical internship sites in the North Country of New York State, throughout the United States, and some international sites as well.

**The DPT Curriculum**
The DPT professional curriculum is a full-time program, starting in the fall semester. Each year is divided into three semesters (trimesters), and includes Clinical Education. The professional curriculum takes three years to complete, finishing in May of the third year.

### Fall — Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>PT505</td>
<td>Foundational Sciences For Physical Therapy</td>
<td>9</td>
</tr>
<tr>
<td>PT506</td>
<td>Professional Found For Physical Therapy</td>
<td>2</td>
</tr>
<tr>
<td>PT508</td>
<td>Principles of Measurement</td>
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### Spring — Semester 2

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<tbody>
<tr>
<td>PT515</td>
<td>Cardiopulmonary/Exercise Science</td>
<td>9</td>
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<tr>
<td>PT517</td>
<td>Professional Practice</td>
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<td>PT518</td>
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### Fall — Semester 7

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<tbody>
<tr>
<td>PT525</td>
<td>Musculoskeletal Physical Therapy</td>
<td>9</td>
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<tr>
<td>PT527</td>
<td>Professional Practice Preparation</td>
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### Spring — Semester 5

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<tbody>
<tr>
<td>PT606</td>
<td>Neuromuscular Physical Therapy II</td>
<td>6</td>
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<tr>
<td>PT 607B</td>
<td>Professional Practice III</td>
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<tr>
<td>PT615</td>
<td>Physical Therapy for Multiple Systems I</td>
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### Summer — Semester 3

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PT616</td>
<td>Physical Therapy for Multiple Systems Disorders II</td>
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<td>PT 617A</td>
<td>Professional Practice IV</td>
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<td>PT616</td>
<td>Professional Practice IV</td>
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<td>PT627 A</td>
<td>Professional Practice V</td>
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### Spring — Semester 5

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<tr>
<td>PT506</td>
<td>Neuromuscular Physical Therapy II</td>
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<tr>
<td>PT 607B</td>
<td>Professional Practice III</td>
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<tr>
<td>PT615</td>
<td>Physical Therapy for Multiple Systems I</td>
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### Fall — Semester 7

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<td>PT505</td>
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<td>PT506</td>
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<tr>
<td>PT508</td>
<td>Principles of Measurement</td>
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### Spring — Semester 2

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<tr>
<td>PT515</td>
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<tr>
<td>PT517</td>
<td>Professional Practice</td>
<td>2</td>
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<tr>
<td>PT518</td>
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### Summer — Semester 3

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<tbody>
<tr>
<td>PT525</td>
<td>Musculoskeletal Physical Therapy</td>
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</tr>
<tr>
<td>PT527</td>
<td>Professional Practice Preparation</td>
<td>2</td>
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</table>
Facilities
The Doctor of Physical Therapy (DPT) curriculum is housed in Clarkson Hall. The Department of Physical Therapy provides a focus on health sciences education, treatment and research in physical rehabilitation for the University and the community. Clarkson Hall houses Clarkson’s academic physical therapy programs.

Accreditation Status
The Commission on Accreditation in Physical Therapy Education (CAPTE) of the American Physical Therapy Association (APTA) accredited Clarkson University’s graduate physical therapy professional curriculum on October 24, 2001. The State Education Department of the University of the State of New York approved Clarkson University’s graduate physical therapy as the Master of Physical Therapy (MPT) on April 21, 1999, and the Doctor of Physical Therapy (DPT) on May 18, 2005. CAPTE reaffirmed Program accreditation on October 28, 2009.

Masters of Physician Assistant Studies Program
Mission and Goals
The mission of the Clarkson University Department of Physician Assistant Studies is to educate Physician Assistants to become highly skilled and compassionate health care providers. The program will encourage an interdisciplinary approach with an emphasis on patient-centered care. Graduates will become leaders in the health care community, continuously striving for excellence in their professional endeavors while compassionately providing for the health care needs of those they serve.

The goals of the Department of Physician Assistant Studies are to:
1. Identify for admission those individuals with the academic ability, clinical experience, interpersonal skills, and maturity necessary to become outstanding Physician Assistants.
2. Provide a coordinated, comprehensive didactic and clinical curriculum that will allow graduates to deliver the highest quality of health care services.
3. Promote a didactic and clinical educational environment that embraces the concepts of continuous communication, cooperation, and compassion.
4. Promote an atmosphere of "learner-centered" education that empowers students to become self-directed learners.
5. Instill in students the core values of Clarkson University and the importance of staying in the Clarkson region to practice after graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Code</th>
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<tbody>
<tr>
<td>PT528</td>
<td>Physical Therapy Research Design</td>
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<td>PT627B</td>
<td>Professional Practice V</td>
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<tr>
<td>PT645</td>
<td>Practice Management in the Autonomous Environment</td>
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<td>PT648</td>
<td>Writing &amp; Presenting Research</td>
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<tr>
<td>PT537</td>
<td>Professional Practice II</td>
<td>6</td>
<td>PT648</td>
<td>Writing &amp; Presenting Research</td>
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<tr>
<td>PT605</td>
<td>Neuromuscular Physical Therapy I</td>
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<td>PT657</td>
<td>Advanced Clinical Skills</td>
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<tr>
<td>PT607A</td>
<td>Professional Practice III</td>
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<td>PT667</td>
<td>Professional Practice VII</td>
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<tr>
<td>PT608</td>
<td>Physical Therapy Data Analysis</td>
<td>1</td>
<td>PT677</td>
<td>Professional Practice VIII</td>
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</table>
6. Provide students with the medical knowledge, clinical skills, and caring attitude needed to practice as a Physician Assistant anywhere and within any type of clinical practice.

7. Contribute knowledge to the medical community by performing research or other forms of academic activity through the students' Master's Project, which may be utilized as a community resource or published in a professional journal.


9. Develop in students an appreciation of the dignity of the individual and each individual's right to a quality life with consideration for the culture and diversity of each patient.


11. Highlight the importance of community service by incorporating service learning into the curriculum while fostering a commitment to future volunteerism in our students.

12. Encourage graduates to strive for excellence in clinical practice while employing professional ethics as a member of the health care team focused on service to others.

The Department of Physician Assistant Studies will prepare individuals to become valued members of the health care team licensed to practice medicine with physician supervision.

*Department motto: a posse ad esse - from possibility to reality.*

**Application**

Applications are made via the Centralized Application Service for Physician Assistants (CASPA) [https://portal.caspaonline.org/](https://portal.caspaonline.org/). A supplemental Clarkson University PA program application will be required for qualified CASPA applicants. Deadline for applications through CASPA is March 1st. A rolling acceptance policy is being used. The class size will be approximately 30 students.

The prerequisites for admission are listed below. Be sure that you meet the Clarkson program prerequisites before submitting your CASPA application. This includes your score on the GRE. Please review the technical standards for the program. Those applicants who are invited to submit a supplemental application will sign a statement in that application that these standards can be met.

**Prerequisites for the Clarkson PA program**

- Bachelor's degree from a regionally accredited college/university
- 2 semesters Human/Animal/Vertebrate Anatomy & Physiology or 1 semester of Human/Animal/Vertebrate Anatomy and 1 semester of Physiology - minimum 6 hours total
- 2 semesters of Biology - one of which must be Microbiology (A&P cannot be used to fulfill the remaining course requirement) -minimum 6 hours total
- 2 semesters of Chemistry (Organic Chemistry recommended) - minimum 6 hours total

**GPA for the above courses must be 3.0 or higher**

- 1 semester of Humanities/Social Sciences: minimum 3 credits
- 1 semester Statistics: minimum 3 credits
- 1 semester Genetics: minimum 3 credits
- 1 semester Psychology (upper level recommended): minimum 3 credits

*Grades less than C are not accepted for any prerequisite (C minus not accepted). Prerequisite courses must be complete or in progress at the time of application. Overall GPA for all required courses must be 3.0 or higher.*

All prerequisite coursework must be completed at an accredited institution within the United States or Canada.

- GRE - with results sent to Clarkson University (school code 2084).
A minimum of 500 hours of documented patient care experience is to be completed by the time of admission. Applicants with compensated hours of direct patient care will have an advantage. A portion of the required hours must be started by the time of application. Those that have not met the required hours by time of application must demonstrate a plan to obtain the remaining hours before classes begin if accepted into the program.

It is required that applicants spend at least one day shadowing/observing a clinically practicing Physician Assistant. A separate (non-reference) Clarkson PA program form will be completed by the PA documenting the experience.

Students who studied extensively outside of North America will require formal evaluation of those transcripts by the World Education Service (WES). Completion of TOEFL will be required for those for whom English is not the primary language. This requirement may be waived if the applicant has a bachelor's, master's, or doctoral degree from a regionally accredited U.S. college/university. Simply meeting the prerequisites and submitting an application will not guarantee an interview or acceptance into the program. The admissions committee will decide which applicants are interviewed and which are selected for admission.

**Technical Standards Requirements**

The abilities and skills which candidates and students must possess in order to complete the education and training associated with Physician Assistant education are referred to as "Technical Standards." These same abilities and skills are essential for clinical practice as a Physician Assistant. The Technical Standards listed below reflect five categorical areas: observation, communication, critical reasoning (intellectual), motor and sensory, and behavioral/social and represent minimum competence levels. Students must attest that they meet these Technical Standards prior to or at the time of matriculation to the Clarkson University Department of PA Studies. Students found to be in violation of Technical Standards are at risk for dismissal from the program. Each standard is defined below and is followed by examples of indicators of minimum competence in that area. Reasonable accommodation for persons with documented disabilities will be considered on an individual basis, but a candidate must be able to perform in an independent manner.

**Observation.** Candidates must have sufficient capacity to observe in the lecture hall, the laboratory, the outpatient setting and the patient's bedside. Sensory skills to perform a physical examination are required. Functional vision, hearing and tactile sensation are required to properly observe a patient's condition and to perform procedures regularly required during a physical examination such as inspection, auscultation and palpation.

**Communication.** Candidates must be able to communicate effectively in both academic and health care settings. Candidates must show evidence of effective written and verbal communication skills. Candidates must be able to communicate with patients in order to elicit information, describe changes in mood, activity and posture and perceive nonverbal communications. Candidates must be capable of completing, in a thorough and timely manner, appropriate medical records and documents and plans according to protocol.

**Motor.** The ability to participate in basic diagnostic and therapeutic maneuvers and procedures (e.g., palpation, auscultation) is required. Candidates must have sufficient motor function to execute movements reasonably required to properly care for all patients. Candidates must be able to move freely about patient care environments and must be able to move between settings such as clinics, classroom buildings, and hospitals. In addition, physical stamina sufficient to complete the rigorous course of didactic and clinical study is required. Long periods of sitting, standing, or moving are required in classroom, laboratory and clinical experiences.
**Intellectual.** Candidates must be able to measure, calculate, reason, analyze and synthesize. Problem solving, one of the critical skills demanded of physician assistants, requires all of these intellectual abilities. Candidates must be able to read and understand medical literature. In order to complete the Physician Assistant Studies program, candidates must be able to demonstrate mastery of these skills and the ability to use them together in a timely fashion in medical problem-solving and patient care.

**Behavioral and Social Attributes.** Candidates must possess the emotional health and stability required for full utilization of their intellectual abilities, the exercise of good judgment and the prompt completion of all academic and patient care responsibilities. The development of mature, sensitive and effective relationships with patients and other members of the healthcare team is essential. The ability to function in the face of uncertainties inherent in clinical practice, flexibility, compassion, integrity, motivation, interpersonal skills and concern for others, are all required. Candidates must be able to function effectively under stress and have the ability to accept constructive criticism and handle difficult interpersonal relationships during training.

**Supplemental Application**
Candidates will be required to certify that they have read and understand the Technical Standards of the Department of PA Studies at Clarkson University and attest that they have no condition -as noted above- that would interfere, inhibit, compromise or distract from their participation in the program.

The supplemental application is in addition to the CASPA application. After verification of the CASPA application the program will review and invite qualified applicants to complete a supplemental application. Supplemental applications received that have not been requested by the program will be disregarded and will not be considered for admission to the program. **The supplemental application is to be completed only at the request of the program.**

For the supplemental application to be completed, it will include:

- The application form
- Your personal statement describing how Clarkson’s values and its PA program will influence your PA education
- Certification of meeting technical standards (*form is in the application*)
- Reference letter from a practicing physician, Physician Assistant, or Nurse Practitioner if one was not included in your CASPA application (*form is in the application*)
- The CASPA and supplemental application must contain a total of three reference letters. If additional letters are needed to meet the minimum requirement, submit additional letters with the supplemental application. (*form is in the application*)
- Official transcript for all coursework not verified in the CASPA application
- Documentation of shadowing PA (*form is in the application*)
- GRE – school code 2085. Must be official scores reported by ETS directly to CASPA
- $50.00 application fee (made payable to Clarkson University)

All materials are to be mailed directly to Clarkson University at:
Clarkson University  
Department of Physician Assistant Studies  
8 Clarkson Avenue  
Potsdam, NY 13699-5882

For questions about completing the Clarkson University supplemental application, contact the Clarkson University Department of Physician Assistant Studies at pa@clarkson.edu or 315-268-7942. The supplemental application must be returned within 30 days of the request from the program. If the supplemental application is not received within thirty days the entire application will closed and applicant status will be moved to withdrawn.
Incomplete applications, applications received after the deadline, or applications received without the application fee will not be considered.

**Program Curriculum**

The PA Program at Clarkson University is a professional degree program intended to prepare students academically and professionally for responsibilities and services as a Physician Assistant. This entry level master’s degree program consists of 82 credit hours divided into three phases that span 28 consecutive months.

The Didactic phase is the preclinical year and spans 13 months.
The Clinical phase consists of 14 months of supervised clinical education and coursework.
The Summative Phase consists of 1 month and consists of evaluation and preparation for the future as a graduate PA.

The curriculum is structured so that courses from Semester Two build on courses in Semester One, etc. Therefore, opportunities for transfer of credit into the PA curriculum or advanced placement are not available.

**Supervised Clinical Practice Experiences** are distributed among 9 clinical field experiences or “SCPE’s”. These experiences form the basis of the clinical and socialization processes for adaptation to the roles and functions of a Physician Assistant. A separate 5 week elective is designed for student research.

### Spring I

<table>
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<tr>
<th>Course</th>
<th>Credit Hours</th>
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<tr>
<td>Introduction to the Profession</td>
<td>PA500, 2</td>
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<tr>
<td>Clinical Medicine I</td>
<td>PA501, 6</td>
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<tr>
<td>Basic Science I</td>
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<tr>
<td>Pharmacotherapeutics I</td>
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<tr>
<td>Patient Assessment I</td>
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<td>The Patient and the PA I</td>
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### Summer I

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Clinical Medicine II</td>
<td>PA502, 4</td>
</tr>
<tr>
<td>Basic Science II</td>
<td>PA505, 2</td>
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<tr>
<td>Pharmacotherapeutics II</td>
<td>PA508, 3</td>
</tr>
<tr>
<td>Patient Assessment II</td>
<td>PA511, 3</td>
</tr>
<tr>
<td>The Patient and the PA II</td>
<td>PA514, 1</td>
</tr>
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<td><strong>Semester Total</strong></td>
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### Fall I

<table>
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<tr>
<td>Clinical Medicine III</td>
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<tr>
<td>Basic Science III</td>
<td>PA506, 2</td>
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<tr>
<td>Pharmacotherapeutics III</td>
<td>PA509, 3</td>
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<tr>
<td>Patient Assessment III</td>
<td>PA512, 3</td>
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<tr>
<td>The Patient and the PA III</td>
<td>PA515, 1</td>
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<tr>
<td>Medical Informatics</td>
<td>PA516, 2</td>
</tr>
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<td><strong>Semester Total</strong></td>
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</table>
Students must complete the program in 28 months unless granted a leave of absence for health or personal reasons. Any student that requests and is granted a leave of absence must complete the program in 40 months (28 month program plus 1 year).

Program sequence and Advance Standing
Students are expected to complete the designated professional curriculum in the sequence specified. Each semester's course work is to be considered pre-requisite to the next semester.

1. Students may not enter the program with advanced standing.
2. Students are required to successfully complete, in sequence, all course work as full-time students.
3. There is no opportunity to progress into an advanced semester.
4. There is no opportunity to change the order of pre-clinical course work.
5. Elective courses are limited to the clinical year.
Students are expected to complete each semester on time as a cohort. Student progression will be a function of successfully passing all required courses in a semester. In the didactic phase of the program, any course failure after attempts at remediation will result in dismissal from the program. In the clinical phase, one rotation may be failed, but with remediation and a repeat of that rotation once only for the clinical phase. In that instance, the student's education may continue 5 more weeks. In the summative phase, the student must pass both the physical assessment exam and the comprehensive written final to pass PA 610 and to be recommended for graduation. If after remediation, a student cannot successfully pass either or both exams, they will not be recommended for graduation and will be released from the program.

**Graduation Requirements**

To graduate from the PA Program, and earn the Master of Science in Physician Assistant Studies degree (MSPAS) candidates must:

- Achieve a grade of C or better for all courses in the program
- Achieve a minimum overall GPA of 3.00 or better at program completion
- Successful completion of a multi-station OSCE/history and physical skills assessment by score or remediation
- Successful completion of the comprehensive written final exam by score or remediation
- Be recommended for graduation by the Program Chair and Clarkson University Faculty
- Student must have paid all debts to the school and be in good standing

**Academic Performance Standards**

Standards of acceptable performance (cognitive and psychomotor) for courses are communicated to students in writing via the syllabus and orally reviewed at the introduction of the course. A student must achieve and maintain the required 3.00 semester Grade Point Average (GPA) to remain in good academic standing and graduate from the PA Program.

The policy of 3.00 or better in a graduate professional program has been adopted to better ensure student’s preparation for future sequential course work. Students will be given feedback at the completion of each exam.

Performance in didactic courses is commonly assessed by written exams, oral presentations and/or research papers, as well as final written (cognitive) exams. In designated courses, psychomotor performance may be assessed by target skill competency exams and small group exercises. During the didactic phase of the program, grades for cognitive performances will be recorded as a raw score and a percentage. At the end of each course the percentage scores will be converted to a grade, A through F for each of the core PA courses.

Performance in the clinical phase of the program is assessed using a combination of targeted behavioral, psychomotor and clinical competencies relative to the supervised practice objectives and opportunities and, when indicated, by the syllabus for the SCPE, grand rounds presentations, and written cognitive exams.

To remain in good academic standing, all PA Students must maintain a minimum semester GPA of 3.00 and receive a “C” or better in all courses (a “D, or F,” grade in any course may result in academic dismissal from the program).

Additionally, a student may not progress to the clinical year of the program with a cumulative GPA of less than 3.00 at the end of the 3rd semester of the program.

Faculty will meet formally at the end of each semester to discuss student’s academic progress; students will be notified in writing the results of their individual student progress. Each bi-weekly faculty meeting will include an agenda item on student progress. Additionally the department will notify Student Administrative Services to comply with the university policy on satisfactory academic progress.
Clarkson Pre-PA Plan
High school seniors who apply to Clarkson University for undergraduate studies are eligible to apply for the Pre-PA Plan as part of their application. Applicants must demonstrate scholarship in Math and Science and a representative SAT/ACT score. Participation in health related courses and activities is encouraged. The Pre-PA Plan is not a major or minor. Students must declare a major in an area of interest, but will be required to take the 10 prerequisite courses for the PA program as part of their degree. At least three prerequisite courses must be completed by the end of the second year. Patient care hours must be acquired during the first 2 years as well. At least 100 hours of the 500 hour total is required by this time. Student advising will be done by the department of the declared major with input from the health science advisor and the PA advisor when needed. Pre-PA students will be expected to participate in PA program activities when possible.

Students must achieve and maintain a GPA of at least 3.25 throughout their undergraduate years. No grade less than B is acceptable for prerequisite courses. The students must also be free of any disciplinary problems. At the end of the second undergraduate year, the student will meet with the PA faculty to determine their continuation in the Pre-PA Plan. They must continue to acquire patient care hours and finish prerequisite courses while maintaining the above mentioned GPA.

During the senior year, the student must still formally apply through the centralized process (CASPA). 50% of the available seats in each cohort will be held for Clarkson University pre-PA students. Each student that successfully completes the prerequisites of the pre-PA plan will be granted an interview and then compete for the available seats with other pre-PA applicants. Applicants that are not Clarkson pre-PA students will compete for the remaining seats with hundreds of other

Accreditation
The program has been granted continuing accreditation by the ARC-PA as of March 2015. The program has also been registered by the New York State Education Department. Graduation from an accredited program is a requirement of states for licensing and healthcare systems for credentialing.

Accreditation-Continued is an accreditation status. The granting of Accreditation-Continued is an accreditation status granted when a currently accredited program is in compliance with ARC-PA Standards. Accreditation remains in effect until the program closes or withdraws from the accreditation process or until accreditation is withdrawn for failure to comply with the Standards.

The approximate date for the next validation review for the program by the ARC-PA will be March 2022. The review date is contingent upon continued compliance with the Accreditation Standards and ARC-PA policy.
If you have questions about the accreditation process or Clarkson's status, please contact us at 315-268-7942 or pa@clarkson.edu.

Contact Us
Clarkson University
Department of Physician Assistant Studies
Box 5882
Potsdam, NY 13699-5882
Phone: 315-268-7942
Fax: 315-268-7944
Email: pa@clarkson.edu
INTERDISCIPLINARY PROGRAMS

In recent years, Clarkson University has built on its existing strengths in business, engineering, liberal arts, and the sciences to develop an increasing number of new interdisciplinary majors that combine learning from two or more traditionally distinct areas. Today, many of the most profound advances in knowledge are occurring at the intersections of previously separate academic disciplines and industrial fields. These innovative programs reflect not only the strength of the University’s academic faculty and resources, but also the flexibility and vitality of Clarkson’s highly collaborative academic environment.

Undergraduate Interdisciplinary Programs

Interdisciplinary BS Programs in Environmental Science

Environmental Science is a fast-evolving and high-demand field for students interested in applying broad expertise in the life sciences (biology and ecology) and policy (law, regulatory history, politics, ethics) to the environmental challenges of the day. At Clarkson students can choose between two interdisciplinary programs in environmental science: The BS in Environmental Science & Policy and the BS in Environmental Health Science. If you are uncertain about which program to choose, you can wait until the end of your sophomore year to decide. Students in both degree programs share a common curriculum in their first three semesters.

B.S. in Environmental Science & Policy

Alan Rossner, Director

Concerns about environmental issues are increasingly at the forefront of governmental policy, corporate planning, and the day-to-day choices of families like yours. Government-supported research focuses on important topics such as global warming, depletion of the ozone layer, and acid rain. Corporations seek new production methods and materials to decrease industrial pollution. At home we recycle our garbage and purchase products with less packaging.

Cleaning up the pollution of the past and confronting contemporary environmental challenges requires creative and multidisciplinary solutions. Those most successful in addressing these complex issues will be trained in a variety of backgrounds. They will understand the basic concepts in the life sciences and their application to real-world problems. They will appreciate the history and complexity of social and political systems. And they will be knowledgeable in environmental regulation and policy. Clarkson’s Environmental Science and Policy (ES&P) program prepares its graduates to become effective leaders by providing a broad-based, interdisciplinary background.

Clarkson undergraduates experience hands-on learning that includes assisting the faculty with research projects and working on independent projects. The coursework is challenging but flexible, and the ES&P degree allows students significant freedom in choosing their emphasis in an environmental area. The curriculum is also well suited as a preparatory degree for students interested in pursuing a degree in the health sciences, including medicine, dentistry, and veterinary science.

Programs can be tailored to meet the interests of the student. To this end, Clarkson offers both a minor and a major in Environmental Science & Policy. Upon successful completion of the major, a student will be awarded a Bachelor of Science (B.S.) degree. The major allows students to pursue their study of the environment in an interdisciplinary fashion.
There are required courses in biology, ecology, business, chemistry, liberal arts, and mathematics. Using these as a foundation, students can use professional electives to investigate environmentally related issues of interest in more depth. Students in completing the Clarkson's ES&P program are expected to meeting the following goals:

- Develop a foundation in natural sciences
- Understand how technology has impacted the environment, and how technology can also be a solution to environmental challenges
- Understand how science and public values guide policy
- Understand how policy influences scientific endeavors
- Understand how policy impacts the environment and public health
- Develop quantitative and qualitative analysis skills
- Develop skills for communicating complex scientific information to nonscientists
- Complete an independent ES&P research experience
- Practice ES&P through a professional experience

### Required Courses

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<thead>
<tr>
<th>Courses</th>
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<th>Courses</th>
<th>Credit Hours</th>
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<tr>
<td>Chemistry</td>
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<tr>
<td>Biology/Environmental Science</td>
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<td>Technology course</td>
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<td>Mathematics &amp; Statistics</td>
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<td>Professional Electives</td>
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<td>Physics</td>
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<td>Free Electives</td>
<td>11-13</td>
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<tr>
<td>EHS/Industrial Hygiene</td>
<td>8</td>
<td>Capstone Research</td>
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<td>Policy Course</td>
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**TOTAL** 120
# Environmental Science & Policy Curriculum

## FIRST YEAR

### First Semester

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<td>BY160</td>
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<td>BY162</td>
<td>Biology II Lab</td>
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<td>CM132</td>
<td>Gen. Chemistry II W/Lab (OR)</td>
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<td>CM104</td>
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<td>Chemistry I Lab</td>
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<td>MA181</td>
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<tr>
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**Total Credits:** 21

### Second Semester

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<td>EHS309</td>
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<tr>
<td>BY244</td>
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<td>EHS310</td>
<td>Intro to Industrial Hygiene Lab</td>
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**Total Credits:** 15

## SECOND YEAR

### First Semester

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<td>EV313</td>
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**Total Credits:** 18

### Second Semester

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**Total Credits:** 16
### THIRD YEAR

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<tr>
<td>Policy Elective</td>
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<td>Professional Elective</td>
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<td>EHS Elective</td>
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<td>OR ADK Semester (Recommended)</td>
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### FOURTH YEAR

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<td>EV400</td>
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<td>POL 375</td>
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<td>Free Elective</td>
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<td>Knowledge Area</td>
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<tr>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

1. Various environmental courses will meet knowledge area requirements. A technology course will be required if one of the major courses does not fulfill this requirement.
2. Or suitable Biology/Chemistry/Engineering course
3. EC150 or EC350 is required as a prerequisite for Environmental Economics (EC360) and will satisfy a knowledge area requirement
4. Or suitable technology course

NOTE: Some electives may require additional prerequisites. Students must be registered for at least 14 credits to qualify for Dean’s List or as a Presidential Scholar.

**PROFESSIONAL ELECTIVES**

Professional Electives are defined as electives appropriate to the professional and career objectives of students and the ES&P Program. Professional electives are typically upper-level courses (300-level or above) chosen with the advice and consent of the student’s advisor, and focused on a minor, concentration or double major (in Biology, Chemistry, Environmental Engineering, Environmental Health Science, Law, or Communication, for example). The following courses are considered professional electives.
<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
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</thead>
<tbody>
<tr>
<td>BY300</td>
<td>Recent Advances in Biological Research</td>
<td>BY214</td>
<td>Genetics</td>
</tr>
<tr>
<td>BY302</td>
<td>Plant Science of Northern New York</td>
<td>BY310</td>
<td>Developmental Biology</td>
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<tr>
<td>BY312</td>
<td>Adirondack Ecology and Environmental Science</td>
<td>BY314</td>
<td>Bioinformatics</td>
</tr>
<tr>
<td>BY320</td>
<td>Microbiology</td>
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<td>Microbiology</td>
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<tr>
<td>BY326</td>
<td>Invertebrate Biology</td>
<td>BY323</td>
<td>Microbiology for Eng.</td>
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<tr>
<td>BY340</td>
<td>Behavioral Ecology and Sociobiology</td>
<td>BY328</td>
<td>Conservation Biology</td>
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<tr>
<td>BY358</td>
<td>Animal Learning and Cognition</td>
<td>BY420</td>
<td>Evolution</td>
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<tr>
<td>BY412</td>
<td>Molecular Biology</td>
<td>BY431</td>
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<tr>
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<tr>
<td>CM242</td>
<td>Organic Chemistry II</td>
<td>BY450</td>
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<td>Organic Chemistry Lab</td>
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<td>Spectroscopy</td>
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<td>CM223</td>
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<tr>
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<td>Principles of Ergonomics</td>
<td>CM460</td>
<td>Biochemistry</td>
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<td>IH Control Methods</td>
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<td>Methods for Analysis</td>
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<td>EHS416</td>
<td>Principles of Toxicology &amp; Epidemiology</td>
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<td>Intro to Environ. Engineering</td>
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<td>Stream Riparian System and Fluvial Morphology</td>
<td>CE478</td>
<td>Solid Waste Mgmt. and Landfill Design</td>
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<td>SOC/ANTH397</td>
<td>Cities and Social Justice</td>
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<td>SOC/POL351</td>
<td>Globalization</td>
<td>POL250</td>
<td>Politics in C-N Perspective</td>
</tr>
<tr>
<td>HIST230</td>
<td>Science and Society</td>
<td>PHIL341</td>
<td>Professional Ethics</td>
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<td>Constitutional Law</td>
<td>PHL243</td>
<td>American Environmentalism</td>
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<td>COMM310</td>
<td>Mass Media and Society</td>
<td>COMM313</td>
<td>Professional Communication</td>
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<td>COMM412</td>
<td>Organizational Communications and Public Relations Theory</td>
<td>COMM341</td>
<td>Introduction to Web Design</td>
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<td>POL380</td>
<td>Law &amp; Bioethics</td>
<td>COMM/EV428</td>
<td>Environmental Communication</td>
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<tr>
<td>POL302</td>
<td>Contemporary Political Theory</td>
<td>POL374</td>
<td>Environmental Political Theory</td>
</tr>
</tbody>
</table>

Professional electives in the ES&P Program. Additional courses may be taken pending permission from the student’s advisor. Some professional electives require additional prerequisites.
B.S. in Environmental Health Science
Alan Rossner, Director

Environmental Health Sciences (EHS) is a multidisciplinary program at Clarkson University focused on the study of how the natural and built environment impacts human health. In this continually evolving field, students study human exposure to chemicals, indoor air quality, water quality, air quality assessments in communities downwind of factories or busy highways, hazardous waste site assessment, and environmental sustainability. EHS practitioners anticipate, measure, and control hazardous biological, chemical, and physical agents. EHS specialists work closely with engineers, occupational health physicians, nurses, safety specialists, and physical therapists to identify the chemical and physical agents responsible for disease in our living environments, as well as hazard control and management strategies.

The EHS curriculum is rigorous and effectively prepares students to work in the important area of environmental health and safety. In addition, the EHS curriculum is well suited as a preparatory degree for students interested in pursuing a professional degree in health sciences, including physical therapy, medicine, dentistry, and veterinary school. The program in Environmental Health Science stresses a strong background in the basic sciences, specific course work in Environmental Health and safety, and industrial hygiene experience gained through laboratory exercises in environmental monitoring, field trips, co-op and internships.

The Goal of Clarkson University’s Environmental Health Science Program is to promote the prevention of illness and injury due to environmental and occupational hazards through education, training, and applied research.

Objectives:
• Recognize and evaluate types of occupational and environmental health hazards present in modern workplace and community environments.
• Study methods used to detect and quantify hazards, and the implement technologies used to control health hazards.
• Understand biological responses from exposures to hazardous agents
• Describe and evaluate regulations and policies associated with environmental health
• Develop the skills to manage and control hazards and risks
• Complete an independent EHS research experience
• Prepare students for a career in Environmental Health Science with a coordinated multidisciplinary education using a curriculum based on a strong foundation in mathematics, physical sciences, biology, engineering and health sciences such as toxicology and epidemiology.

Requirements:
a. 120 credit hours total.
b. Two Math courses and one statistics course.
c. Minimum of 11-17 credit hours in Chemistry depending up the chosen concentration
   d. Minimum of 13 credit hours in Biology.
e. Additional Minimum of 12 credit hours in Science and/or Engineering.
f. Eight credit hours in Physics.
g. Minimum of 18 credit hours of EHS courses.
h. Three credit Capstone research project.
i. Meet the university requirements for knowledge areas, communication points, technology serving humanity course, and the professional experience.

### Environmental Health Science Sample Curriculum

<table>
<thead>
<tr>
<th>Course</th>
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<th>Course</th>
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<td>BY142</td>
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<td>BY162</td>
<td>Biology II Lab</td>
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<tr>
<td>CM131</td>
<td>Gen. Chemistry I w/Lab or</td>
<td>4</td>
<td>CM132</td>
<td>Gen Chemistry II w/Lab or</td>
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<tr>
<td>CM103</td>
<td>Structure and Bonding and</td>
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<td>CM104</td>
<td>Chemistry II and</td>
<td></td>
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<tr>
<td>CM105</td>
<td>Chemistry Lab 1</td>
<td></td>
<td>CM106</td>
<td>Chemistry II Lab or</td>
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</tr>
<tr>
<td>EV100</td>
<td>Intro to Environ &amp; Policy</td>
<td>3</td>
<td>MA181</td>
<td>Basic Calculus</td>
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<tr>
<td>Univ190</td>
<td>The Clarkson Seminar</td>
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<td>MA132</td>
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<table>
<thead>
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<td>General Ecology</td>
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<td>EHS309</td>
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<td>PH131</td>
<td>Physics I</td>
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<td>EHS310</td>
<td>Intro to Industrial</td>
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<tr>
<td>141</td>
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<td>CM241</td>
<td>Organic Chemistry I</td>
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<td>PH132</td>
<td>Physics II</td>
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<tr>
<td>or 142</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EV313</td>
<td>Biogeochemic Systems Science</td>
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<td>Knowledge Area Course</td>
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<td>Science Elective</td>
<td>3</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td>15</td>
</tr>
</tbody>
</table>
### Third Year

| First Semester | | Second Semester | |
|----------------|-----------------|-----------------|
| **Course**     | **Title**       | **Cr. Hrs.**    | **Course** | **Title** | **Cr. Hrs.** |
| Sci/Eng Elective | Sci/Eng Elective | 3               | EHS330     | Safety Management | 3 |
| *(Recommend SC301 Geo. Info Systems²)* | | | STAT282 | Statistics | 3 |
| Sci/Eng Elective | Chem/Biology Elective | 3 | | | |
| EHS405 | Methods & Analysis | 4 | KA | 3 |
| EHS406 | Industrial Hygiene | 3 | Free Elective | 3 |
| CE340 | Intro to Env. Eng | 3 | | 15 |
| | | 16 | | | |

| Fourth Year | | Second Semester | |
|-------------|-----------------|-----------------|
| **Course** | **Title** | **Cr. Hrs.** | **Course** | **Title** | **Cr. Hrs.** |
| Free Elective | | 3 | ES432 | Risk Analysis¹ | 3 |
| Prof. Sci/Eng/Math | | 3 | EV401 | Capstone Project | 1 |
| EV400 | Capstone Project | 3 | EHS481 | Advanced Topics in EHS | 3 |
| EHS416 | Principles of Toxic & Epidemiology | 3 | Knowledge area Course | 3 |
| Knowledge Area Course | | 3 | Professional Elective | 3 |
| | 15 | | 13 | | |

1. Or suitable Biology/Chemistry/Engineering course
2. Or other suitable Engineering elective.
3. Or other suitable Statistics course

### Concentrations

**EHS Concentration in Environment and Security**

A concentration in *Environment and Security* requires 20 or more credits in the following specified areas. Completion of an approved concentration will be designated on the student’s transcript.

**Students must take the following:**

- CM 221 Spectroscopy (3 Credits)
- CM 223 Spectroscopy Laboratory (3 Credits)
- BY 320 Microbiology I & Lab (3 Credits)
- BY 322 Microbiology Lab (2 Credits)
- EV400/401 Capstone Project related to Environment and Security (4 Credits)
In addition students must select 2 of the following from SUNY Canton:
JUST 230 Fundamentals of Homeland Security (3 Credits)
JUST 326 Threats to Homeland Security (3 Credits)
JUST 420 The Corporate Role in Homeland Security (3 Credits)
EHS 401 Chem, Bio, & Rad Forensics and Terrorism Threats (3 credits)

- Other suitable course Criminal Justice/Homeland security courses can be approved by the Director of the ISE or designee.

EHS Concentration in Ergonomics
A concentration in Ergonomics requires 16 or more credits in the following specified areas. Completion of an approved concentration will be designated on the student’s transcript.

Students must take the following:
BR 200 Introduction to Biomedical Rehabilitation (3 Credits)
EHS 330 Safety Mgmt/ EHS 320 Ergo course (3 Credits)
EV400/EV 401 Capstone Project – Ergonomics – related (4 Credits)

In addition students must select at least 2 of the following courses:
BY 460 Kinesiology II (3 Credits)
BY 471 Anatomy & Physiology I (3 Credits)
BY 472 Anatomy & Physiology II (3 Credits)*
ME 380 Special topics Biomechanics (3 Credits)*
BY 360 Physiology (3 Credits)
BY 350 Comparative Anatomy (3 Credits)

- Other suitable course Ergonomics related courses can be approved by the Director of ISE or designee.
- * NOTE: BY 472 requires BY 471 as a pre-requisite.
- * ME 380 requires: MA 132 and PH 131 as pre-requisites.

EHS Concentration in Industrial Hygiene
A concentration in Industrial Hygiene requires 19 or more credits in the following areas. Completion of an approved concentration will be designated on the student’s transcript.

Students must take the following:
CM 221 Spectroscopy (3 Credits)
CM 223 Spectroscopy Laboratory (3 Credits)
EHS 330 Safety Management (3 Credits)
EV 400/401 Capstone Project (4 Credits)
In addition students must select 2 of the following courses:
CE 301 Geographical Information Systems
CE 340 Intro to Environmental Engineering (3 Credits)
CE 435 Groundwater and Hydrology and Geochemistry (3 Credits)
CE 477 Atmospheric Chemistry (3 Credits)
CE 479 Water and Wastewater Treatment Process (3 Credits)
CE 481 Hazardous Waste Management Engineering (3 Credits)
CE 486 Industrial Ecology (3 Credits)
CM 242 Organic Chemistry (3 Credits) OR
CM 244 Organic Chemistry Lab (3 Credits)
CM 371 Physical Chemistry I (3 Credits)
CM 320 Separations and Radiochemistry (3 Credits)
CM 300 Instrumental Laboratory (3 Credits)

Other suitable course Industrial hygiene or chemistry related courses can be approved by the Director of the EHS program

B.S. in Engineering & Management
Amy K. Zander, Program Director
Misty Spriggs, Associate Director
Adrienne Boswell, Academic Advisor/Office Manager

Clarkson’s Engineering & Management (E&M) program is ideal for those who desire breadth and flexibility in a career centered on leadership and technology. The major was established in 1954 to meet the growing needs of industry for individuals with strong skill sets in both engineering and business. Graduates are prepared to integrate the rapidly changing technical and managerial aspects of an organization.

The E&M program utilizes Clarkson’s traditional strengths, stressing engineering principles and technical problem solving in conjunction with quantitative and qualitative managerial decision making. Students receive a balanced education involving course requirements from each of the major disciplines of engineering, business, science and liberal arts. The carefully planned curriculum is taught by faculty within their respective areas of expertise.

The Program Educational Objectives of the E&M program are to prepare students who within a few years of graduation:
• Apply technical problem solving skills to develop innovative, effective, and sustainable solutions to complex problems;
• Lead multi-disciplinary teams to success by managing team dynamics;
• Effectively communicate information for decision-making both orally and in writing to both technical and non-technical audiences;
• Continuously balance simultaneous demands of today’s global environment through multi-tasking capabilities of planning, organizing, managing and controlling resources;
• Combine engineering and business core knowledge and apply quantitative and qualitative methods to process analysis in business systems;
• Make timely, ethical and useful decisions in response to organizational challenges.
• Make timely, ethical and useful decisions in response to organizational challenges.
Typically, E&M students are people oriented, at ease with science and mathematics, and anticipate increasing managerial responsibilities over the course of their careers. Problem solving, communication and teamwork permeate the E&M curriculum. By design, the environment is one of collaborative teamwork and is known for strong mutual support among students. E&M graduates are recognized as leaders and facilitators who possess the ability to initiate new ideas and change.

The E&M program maintains two professional organizations and an E&M Student Advisory Council. Sigma Tau Iota, the E&M honorary society, consists of students enrolled in the program who display consistent academic excellence. The Engineering & Management Society regularly hosts business leaders and representatives who engage students in discussions that range from career opportunities to current industry trends and issues. The Student Advisory Council serves as a curricular advisory group and aids in assessment of the program outcomes.

Curriculum
The Engineering & Management program confers the Bachelor of Science (B.S.) degree upon completion of the 120 credit-hour program requirements. A candidate for the bachelor’s degree must not only pass all prescribed courses in the E&M curriculum, but must also meet all other graduation requirements and Clarkson Common Experience requirements stated in the Academic Requirements section of this catalog.

The Engineering & Management student is encouraged to use program professional electives to focus on specific career objectives. Students work closely with their advisor to select electives that best suit these objectives. Students often choose to pursue a minor in project management, a concentration in global supply chain management, or courses in construction management or manufacturing management.

Employment
Due to the program’s unique nature, and the quality and versatility of students attracted to it, E&M graduates are some of the most heavily recruited at Clarkson. For example, while the program’s enrollment represents roughly 10 percent of the student population, E&M seniors are typically invited to interview with nearly half of all companies recruiting at the on-campus Career Fair.

The career paths of E&M alumni reflect the breadth of the program’s curriculum and include:

Supply Chain Management
Consulting
Manufacturing and Production
Project Management
Marketing and Technical Sales

Quality Systems Management
Entrepreneurship
Applications Engineering
Field Service Engineering
Construction Management

### Engineering & Management Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<th>Course</th>
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<tr>
<td>EM205</td>
<td>Accounting for</td>
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<td>EM211</td>
<td>Intro to Enterprise</td>
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<td></td>
<td>Decision Analysis</td>
<td>3</td>
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<td>Information Systems</td>
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<tr>
<td>EM120</td>
<td>Team-Based Design &amp;</td>
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<td>EM121</td>
<td>Technical</td>
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</table>
**Innovation**<sup>1,3</sup>  
**Entrepreneurship**<sup>1,3</sup>

<table>
<thead>
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<td>PY151</td>
<td>Intro to Psychology</td>
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<td>Calculus I</td>
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<td>Calculus II</td>
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<td>CM131</td>
<td>Chemistry I</td>
<td>4</td>
<td>CM132</td>
<td>Chemistry II or</td>
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<tr>
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<td>First-Year Seminar</td>
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<td>BY160</td>
<td>Cellular and Molecular Biology&lt;sup&gt;5&lt;/sup&gt;</td>
<td>3</td>
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17  
17 or 18

**SOPHOMORE YEAR**

**First Semester**  

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<td>Economic Principles &amp; Engineering Economics</td>
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<td>ES220</td>
<td>Statics</td>
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<td>LW270</td>
<td>Law &amp; Society</td>
<td>3</td>
<td>EM480</td>
<td>Project Management</td>
<td>3</td>
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<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>STAT383</td>
<td>Applied Statistics I</td>
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<td>EM286</td>
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<td>4</td>
<td>EM480</td>
<td>Project Management</td>
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16  
19
JUNIOR YEAR

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<td>FN361</td>
<td>Financial Management</td>
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<td>EM333</td>
<td>Operations Research</td>
<td>3</td>
<td>EM331</td>
<td>Operations &amp; Supply Chain Management</td>
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<td>MK320</td>
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<td>3</td>
<td>ES250</td>
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<td>ES222</td>
<td>Strength of Materials or</td>
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<td>Professional Elective</td>
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<td>EE264</td>
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SENIOR YEAR

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<td>EM432</td>
<td>Organizational Policy &amp; Strategy</td>
<td>3</td>
<td>Knowledge Area</td>
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<td>Knowledge Area</td>
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<td>EM456</td>
<td>Process Engineering</td>
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<td>Professional Elective</td>
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<td>(1,3,4)</td>
<td>&amp; Design(^1)</td>
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<td>COMM217</td>
<td>Public Speaking</td>
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</table>

15

\(^1\) Communications intensive (CI) – Students must earn a minimum of six (6) CI points outside of UNIV190 to meet graduation requirements.

\(^2\) Information technology-based courses

\(^3\) Technology course that meets CCE requirement

\(^4\) Students must take EM456 or another senior capstone design course approved by the Director of E&M.

\(^5\) Students who take BY160 rather than CM132 will need to complete one more credit of coursework to reach 120 credits.

See Academic Requirements for details of the Clarkson Common Experience including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements. Students are required to take five courses which cover four of the six specified CCE knowledge areas; one University course (UC) must span two Knowledge Areas.

Professional Experience Requirement is met when student completes EM120, EM121, EM432 and EM456 or the recognized equivalents of these courses. Beginning with the Class of 2017, all students will participate in a project-based professional experience such as co-op, internship, directed research or community project related to the student’s professional goals.
B.S. in Social Documentation Double Major
Bill Karis and Bill Vitek, Co-Directors
Students, whose interests are broad and flexible, with a broad span of interests, should consider Clarkson's double major in Social Documentation (SD), combining majors in the Social Sciences (history, political science, anthropology and sociology) or Humanities (literature, film and philosophy) with a major in Communication & Media.

SD students express a desire to combine social, political or creative perspectives with mastery of sophisticated communication and recording technologies. They may be interested in historical preservation of the creative arts or creating oral and video histories of people or groups of people; they may be social or political activists who want to create the sound and video recordings and products that most effectively put their ideas before a contemporary audience.

Social Documentation emphasizes critical inquiries into societal issues as well as the study of recording and documenting theories, techniques and technologies. A substantive knowledge base in a social science or humanities discipline enables students to ground their communication degree in an area of interest that will also give them a distinctive perspective. Likewise, the critical thinking, persuasive, and media production skills learned from the communication program will empower the social science or humanities major to more effectively create products that can influence, entertain or educate. During their years at Clarkson, students will develop the ability to use sophisticated recording and communication technologies in order to better understand or advance a set of social, historical, political or creative interests or concerns.

Employment
After graduation, students can find careers in public or private radio or television broadcasting, in media-oriented firms, and within communications units in the public or private sector. Many public agencies are charged with handling electronic and publicly available data sets, and this double major also provides the basics for such a career choice. Some may choose to pursue independent work as filmmakers and writers.

Alternately, students may decide to go on to graduate school in a growing number of Social Documentation programs at universities like Duke, American or UC Santa Cruz. Others may choose from a wide array of master’s programs, receiving degrees in fields as diverse as fine arts or business. Graduates can also opt for masters or doctoral programs in social sciences, communication or humanities.

Curriculum
Students choosing this double major will begin with the Clarkson Common Experience, as detailed in the Clarkson Catalog. Additionally, they will satisfy all the requirements for each major, also as detailed in the catalog. The following requirements are specific to Social Documentation, but most will also count as one of the requirements for one of the majors:

• History of Social Documentation, a three-credit hour gateway course to the major, will introduce basic concepts and stress the connections between the two majors;
• One three-credit hour research methods course, chosen from a list of approved courses;
• One three-credit hour film course, chosen from a list of approved courses;
• Two three-credit hour video production and digital design courses, chosen from a list of approved courses.
• Two senior capstone courses, SD480 and SD490, will generally be taken sequentially. These will replace each department’s normal capstone course and are designed specifically for SD majors.

The sample curriculum below indicates some examples of the kinds of courses that might be chosen by Social Documentation double majors, though individuals will personalize their curricula in order to meet their specific educational and career goals.
## Social Documentation Sample Curriculum

### FIRST YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td>Computer Applications in Media</td>
<td>3</td>
<td>COMM210</td>
<td>Theory of Rhetoric</td>
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<tr>
<td>SD200</td>
<td>History of Social Documentation</td>
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<td>COMM310</td>
<td>Mass Media and Society</td>
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<td>MA180</td>
<td>Into College Mathematics</td>
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<td>HIST391</td>
<td>Documenting Social Activism</td>
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<td>Common Experience Science Course</td>
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<td>STAT282</td>
<td>General Statistics</td>
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<td>Common Experience Science Course</td>
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|                      |                                         |          |              |                                 |          |
|                      |                                         | 18       |              |                                 |          |

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ANTH200</td>
<td>Intro. to Culture and Society</td>
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<td>ANTH320</td>
<td>Racial Inequity in the US</td>
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<td>COMM327</td>
<td>Digital Video Production I</td>
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<td>COMM3xx</td>
<td>Professional Communication</td>
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<td>COMM341</td>
<td>Introduction to Web Design</td>
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<td>Digital Video Production II</td>
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<td>World in a Frame</td>
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<td>Intro to Psychology</td>
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|                      |                                         | 15       |              |                                 | 15       |

## Second Semester
### JUNIOR YEAR

<table>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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<tr>
<td>ANTH385</td>
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<td>COMM320</td>
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<td>COMM345</td>
<td>Information Architecture</td>
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<td>POL351</td>
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### SENIOR YEAR

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<td>Research Project and Internship</td>
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<tr>
<td>COMM410</td>
<td>Theory and Philosophy of Communication</td>
</tr>
<tr>
<td>SOC350</td>
<td>International Development and Social Change</td>
</tr>
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<td>Free Electives</td>
</tr>
</tbody>
</table>
B.S. in Software Engineering

The discipline of software engineering is concerned with the application of engineering principles to the construction of computer software. It addresses critical issues across the life cycle of a software product, beginning with a proposal to develop an application that requires computing resources and continuing through the development, testing, operation, and maintenance of the software product until it is retired.

The software engineer plays the role of the architect of a complex system. He or she takes into account the user requirements and needs, feasibility, cost, quality, reliability, safety, and time constraints. To do this, the software engineer has to be able to understand the application area that is the target of the desired software system, develop the software and ensure that it is reliable, and also manage the project so that it is produced in an economical, timely manner.

Objectives of the Clarkson Software Engineering Program

Software engineering graduates should be well prepared for a lifetime of professional activity, and the objective of our program is to build a foundation on which graduates can build successful careers. This means that, within a few years after completing the program, we expect that our graduates will be contributing professionals, effective and responsible collaborators. They should also have continued to grow intellectually and as well rounded citizens. This means graduates are expected to have

- Advanced their careers as contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications
- become well-rounded citizens who rely on their engineering education to serve society in an ethical and professional manner
- become effective and responsible collaborators who function well in diverse team environments, with some graduates having emerged as leaders in their field
- have exhibited intellectual growth and pursued continual innovation in their field, while those graduates who are especially talented and motivated to pursue a graduate degree should be or have been successful at entering and completing graduate studies

To attain these objectives, the curriculum is structured so that when a student graduates from the Software Engineering program, he or she will have gained the knowledge, skills, and attributes that provide a foundation on which a successful career in the Software Engineering profession rests. Our graduates will attain the following student outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

In the context of the software engineering discipline, this means that graduates of the program will:
• have a fundamental understanding of computer systems
• be able to apply engineering principles to software design and construction, having developed the ability to:
  • develop software requirements and functional specifications
  • use proven techniques to design software structure before it is implemented
  • apply established verification and validation techniques
  • understand the importance of constructing large software systems using standardized components and reusing existing code (modules) where possible,
  • use software tools as effective aids in all phases of software development
  • design, develop, and deliver software in a cost effective manner
• have experience with issues encountered at every stage in the software life-cycle
• understand how to manage the development of software intensive systems
• be able to work on an interdisciplinary team of software components of a system
• have good interpersonal and communication skills
• be able to readily assimilate new technologies
• understand the impact their discipline has on society

Curriculum
To accomplish these goals, the curriculum is structured around a group of required courses in science, mathematics, and computer science and engineering. A variety of courses in the engineering sciences are included in the curriculum in order to provide exposure to application areas. Although there is ample opportunity for students to participate in team-based activities throughout the curriculum, each student’s program of study includes a major design experience in the senior year in which the student is required to bring together knowledge gained in a wide variety of courses to solve realistic problems, building significant applications in a team-based environment.

An Interdisciplinary Approach
Software Engineering is distinctive at Clarkson because it is interdisciplinary: we combine the expertise, knowledge, and experience of faculty from both the Electrical and Computer Engineering and the Computer Science Department. That benefits the students because they master the application of theory as well as knowledge and understanding of processes software process as they gain the ability to develop effective and cost-efficient software systems. Clarkson’s program is also designed to help students build interpersonal and communication skills that can launch a successful career in today’s world.
Software Engineering Curriculum

FIRST YEAR
(See Common First-Year Curriculum in Engineering)

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
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<td>MA211</td>
<td>Foundations</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
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<tr>
<td>EE261</td>
<td>Intro. to Programming and Software Design or</td>
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<tr>
<td>CS141</td>
<td>Computer Science I</td>
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<tr>
<td>KA/UC Elective</td>
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JUNIOR YEAR

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<td><strong>Course</strong></td>
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<td>Applied Statistics or</td>
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<td>MA381</td>
<td>Probability</td>
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<td>EE407</td>
<td>Computer Networks</td>
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<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
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<tr>
<td>EE408</td>
<td>Software Design for Visual Environments</td>
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<tr>
<td>KA/UC Elective*</td>
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SENIOR YEAR

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<th>Second Semester</th>
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<tr>
<td><strong>Course</strong></td>
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<td>EE466</td>
<td>Computer Architecture</td>
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<td>Programming Languages</td>
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</tr>
<tr>
<td>KA/UC Elective</td>
<td>3</td>
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</tbody>
</table>

* One of the KA/UC electives must be in economics.
Undergraduate Interdisciplinary Minors

Minor in Biomedical Engineering
As various fields of medicine and health care increasingly depend upon advances in technology, graduates who possess combined expertise in engineering principles and knowledge of biological sciences at all levels will be in high demand. The minor in Biomedical Engineering enhances opportunities for Clarkson’s students to meet this need. This minor is connected closely with the minor in Biomedical Science and Technology. Students from both minors participate in shared core courses along with a multidisciplinary capstone design course. **Students can take only one (not both) of the two minors.**

A foundation knowledge of Calculus I & II (MA131/132), Physics I & II (PH131/132), and Biology II: Cell and Molecular Biology (BY160) is required for this minor.

**Requirements:**

**Physiology/Anatomy Requirement**
BY471 Anatomy and Physiology I
BY473 Anatomy and Physiology I Laboratory
OR
BYBY472 Anatomy and Physiology II
BY474 Anatomy and Physiology II Laboratory
OR
BY360 Human Physiology
BY362 Human Physiology Laboratory
BR200 Introduction to Biomedical and Rehabilitation Engineering, Science and Technology
BR450 Biomedical Engineering, Science, and Technology Capstone Design I or equivalent engineering design course with a BEST approved project
BR400 Biomedical Engineering

**Engineering Depth Elective**
Choose 1 (3 credits) from approved list of upper division courses.

**Breadth Elective**
Choose 1 (3 credits) from approved list of upper division courses.

The latest approved list of courses is available at the Center for Rehabilitation Engineering and Science (CREST) office.

**Proposed list of approved courses for Biomedical Engineering Minor**
(Prerequisites in parentheses)

**Choose One for Breadth Elective**
BY/CMB314 Bioinformatics (BY160, BY214)
PH/CMB426 Introduction to Biophysics (BY160 or BY312 or consent)
CM453 Introduction to Biomaterials (CM241, CM242)
PT360 Kinesiology I - Concepts of Human Movement (PH131 or PH141 or equivalent, and MA131 or MA180 or equivalent)
PT460 Kinesiology II - Functional Anatomy (PT360)
BY450 Biochemistry I (CM241 or consent)
BY/CMB460 Neurobiology (BY160 or BY360 or consent)
PY/BY454 Physiological Psychology
Choose One for Engineering Depth Elective
ME380 Special Topics: BioMechanics (PH131, MA131)
CH465 Biochemical Engineering (CM241)
ES452 Biomaterials and Biomedical Applications (BY160, CM241 or ES260, and CH301 or ES330 or consent) EE4XX Biomedical Signal Processing

Minor in Biomedical Science and Technology
As various fields of medicine and health care increasingly depend upon advances in technology, graduates who possess combined expertise in engineering principles and knowledge of biological sciences at all levels will be in high demand. The minor in Biomedical Science and Technology enhances opportunities for Clarkson’s students to meet this need. This minor is connected closely with the minor in Biomedical Engineering. Students from both minors participate in shared core courses along with a multidisciplinary capstone design course. Students can take only one (not both) of the two minors.

A foundation knowledge of Biology II: Cell and Molecular Biology (BY160) is required for this minor.
Biology Fundamentals: Required (4 credits):
Physiology/Anatomy Requirement
BY471 Anatomy and Physiology I
BY473 Anatomy and Physiology I Laboratory
OR
BY472 Anatomy and Physiology II
BY474 Anatomy and Physiology II Laboratory
OR
BY360 Human Physiology
BY362 Human Physiology Laboratory

Engineering Fundamentals (3 credits)
BR200 Introduction to Biomedical and Rehabilitation Engineering, Science and Technology

Intersecting BEST courses, Required (3 credits)
(team taught, interdisciplinary)
BR450 BEST Capstone Design I (3 credits) or equivalent engineering design course with a BEST approved project

Specialty Tracks (Tentative):
Choose one (2 course - 6 credits) track

Track I Genetic Engineering
BY214 Genetics
And choose one of
BY412 Molecular Biology Laboratory (4 credits)
BY/CM314 Bioinformatics
Track II Kinesiology
PT360: Kinesiology I - Concepts of Human Movement
PT460: Kinesiology II - Functional Anatomy (PT360)

Track III Neuroscience
BY/CM460 Neurobiology (BY160 or BY360 or consent)
PY458 Cognitive Neuroscience (PY151 or junior/senior standing)

Breadth Elective:
Choose 1 (3 credits) from approved list of upper division courses

Total: 19 credits (plus 3 credits cell biology)
Proposed list of approved courses for Biomedical Science and Technology Minor (Prerequisites in parentheses)
Examples include:
Choose one.
BY450 Biochemistry I (CM 241 or consent)
BY350 Comparative Anatomy (BY160 or consent)
BY320 Microbiology (BY160, BY214 and CM 132 or CM104 or consent)
BY312 Advanced Cell Biology (BY160/162 or consent)
PT360 Kinesiology I - Concepts of Human Movement (PH131 or PH141 or equivalent, and MA131 or MA 180 or equivalent)
PT460 Kinesiology II - Functional Anatomy (PT360)
BY/CM314 Bioinformatics (BY160, BY214)
PH/CM426 Introduction to Biophysics (BY160 or BY312 or consent)
CM453 Introduction to Biomaterials (CM241, CM242)
PY/BY454 Physiological Psychology
PY458 Cognitive Neuroscience (PH151 or junior/senior standing)
PY359 Perception (PH151 or consent)
PY360 Learning and Memory (PH151 or junior/senior standing)
PY463 Health Psychology (PY151 or junior/senior standing)
SB305 Cost Management
SB322 Designing and Leading Innovative Ventures
MK321 Consumer Behavior
OS466 Negotiations and Relationship Management
Other programs can submit courses appropriate to this minor.
**Minor in Environmental Health Science**

A minor in Environmental Health Science is available to all students except those majoring in this program. To obtain a minor, a student must successfully complete the following courses:

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>EHS309</td>
<td>Introduction to Environmental Health Science</td>
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<tr>
<td>EHS310</td>
<td>Introduction to Environmental Health Science Lab</td>
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<tr>
<td>EV 313</td>
<td>Biogeochemical Earth Systems Science</td>
<td>3</td>
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**B. Any two or three courses from the following**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>EHS405</td>
<td>Environmental Health Science Monitoring &amp; Analysis</td>
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<tr>
<td>EHS406</td>
<td>Environmental Health Science Control Methods</td>
<td>3</td>
</tr>
<tr>
<td>EHS416</td>
<td>Principles of Occupational Health</td>
<td>3</td>
</tr>
<tr>
<td>EHS330</td>
<td>Safety Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EHS 481</td>
<td>Advanced Topics in Environmental Health</td>
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**C. Any one or two courses from the following**

<table>
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<th>Course Title</th>
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<tbody>
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<td>CE 340</td>
<td>Introduction to Environmental Engineering</td>
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<tr>
<td>CE480</td>
<td>Environmental Quality Engineering</td>
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</tr>
<tr>
<td>CE481</td>
<td>Hazardous Waste Management Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE479</td>
<td>Water and Wastewater Treatment Processes</td>
<td>3</td>
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<tr>
<td>CM371</td>
<td>Physical Chemistry I</td>
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<td>CE477</td>
<td>Atmospheric Chemistry</td>
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<td>CE580</td>
<td>Environmental Chemistry</td>
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<tr>
<td>BY320</td>
<td>Microbiology</td>
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<tr>
<td>BY350</td>
<td>Anatomy</td>
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<tr>
<td>BY360</td>
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<tr>
<td>BY 471</td>
<td>Human anatomy and Physiology I/II</td>
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<tr>
<td>ES432</td>
<td>Risk Analysis</td>
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</table>

**Total Credit Hours for the Minor: 21**

In addition to the required courses, it is recommended that MA282 or MA383 or MG284 Statistics be taken as a mathematics elective course for this minor. A minimum grade point average of 2.0 is required in the courses taken for the minor. At least one quarter of the total credit hours required must be completed at Clarkson, unless the Dean of the School of Science approves an exception.
Minor in Environmental Science or Policy

**Policy:** 15 credits of Policy course and 6 credits of Science course

**Science:** 15 credits of Science course and 6 credits of Policy course

Req*  
*EV313 Biogeochemical Earth Systems Science* is required for Science minor

**I. Courses in Environmental Policy**

- ANTH 270 Environment, Technology & Society
- PHIL 410 Sustainability: Theory and Practice
- COMM 428 Public Debate & Environment
- COMM 429 Issue Analysis & Advocacy
- EC 360 Environmental Economics
- ES 436 Global Climate Change: Sci, Eng & Policy
- LW 270 Law & Society I
- LW 466 Law of the Workplace
- EM 351 Quality Mgmt. & Lean Enterprise
- EM 361 Supply Chain Environmental Mgmt.

- PHIL 270 American Environmentalism
- PHIL 405 Where the Wild things are.
- PHIL 371 Energy and Society
- POL 220 American Politics
- POL 250 Politics in Cross-National Perspective
- POL 351 Globalization
- POL 371 Environmental Law
- POL 400 Constitutional Law
- POL 470 Environmental Policy
- POL 471 Energy Policy
- SOC 330 Health, Wealth, Inequality & the Environ.

**II. Course offerings in Environmental Science**

- BY 140 General Biology I
- BY 222 General Ecology
- BY 224 General Ecology Lab
- BY 314 Genetics
- BY 320 Microbiology
- BY 322 Microbiology Lab
- BY 328 Conservation Biology
- BY 340 Animal Behavior
- BY 420 Evolution
- BY 425 Biological Systems and Environ. Change
- BY/EV 330 Great Lakes Water Protection
- BY 431 Limnology

- BY 160 General Biology II
- CM 221 Spectroscopy
- CM 223 Spectroscopy Lab
- CM 371 Physical Chemistry
- CM 476 Atmospheric Chemistry
- CH 434 Air Pollution Controls
- EHS 309 Industrial Hygiene
- EHS 310 Intro to Industrial Hygiene Lab
- EHS 405 Methods and Analysis
- EHS 416 Principles of Toxicology and Epidemiology
- EV/CE 435 Groundwater
- ES 432 Risk Analysis

**III. Three courses spread across the following areas:**

(These can be projects from classes or specific course.)

A. An independent research project (1 credit equivalent))

B. An ES&P Multidisciplinary Project Course (1 credit equivalent)
C. One of the following 1 credit courses (EV 100, 300, or 305)

* A suitable alternative for EV 313 maybe substituted by the program Director
**A current list of the suitable courses for the minor are available through ISE

<table>
<thead>
<tr>
<th>Engineering*</th>
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<tbody>
<tr>
<td>CE301 Eng. Measurements</td>
</tr>
<tr>
<td>CE470 Hydraulic Engineering</td>
</tr>
<tr>
<td>CE474 Engineering Hydrology</td>
</tr>
<tr>
<td>CE479 Water and Wastewater Treatment Proc.</td>
</tr>
<tr>
<td>CE480 Environmental Quality</td>
</tr>
<tr>
<td>CE481 Hazardous Waste Management</td>
</tr>
</tbody>
</table>

*No more than six credits of the above engineering courses can be applied to the Environmental Science minor.

**Minor in Software Engineering**

A minor in Software Engineering is available to students in any degree program with the exception of the Software Engineering and Computer Science degree programs. To obtain a minor, a student must complete the following course requirements:

a. (CS141, CS142, and CS344) or (EE261, EE361, and EE363)
b. CS242 or EE408
c. EE368 or CS350
d. EE465/CS452, CS455/EE407, EE468/CS460, or other course approved by the Software Engineering Program Committee.

**Minor in Sustainable Solutions for the Developing World**

A minor in Sustainable Solutions for the Developing World is available to students in any degree program. The minor seek to employ humanitarian principles toward sustainable solutions that address the conflict that often occurs between economic development and environmental justice predominant in the developing world. A goal of the curriculum is to provide students with the tools to understand issues concerning social justice and sustainability to be used when designing and implementing solutions for the developing world. To obtain the minor, a student must complete the following courses.

**Required Courses:**

3. **Three credit total from the following list of courses1 (3cr. total):**

   ANTH 381 Consumption and Culture (3 cr.)
   EV 305 Sustainability and the Environment (3cr.)
   PHIL 370 Environmental Ethics (3 cr.)
POL 471 Energy and Policy (3cr.)
PHIL 405 Sustainability Theory and Practice: A Critical Assessment (3cr.)
POL 350 International Development and Social Change (3cr.)

4. Two of the following courses 2 (6 cr. total)

ANTH 201 Introduction to Anthropology (3cr.)
ANTH 351 Global Forces, Local Outcomes (3 cr.)
ANTH 335 Understanding the Contemporary Middle East (3 cr.)
COMM 428 Public Debate and the Environment: Reading & Writing Environmentally (3 cr.)
LIT 250 World Literature (3 cr.)
LIT 251 Understanding Vietnam (3 cr.)
LIT 353 African Literature (3cr.)
PHIL 310 World Religious and Contemporary Issues (3 cr.)
POL 250 Politics in Cross National Perspective (3 cr.)
POL 251 Introduction to International Politics (3 cr.)
POL 362 Human Rights Law and Politics (3 cr.)
SOC 330 Health, Wealth, Inequality, and the Environment (3cr.)

3. Two of the following courses 3 (6 cr. total)

MK 436 Creativity, Innovation and New Product Development (3cr.)
SB 396 Global Business Strategies (3cr.)
MK 320 Principles of Marketing (3 cr.)
OM 476 Management of Technology (3 cr.)
OM 480 Project Management (3 cr.)
EC 360 Environmental Economics (3 cr.)
ES 438 Alternative Energy Systems (3 cr.)

4. ONE of the following courses (3 cr.)

UNIV 399 Global Experience (with Sustainable Solutions for the Developing World emphasis), recommended for all students; OR A Multidisciplinary project course (with Sustainable Solutions for the Developing World emphasis) if approved by the director of the minor and the chair or advisor for the student’s major program of study.

The purpose of this category of course work is for students to develop a comprehensive understanding of sustainability principles. This list reflects courses available as of 10/2011 to fit its context. It is recognized that this list may evolve over time with availability of instructors or Development of new courses. A student may substitute a relevant course upon approval of the minor director.

The purpose of this category of course work is for students to develop an understanding of the cultural, political, and social character of countries around the world. This list reflects courses available as of 10/2011 to fit this context. It is recognizes that this list may evolve over time with availability of
instructors or development of new courses. A student may substitute a relevant course upon approval of the minor director.

The multidisciplinary project is intended to serve as the Capstone, Senior Design, or other culminating project based experience that is normally completed within the student’s major program of study. Students participating in the minor will engage in a multidisciplinary project developed by students with the minor faculty who support the minor OR the student may participate in related experiences and opportunities within the student’s major program of study that are thematically linked to this minor. For example, if a student’s senior design course within their major has a multidisciplinary them and relates to strategies employable in developing world, the student can obtain approval from the director of the minor for the course to serve as the minor required course.
Interdisciplinary Graduate Programs
MS in Computer Science
William Jemison, Chair, Department of Electrical and Computer Engineering; Christopher A. Lynch, Chair of Computer Science

A program of study leading to the Master of Science in Computer Science is offered jointly by the Department of Electrical and Computer Engineering and the Department of Computer Science. With unique strengths in engineering, science, and business, Clarkson is in a position to offer students an unusual opportunity to study computer science in an interdisciplinary environment. Courses are offered in a wide variety of areas, ranging from theoretical topics in computer science to design and layout of VLSI circuits; computer vision, image processing, and medical imaging. Students having an undergraduate background with appropriate computer science content are invited to apply. The regular course load for a full-time student, including research credit towards the M.S. degree, is 30 credit hours per calendar year. Thirty credit hours and a thesis are required for the M.S. degree.

Requirements for the M.S. Degree in Computer Science
In addition to the general requirements for the M.S. degree established by the University, a student is required to satisfy the following set of requirements:

- The program requires a minimum of 30 credit hours of graduate-level work. At least 20 credit hours must be earned in residence at Clarkson. Each student’s program of study must be approved by the Computer Science Advisory Committee.
- Those students who are not fully prepared to pursue graduate work in computer science may be required to take CS511 Foundations in Computer Science. In addition, students with insufficient background in computer science may be required to take undergraduate computer science courses, for which graduate credit will not be given.
- Course and seminar work will comprise a minimum of 20 credit hours. To ensure some breadth in the program, courses must include four that satisfy the following criteria:
  - **Two** foundation courses must be taken, as described below:
    - CS541 Introduction to Automata Theory and Formal Languages
    - CS547 Computer Algorithms
  - **Two** courses from the following set, where each of these courses requires a substantial amount of programming:
    - CS544 Operating Systems
    - CS545 Compiler Construction
    - CS550 Software Design and Development
    - EE505 Computer Graphics
    - EE569 Software Design and Analysis

  For those students who can demonstrate that they have successfully completed comparable graduate-level courses before coming to Clarkson, the Advisory Committee may waive the requirement that the student take these specific courses upon request from the student.

At least **two** restricted elective courses will be taken from the courses offered by the computer science or computer engineering departments as selected by the student and their advisor. Of these two restricted
elective courses:

(a) one must be a course that focuses on research topics in computer science.
(b) One must be a computer engineering course with relevant emphasis on computer science topics.

Students should consult with their advisors to identify courses in these categories.

Two seminar credits. To earn a seminar credit, students must enroll in a seminar course in Computer Science.

Thesis credit will comprise a maximum of 10 credit hours of the 30 credit-hour minimum. All students must have a research advisor by the end of their first semester of study and must submit a research proposal to the Examination Committee by the end of the semester before they plan to graduate. The Examination Committee shall consist of a minimum of three faculty members. All students must complete a thesis and defend it orally to their Examination Committee. Two copies of the completed thesis must be submitted to the University.

A wide variety of research areas are represented by the faculty supporting this program. Among these are algebraic theory of automata, algorithms, artificial intelligence, automata and formal language theory, automated deduction, Boolean circuits, complexity theory, computational learning theory, computer-aided design, computer architecture, distributed artificial intelligence, expert systems, file systems, finite element methods, finite model theory, genetic programming, hardware and software verification, high speed network architectures, intelligent tutoring, machine learning, multiagent systems, multigrid and spectral methods in numerical analysis, multimedia applications, networked computing, operating systems, parallel and distributed computing, programming environments, semantics, virtual reality, and VLSI CAD. Further information can be obtained at http://www.clarkson.edu/cs/graduate/cs_requirements.html or contact the School of Arts & Sciences (sciencegrad@clarkson.edu).
Environmental quality is a function of complex and interacting biological, chemical, physical and technical systems. In turn, the way we understand the functioning of these systems and attempt to manage them to improve environmental outcomes, while simultaneously realizing economic well-being, are embedded within social, political and economic institutions and processes. That is, discerning the socioeconomic and political basis for mechanisms as diverse as the allocation of federal funding of environmentally-related research, the development of science-based environmental policy and taking into account the actions and interests of private sector firms and non-governmental organizations in the environmental arena is fundamental for understanding why and how environmental quality outcomes occur as they do.

The interdisciplinary MS Degree in Environmental Politics and Governance provides a unique graduate experience in the policy aspects of environmental management. We use the term politics to refer to both the study of the functioning of government at all levels, and the use of strategies and maneuvers to further an interest in a political, social, or economic agenda or outcome. Governance in the context of the environment is a term that refers to the development of policy within the public and private sectors including corporate and firm policies as well as the agendas and actions of environmentaly interested not-for-profit organizations.

Requirements for MS in EPG
There are three required core courses: Environmental Policy, Risk Analysis and Environmental Economics. In addition the elective courses are divided into three categories: Environment and Society, Environmental Philosophy and Environmental Policy. Beyond the core, students must take at least one course from each category and complete a directed study in research methods appropriate to their thesis research. Finally, if students have not taken a course on American Politics or Society, social science research methods and/or introduction to environmental science, they must make-up the deficiency for no graduate credit.

### MS EPG Sample Schedule

<table>
<thead>
<tr>
<th>Fall Semester</th>
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<tbody>
<tr>
<td>POL/SOC 570 Environmental Policy</td>
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<td>Core</td>
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<tr>
<td>ES 532 Risk Analysis</td>
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<td>POL 592 Environmental Political Theory</td>
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<td>Philosophy</td>
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<td>SOC 572 Biofuel and Farm Policy</td>
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<tr>
<td>SS 580 Directed Study in Research Methods</td>
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<td>Open</td>
</tr>
<tr>
<td>EC 660 Environmental Economics</td>
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<td>Core</td>
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<td>CE5 586 Introduction to Industrial Ecology</td>
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<td>Policy</td>
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<td>ANTH 570 Environment, Technol. and Soc.</td>
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<td>Env &amp; Society</td>
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<th>Summer Semester</th>
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<td>EV 612 Thesis Research</td>
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<td>SS XXX\textsuperscript{a} Student Discussion Seminar</td>
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\textsuperscript{a}Planned course
MS and PhD in Environmental Science and Engineering
Susan E. Powers, Interim Director, Institute for a Sustainable Environment

Master's and doctoral degrees in Environmental Science and Engineering (ES&E) span multiple disciplines to investigate how science and engineering interact with the environment in a broad context. This approach is necessary since the environment comprises complex, interacting biological, chemical, physical and social systems. It is essential to apply an interdisciplinary framework to understand how these systems function and the many ways environmental factors should be integrated into a comprehensive decision-making process. The unusually broad background of ES&E graduates will enable them to better understand how engineering and science impact policy decisions. The ES&E degree programs provide a flexible framework for students to develop coursework and pursue research projects that fit their individual interests.

ES&E is administered by Clarkson's Institute for a Sustainable Environment, whose mission is to develop, foster and enhance innovative, cross-disciplinary research and educational activities at the forefront of environmental research, education, and outreach. Interdisciplinary group faculty affiliates associated with the center will advise students.

Course Requirements
Students must take at least one course from the following:
ES532 Risk Analysis
EC660 Environmental Economics
CE582 Environmental Systems Analysis
CE586 Introduction to Industrial Ecology

Additional courses are divided into four major groups:
- Biology and Ecology
- Chemistry and Physics
- Control Technologies
- Fluid Mechanics and Transport

M.S. students must take at least two courses from at least one of these groups and have at least three engineering courses. Ph.D. students must take at least two courses from at least two of these groups. Detailed course listings are provided in the ISE Graduate Handbook.
MS in Information Technology
Wm. Dennis Horn, Director

The Master of Science in Information Technology offers an interdisciplinary, broad-based curriculum for this professional degree. Students take courses from a range of disciplines that include math and computer science, electrical and computer engineering, communications, and management information systems. The program has a practical orientation that emphasizes hands-on learning and real-world experience in collaborative projects.

Students develop a broad base of competencies in hardware, software, and the management of technology. At the same time they can explore specific application areas of their choice through elective classes and project work. Projects will focus on problems that provide experience directly applicable to IT in an organizational setting.

Applicants should be able to show competence in at least one modern programming language (such as C, C++, Pascal, Java, or related languages), familiarity with the use of a modern operating system, and experience with applications on multiple hardware platforms. Full acceptance may be delayed and remedial coursework required if a student lacks specified competencies. All applications are evaluated individually by an advising committee.

The MS in IT program comprises a minimum of 30 credit hours which include: one course treating modern object-oriented design in a language such as C++; one course treating the principles of computing and telecommunication systems; one course in the management of technology; three courses in application of information technology; six credits of project work; additional credits can include course or project work. Each student must prepare a comprehensive report acceptable to the IT Advisory Committee documenting the scope and subject matter of the degree project.
**PhD in Materials Science and Engineering**

The doctoral degree in Materials Science and Engineering (MSE) crosses multiple disciplines to understand the properties, synthesis and processing of advanced materials. This multi-disciplinary approach is required given the complex nature of advanced materials. To provide just one example, materials’ optical, electrical, mechanical, magnetic and thermal properties depend in a complex manner on their chemical composition and morphology. Applications of advanced materials to the fields of electronic devices, biotechnology, alternative energy, and the environment are at the forefront of current Materials Science and Engineering research.

The Materials Science and Engineering (MSE) graduate program is administered through its Director (materials@clarkson.edu), who works closely with the Dean of Engineering and the Dean of Arts & Sciences. The MSE graduate program is closely associated with Clarkson’s Center for Advanced Materials Processing, whose mission is "to perform innovative research and conduct educational efforts on the synthesis and processing of advanced materials of interest to industry." Doctoral students are mentored by faculty associated with the MSE graduate program.

**Course Requirements**

Doctoral students are required to take a total of 10 courses. These include 2 required courses:
- MT 560
- MT 551

Doctoral students must also take 4 courses from one of these two focus areas:

**Nanotechnology:**
- CM 530 Colloids and Interfaces
- CM 551 Manufacturing Implications of Advanced Materials Processing
- CM 566 Bioelectronics and Bionanotechnology
- CM 584 Multicomponent Polymer Systems
- EE 541 Electronic Devices for IC Simulation
- ES 557 Microelectronic Circuit Fabrication
- ES564 Corrosion Engineering
- ME 591 Micro/Nano Systems Engineering
- ME 595 Principles of Physical Metallurgy
- PH 528 Intermolecular Forces in Modern Nanotechnology
- CM 585/PH 585 Nanostructured Materials
- PH 589/EE 543 Physics of Semiconductor Devices
- PH 636 Scanning Probe Techniques in Soft Condensed Matter Physics
**Advanced Materials and Biomaterials:**

BY 512  Advanced Cell Biology  
BY 612  Molecular Biology  
CH 515  Polymer Materials  
CM 566  Bioelectronics and Bionanotechnology  
CM 553  Medical and Pharmaceutical Biomaterials  
CM 583  Introduction to Polymer Science  
CM 584  Multicomponent Polymer Systems  
EE 539  Dielectrics  
EE 541  Electronic Devices for IC Simulation  
ES 552  Biomaterials and Biomedical Engineering Applications  
ES 557  Microelectronic Circuit Fabrication  
ES 564  Corrosion Engineering  
ME 557/CE 521  Advanced Mechanics of Composite Materials  
ME 591  Micro/Nano Systems Engineering  
ME 595  Principles of Physical Metallurgy  
ME 637  Particle Transport, Deposition and Removal  
PH 589/EE 543  Physics of Semiconductor Devices  
PH 636  Scanning Probe Techniques in Soft Condensed Matter Physics  

Doctoral students must also take 4 elective courses in consultation with their research advisor.
NONDEGREE GRANTING DEPARTMENTS

Reserve Officers’ Training Corps

ROTC at Clarkson University is an elective course of study that provides college-trained officers to the United States Army and Air Force. Upon graduation and successful completion of either the Army program in Military Science or the Air Force program in Aerospace Studies, students receive appointments as commissioned officers at the rank of second lieutenant. Each program provides a Basic Course in the first and sophomore years, and an Advanced Course in the junior and senior years. Sophomores who did not participate during their first two years may qualify for admission into the Army Advanced Course by attending a special, expenses-paid, four-week Leader’s Training Course in the summer prior to their junior year. There are other entry options available for veterans and graduate students. Students may enroll in the ROTC Basic Course without incurring any military service obligation.

Admission to junior and senior (300- and 400-) level classes is contingent upon successful completion of first-year and sophomore curriculum (or its equivalent) and qualifications in leadership, academic proficiency, and physical fitness. In special situations, students may qualify for admission into 300- and 400-level curriculum by meeting other criteria. Academic credit toward graduation requirements for Military Science and Aerospace Studies courses is determined by the individual schools at Clarkson. Interested individuals should contact the Professor of Military Science or the Professor of Aerospace Studies.

Uniforms and books required for ROTC courses are furnished free of charge to students in the Basic and Advanced Courses. Advanced-course students are currently paid a $450-500 per month (tax-free) stipend on a 10-month-per-year basis to offset living costs. Additionally, qualified students are eligible to compete for Army and Air Force scholarships.

Military Science (Army ROTC)

LTC Abrahm DiMarco — Chair & Professor of Military Science; Mr. Scott Toth, Assistant Professor of Military Science

The Clarkson University Army ROTC Golden Knight Battalion was founded in 1936 to enable Clarkson students to earn commissions as second lieutenants in the United States Army. Since then, it has commissioned over 1,300 leaders into the Active Army, Reserve, and National Guard components. Today, the Golden Knight Battalion continues to commission high-quality officers not only from Clarkson, but also from St. Lawrence University, SUNY Potsdam, and SUNY Canton.

The goal of the department is to develop outstanding scholar-athlete-leaders. The specific training you receive in Army ROTC will teach you leadership development, ethics, military law, training management, communications and fitness. This will take place both in the classroom and hands-on in the field, but you will have a normal daily schedule like all college students.

Army ROTC is an integral part of campus life, and cadets are active in all campus activities, including student government, varsity athletics, and Greek organizations. The battalion is approximately 100 cadets strong, and its focus remains on the development and training of America’s future leaders.

The Program

The ROTC program complements the traditional college curriculum by emphasizing development of the student’s leadership, management and interpersonal skills through dynamic instruction and challenging, experiential training. This is accomplished through a two-stage curriculum: Army ROTC Basic Course and
Advanced Course.

The first stage, or Basic Course, takes place during your first two years in college as elective courses. It involves one elective class and lab each semester. You will learn basic military skills, the fundamentals of leadership and start the groundwork toward becoming an Army leader. You can take Army ROTC Basic Courses without a military commitment.

The second stage, or Advanced Course, takes place during your last two years in college as elective courses. It includes one elective class and lab each semester, plus a summer leadership course. You will learn advanced military tactics and gain experience in team organization, planning and decision-making. Entering the Advanced Course requires a commitment to serve as an Officer in the U.S. Army after you graduate.

Every Army ROTC cadet who enters into the Advanced Course attends the Leadership Development and Assessment Course. It is a four-week summer camp to evaluate and develop all Army ROTC cadets. This camp takes place between your junior and senior years of college, and is conducted at Fort Lewis, Washington.

Cadets also attend a weekly leadership lab that complements classroom instruction with experiential learning. Leadership labs focus on the practical application of recent instruction. Labs include a leadership reaction course, land navigation, rappelling, small unit tactics, and drill and ceremonies. Once each semester, cadets may participate in an extended two-day field training exercise, designed to challenge each cadet’s leadership and military skills.

The Golden Knight Battalion also sponsors other events during the year such as a military ball and athletic events. Cadets may also compete to attend the Airborne, Air Assault, Mountain Warfare, and Northern Warfare schools during the summers. After the junior year, cadets may volunteer for summer training internships in locations throughout the United States, Europe and Korea.

Upon graduation and satisfaction of ROTC requirements, cadets are commissioned as second lieutenants into one of 16 specialized branches in Active Army, Army Reserve or National Guard.

Scholarships

Army ROTC offers a wide range of scholarships for interested and competitive students. These scholarships are offered to both undergraduate and graduate students. Four-, three- and two-year scholarships are awarded to students on a merit basis. Students may apply for four-year scholarships while still in high school, as well as two three-year and four-year scholarships once on campus. These scholarships include:

- full tuition and educational fees;
- $1,200 per year for textbooks and classroom supplies;
- $300-500 per month (tax-free) spending money for up to 10 months per year; and
- Clarkson offers all scholarship recipients a Clarkson ROTC Incentive Scholarship to be used to defray the costs of room and board. This scholarship is worth over $14,000 annually. This incentive is worth over $8,000 annually.

Scholarship applicants are evaluated on a number of areas that include: SAT/ACT performance, high school or college grade-point average, athletic ability and performance, participation in extracurricular activities, and leadership potential.

Facilities and Equipment

The Golden Knight Battalion has access to special equipment and training facilities that are second to none. On campus, cadets train in a 47-acre area of wooded forest, containing a rappel tower, grenade assault course, land navigation course, and field leadership reaction course. Additionally, students train at Fort
Drum, New York, the home of the Army’s 10th Mountain Division, located just 60 miles from the Clarkson campus.

Other Activities
There are many extracurricular activities open to ROTC cadets, including the Ranger Challenge Team and Club, Color Guard, Cadet Association, Army 1-Miler Team, Clarkson Guard and Intramural Teams. Some of these groups compete against other universities and ROTC programs in military and athletic competitions. The Cadet Color Guard performs at home hockey games, commissioning and graduation ceremonies, and other official events.

Leadership Training
No other college programs offer leadership training that is comparable to Army ROTC. An Army ROTC student knows how to lead, manage and work with people. Whether you decide on the Army as a career, or use it as a stepping stone to other goals in life, you will have a competitive advantage because you will learn what it takes to lead!

<table>
<thead>
<tr>
<th>Military Science Curriculum *</th>
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<tbody>
<tr>
<td><strong>FIRST YEAR</strong></td>
</tr>
<tr>
<td><strong>First Semester</strong></td>
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<tr>
<td>Course</td>
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<tr>
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<td><strong>SOPHOMORE YEAR</strong></td>
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### JUNIOR YEAR

#### First Semester

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<td>MS332</td>
<td>Leadership in Changing Env.</td>
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#### Second Semester

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### SENIOR YEAR

#### First Semester

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<td>MS441</td>
<td>Developing Adaptive Leaders</td>
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#### Second Semester

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<tbody>
<tr>
<td>MS442</td>
<td>Leadership in a Complex World</td>
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</table>

* Courses may be applicable as free electives in some majors where noted. Consult individual departments for details.

**For More Information**

If you have any questions or would like to speak with someone about Army ROTC, contact the Golden Knight Battalion at 315-265-2180 (collect) or 315-268-7705 or e-mail armyrotc@clarkson.edu. You can also visit our Web site at www.clarkson.edu/armyrotc.
Aerospace Studies (Air Force ROTC)
Lt Col Jennifer Amato — Chair and Professor of Aerospace Studies

Air Force Reserve Officer Training Corps (AFROTC) combines college study with military leadership, discipline, and training to produce officers and leaders for the United States Air Force. Upon graduation with at least a bachelor’s degree, students are commissioned as second lieutenants in the active duty Air Force. A commission is an appointment to a military officer by the President of the United States.

Curriculum
AFROTC is normally a four-year program divided into two portions, the General Military Course (GMC) for freshmen and sophomores, and the Professional Officer Course (POC) for juniors and seniors. All students also complete Leadership Laboratory (LLAB) each semester.

GMC
The GMC involves a one credit hour course and a two-hour Leadership Laboratory each semester. The freshman curriculum introduces the Air Force mission and organization, covers the basics of military customs and courtesies, military correspondence styles, and drill and ceremonies. The sophomore curriculum focuses on the history of air power, starting with the Wright Brothers’ first flight at Kitty Hawk, and traces the evolution of aircraft and Air Force missions throughout WWI, WWII, Korea, Vietnam, the Gulf War, and recent operations around the world such as Afghanistan and Iraq.

Field Training
After successful completion of the GMC, students are normally scheduled to attend Field Training during the summer between the sophomore and junior year. Field Training is an intense, four-week, hands-on leadership challenge. Cadets will be evaluated on their mastery of military customs and courtesies, drill and ceremonies, and on their leadership ability. Cadets are exposed to a variety of challenges to force them to work as a team, learn to critically evaluate situations, and perform under stress. While no cadet will tell you it is fun, Field Training is often a life-changing experience that builds self-confidence and fine-tunes leadership skills.

POC
After successfully completing Field Training, cadets are sworn in to the POC and are enlisted in the inactive reserves while they complete their final two years of college. The junior curriculum focuses on an in-depth study of leadership and management concepts. The senior curriculum continues to emphasize leadership, but introduces national security concepts and issues, cultural awareness, military law, the law of armed conflict, and preparation for entrance into the active duty Air Force. POC cadets are placed in leadership positions and are charged with running the cadet wing that is modeled after the organizational structure of the active duty Air Force.

Leadership Laboratory (LLAB)
LLAB is a hands-on leadership training program. The POC plan and execute 13 labs in which the GMC are instructed in skills they will need to successfully complete Field Training and for a thriving military career. POC members are responsible for planning and executing LLAB, as well as other extracurricular activities like formal dinners and awards ceremonies. Cadets are challenged in the classroom, and their jobs in the cadet wing require them to put the theories into practice. Cadets are also expected to participate in 2
hours of Physical Training (PT) per week during each semester.

Scholarships
Merit-based tuition scholarships are available to AFROTC cadets; they vary from $3,000 to full tuition. Below is a list of current scholarships.

- TYPE I — Full tuition and fees scholarship
- TYPE II — $18,000 towards tuition and fees
- TYPE III — $9,000 towards tuition and fees
- TYPE VI — $3,000 towards tuition and fees
- TYPE VIII — A competitive-based academic upgrade of a TYPE II, pays up to 80% of tuition

Other Benefits — All scholarships include the following:

- Free room and board (Clarkson incentive)
- Monthly Stipend during the academic year — FR = $300, SOPH = $350, JUN = $450, SEN = $500
- $300 per semester for books

For more details, contact the Aerospace Studies Department at 315-268-7989.

Aerospace Studies Curriculum*

<table>
<thead>
<tr>
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<td>The Air Force Today II</td>
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## JUNIOR YEAR

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## SENIOR YEAR

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* Course may be applicable as free electives in some majors where noted. Consult individual departments for details.

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## Physical Education

Steve Yianousos — Chair; Director Bill Bergan; Instructors are the Division 3 Head Coaches.

Physical Education offers an array of optional courses that vary based upon student interest and the season. The program is designed to offer a variety of activities in individual, lifetime and team sports which augment the required Personal Wellness course. Special attention is given to those activities with significant carry-over values for lifelong participation.

### Optional Physical Education Courses

- Weight Training Techniques, EMT/CPR Lifesaving, Golf, Racquetball, Aerobic Fitness, Badminton
- In cooperation with the University medical staff, the Physical Education Department will assist those students who are physically disabled to design a program best suited to their capabilities.
- The Henry R. Hodge Sports and Recreation Complex is located adjacent to the residence halls and offers facilities for team and recreational activities. Included in the complex are the Alumni Gymnasium; the Fitness Center; the Schuler Recreation Building, which houses the Stephenson Field House and the Fuller Pool; and the Snell Athletic Fields. Other fields, some lighted, are also available for athletic and recreational use.

  The Department of Athletics and Recreation offers a number of summer camp opportunities. Please contact them directly at 315-268-6622 or visit them on the Web at [http://www.clarksonathletics.com/](http://www.clarksonathletics.com/) for more details.
GRADUATE SCHOOL

GRADUATE STUDY
Clarkson offers programs of study during the regular academic year leading to the Master of Business Administration, Master of Engineering, Master of Science, Master of Science in Occupational Therapy, Master of Science in Physician Assistant Studies, Doctor of Philosophy, and Doctor of Physical Therapy degrees. For a full listing of program offerings and details on these graduate programs, please see page 18, and the Graduate Programs sections under Arts and Sciences, Business, Engineering, and Interdisciplinary Programs.

Graduate work during the entire year leading to the Master of Business Administration is available both on campus and online on a part-time basis for employed individuals.

Interdisciplinary programs leading to Master of Science and Doctoral degrees offer a unique perspective on graduate study and is a key element in many of our programs.

ADMISSION
Admission to graduate study is on a merit basis. The applicant must have received a bachelor’s degree from a college accredited by its regional association and must have achieved a record distinctly above average. Non-engineering majors may do engineering graduate work, but the degree they receive may not make them eligible to sit for the professional engineering licensing examinations immediately upon graduation.

Required application materials may include: resume, personal statement, and letters of recommendation. Each school maintains its own set of requirements – please contact the appropriate school for details.

Applicants for all graduate programs in science, engineering and interdisciplinary programs are required to take the Graduate Record Examinations; some programs including the School of Business will also accept the GMAT score.

All admission decisions must be approved by the applicant’s departmental graduate representative, by the director of the program and/or the dean of the appropriate school. While there is a rolling admission policy, and all applications will be reviewed up to a reasonable time prior to the beginning of classes, it is recommended that students requesting financial aid apply by January 30 for the fall semester and September 1 for the spring semester. Students are encouraged to apply no later than April 15 for the fall semester or October 1 for the spring semester to allow time for admissions processes.

For applications and other inquiries about the status of an application, contact the specific department of interest or see Clarkson’s Web site at www.clarkson.edu/admission/graduate/.

International Applicants: Language Verification Requirement
Clarkson University must verify all international students' English language proficiency when English is not a first language. This requirement, as part of the application process, must be completed prior to the issue of an I-20. Once the university has verified this requirement, and the applicant is accepted, the I-20 may be used to obtain a student visa.

Clarkson University requires one of the following language proficiency exams:
• TOEFL (Test of English as a Foreign Language: http://www.toefl.org )
• IELTS (International English Language Testing System: http://www.ielts.org )
Graduate admissions in the School of Business and the Coulter School of Engineering require a minimum IBT TOEFL score of 80 or minimum IELTS band score of 6.5. The School of Arts and Science (including Health Sciences) has no minimum requirement for TOEFL or IELTS exams, however a solid understanding of speaking/writing English is expected. A TOEFL/IELTS official score must be submitted as part of the application requirement.

Lastly, all matriculated international students for whom English is a second language are required to complete the ESL placement exam upon arrival to campus and complete any resulting requirements. Any language courses required as a result of the placement exam are not counted toward degree requirements.

**Graduate Application Procedure**

Application for admission is made on forms furnished by the University, obtained and completed online, or from the appropriate graduate studies office. Applicants to the Graduate School from within the U.S. and Canada are required to pay a $25 application fee. All other applicants are required to pay a $35 application fee. The fee will be waived for applicants from within the U.S. and Canada who apply for admission before December 31 for the following fall semester, or June 30 for the following January. The fee is waived for all Clarkson University undergraduates and alumni. Applications should be sent to the appropriate School office as indicated on the application. Information about the graduate program offerings, including application materials, is available at www.clarkson.edu/graduate.

**Financial Aid for Applicants**

Applicants who submit their applications by January 30 for entry the following August (fall semester) or by September 1 for entry the following January (spring semester) will receive priority for assistantships and other financial aid. Fellowships, instructional or research assistantships, and full or partial tuition scholarships are available in many of our graduate programs. Notices of appointment will generally be made on or before April 15. Merit-based scholarships and graduate assistant positions are available in the School of Business. All assistantships will be awarded on a merit basis (see Financial Assistance).

**Accelerated Admission Graduate School Policy**

This policy is intended to encourage early consideration and preparation for graduate work at Clarkson by highly qualified students. Such students would likely participate in undergraduate research experiences and would have identified a graduate advisor prior to baccalaureate graduation. These students may accelerate their undergraduate course of study to graduate early and begin their graduate work as soon as possible.

Any student who completes at least two years of residential study at the University and who has received a baccalaureate degree from Clarkson will automatically be accepted into any Clarkson graduate program for a master’s degree, at minimum, if he or she meets the conditions below at the time of entry to Graduate School. Eligible students must have:
• graduated in good standing from Clarkson within the previous year and have taken any necessary prerequisite courses for entrance to the graduate program in question;
• exhibited the quality of character expected of an entering graduate student of Clarkson University, as indicated by a letter from their academic advisor, department chair, or the dean of the school in which their baccalaureate degree resides;
• maintained a minimum grade-point average of 3.50 in their major;
• achieved a School-defined minimum score on a designated national exam; the CUSB requires the GMAT exam and all others, with the exception of Clarkson students, require the GRE.
Applications for graduate admission from students receiving a Clarkson University baccalaureate degree who have not met all conditions specified above will still be considered, but admission will no longer be automatic.

Superior Clarkson undergraduate student, with the permission of their department chair and the dean of the appropriate School, may enroll in engineering, science, and information technology graduate courses. When such courses are completed with a grade of c or better beyond the normal credit hour requirements for the bachelor’s degree, credit may be applied toward a graduate degree. Graduate-level courses in the School of Business are restricted to matriculated graduate students.

DEGREE REQUIREMENTS AND ACADEMIC POLICIES FOR GRADUATE STUDENTS
Requirements for the Master’s Degree
The minimum graduation requirements for students in all Master of Science degree programs at Clarkson are listed below. Additional graduation requirements are set by each degree program. Consult the department office for details. Requirements for the Master of Business Administration program can be found on Page 306.

1. A minimum of 30 credit hours of graduate coursework, as follows.
   a. At least 20 credit hours of course and seminar work. The balance of coursework must be consistent with the research or professional experience component.
   b. Only courses numbered 500 and above are accepted for graduate credit.
   c. 10 credit hours of transfer credit (B grade or better) may be accepted.
2. Satisfactory completion of a research or comparable professional experience, as follows.
   a. A written thesis based on independent research;
   b. A comprehensive examination; or,
   c. An appropriate, professionally oriented special project.
3. At least one academic year of study beyond the B.S
4. A cumulative GPA of 3.0 in courses used to meet graduation requirements
5. All work must be completed in five calendar years
6. A thesis or project submitted in partial fulfillment of the requirements for the Master of Science degree will be examined by a committee of at least three Clarkson faculty appointed by the student’s department. After approval by the examining committee, a thesis requires signature approval by the dean of the Graduate School, and two copies of the thesis will be deposited in the University library.

The minimum graduation requirement for students in all Master of Engineering degree programs at Clarkson is 30 hours of graduate credit. Each semester, full-time M.E. students must register for 15 credits, possibly including required and elective coursework, a seminar, and project work. Each department has its own specific requirements, but the common element throughout is the practical orientation of the program.
Students failing to perform satisfactorily will be separated from the University upon the request of the department chair and with the concurrence of the dean of the respective School. Any changes in the student’s degree program must be approved by the department chair and dean of the school.

Requirements for the Doctoral Degree
The minimum requirements for all students in Doctor of Philosophy (Ph.D.) degree programs are described below. Please consult your departmental office for additional requirements. Requirements for students enrolled in the Doctor of Physical Therapy (DPT) program vary from those outlined here and are described in the General Requirements for DPT Curriculum.

1. A minimum of 90 credit hours, as follows.
   a. A minimum of 24 credit hours coursework.
   b. A minimum of nine course credit hours taken in residence (includes distance learning courses offered by Clarkson University).
   c. A minimum of six credit hours of seminar.
   d. A maximum of 30 credits transferred from an M.S. degree towards Ph.D. degree requirements (B grade or better).
2. A minimum of three academic years of full-time graduate study or the equivalent in part-time study. Two years of study must be in residence at Clarkson. Students matriculated in the off-campus Ph.D. program are exempt from this residency requirement (see below).
3. Satisfactory completion of the Ph.D. comprehensive examination for admission to candidacy (“candidacy procedure”) within two years of full-time study after admission to the Ph.D. program or, for part-time students, before completing 66 credits. (See below)
   a. After completion of the candidacy procedure, the student will be identified as a “Ph.D. Candidate.”
   b. Students who fail the candidacy procedure may make a second attempt according to department guidelines.
   c. A student who does not successfully complete the candidacy procedure within the time allowed may be dropped from the graduate program.
4. A written dissertation must be submitted by each candidate and defended orally as part of the final examination (see below).
5. All work must be completed within seven years after the student is identified as a Ph.D. candidate.

Any changes in the student’s degree program must be approved by the Department Chair and Dean of the school.

Comprehensive Examination for Admission to Candidacy
A comprehensive examination based on general preparation in the major field must be taken within two years after admission to the Ph.D. program. If the comprehensive examination is failed twice, the student will be dropped.

Time Limit
After the comprehensive examination is passed; all work done specifically for the doctorate is to be
completed within a period of seven calendar years.

**Final Examination**
A final examination must be passed. This examination will include, as a minimum, an oral examination based on the dissertation. For the final oral examination, a committee will be selected by the faculty advisor and approved by the department chair and dean of the respective school. The committee will consist of a minimum of five members. The members should include at least four Clarkson faculty of assistant professor rank or higher and possessing an earned doctoral degree. At least one of the members must be from a department other than the candidate’s major department. With the approval of the Provost, an external examiner with appropriate credentials from another University or industry may also be appointed to serve as one of the five committee members. This committee will judge the technical competence of the dissertation and the oral presentation. Final completion paperwork and an electronic copy of the accepted dissertation (on CD) must be received in the student’s School office no later than 10 working days before commencement to confer degrees to qualify a student to receive a degree at the end of the spring semester. Before final submission of the Ph.D. dissertation, each student will be responsible for submitting their dissertation for publication, and paying any associated fees.*

*For information and assistance, contact the Graduate Coordinator in your school's office.
Off-Campus Ph.D. Program Policy
The off-campus PhD program has been designed to allow Clarkson University doctoral degree candidates to conduct their dissertation research at their employer’s research facilities. A Clarkson faculty advisor directs the dissertation research with the assistance of a co-advisor at the student’s employer, and up 50% of required coursework can be taken from Clarkson via online and distance learning.

1. The minimum-credit-hour requirement after the bachelor’s degree is 90 hours (current requirements). The normal course requirements for the student’s department and the University must be met. Students may take up to 50% of required coursework through distance learning. Students who enter the program with an M.S. degree may transfer up to 30 credits toward the Ph.D. from their master's program.

2. The student must satisfy all the entrance requirements of the academic department. This is beyond the basic University requirements already in place for admission to the Ph.D. program. The experience and specialization of each candidate will be considered in the admission evaluation process.

3. It is essential that the dissertation committee includes one qualified representative from the student’s employer. The representative will act as a co-advisor within the organization. Each department will decide if the representative should be appointed as an external committee member of the student's Ph.D. Committee.

4. The student must fulfill all degree requirements according to each department’s policy. It is considered essential that each candidate is carefully examined for both the depth and breadth of his/her knowledge in the chosen field of study.

5. The dissertation should be defended at Clarkson University in the normal manner and according to the University and department requirements and regulations. The candidate must demonstrate a sufficient fundamental knowledge in his/her field.

6. The department will specify the period of time the student spends on campus (at the department) and the number of visits (each semester).

7. The maximum duration of time allowed to finish the dissertation is eight years.

8. The relationship between the student’s employing organization and Clarkson University must conform to the Clarkson Conflict of Interest Policy.

A listing of courses available through distance learning is published each semester. Off Campus PhD students may choose from that list and enroll in those courses. These courses shall meet the matriculation requirements set forth in the University catalog.

The courses for this program will be delivered using a video conference/classroom facility or through the Internet. Graduate classes that include off-campus students are scheduled at a video conference facility at Clarkson. An appropriate faculty member is assigned to oversee the courses, coordinate the examinations and evaluation of the student’s performance. Courses may also be given through other means of delivery, provided they meet the University and department requirements. These courses shall meet the matriculation requirements set forth in the University catalog.

Comprehensive Examination for Admission to Candidacy
A comprehensive examination based on general preparation in the major field must be taken within two years after admission to the Ph.D. program. If the comprehensive examination is failed twice, the student will be dropped.
Time Limit
After the comprehensive examination is passed; all work done specifically for the doctorate is to be completed within a period of seven calendar years.

Final Examination
A final examination must be passed. This examination will include, as a minimum, an oral examination based on the dissertation. For the final oral examination, a committee will be selected by the faculty advisor and approved by the department chair and dean of the respective school. The committee will consist of a minimum of five members. The members should include at least four Clarkson faculty of assistant professor rank or higher and possessing an earned doctoral degree. At least one of the members must be from a department other than the candidate’s major department. With the approval of the Provost, an external examiner with appropriate credentials from another University or industry may also be appointed to serve as one of the five committee members. This committee will judge the technical competence of the dissertation and the oral presentation. Final completion paperwork and an electronic copy of the accepted dissertation (on CD) must be received in the student’s School office no later than 10 working days before commencement to confer degrees to qualify a student to receive a degree at the end of the spring semester. Before final submission of the Ph.D. dissertation, each student will be responsible for submitting their dissertation for publication, and paying any associated fees.*

*For information and assistance, contact the Graduate Coordinator in your school's office.

Grading System
The grades A, B+, B, C+, C, and P are acceptable for credit toward the degree. For graduation an average of B or better must be earned in nondissertation courses and seminar work. The grade of P will not affect the average.

Students failing to perform satisfactorily will be separated from the University upon the request of the department chair and with the concurrence of the dean of their School.

GRADUATE GRADE DEFINITIONS325
Graduate grades at Clarkson are defined as follows:

A+ passed with 4.00 quality points per credit hour
A  Passed with a 4.00 quality points per credit hour
A- Passed with a 3.67 quality points per credit hour
B+ passed with  3.33 quality points per credit hour
B  passed with 3.00 quality points per credit hour
B- Passed with 2.67 quality points per credit hour
C+ passed with  2.33 quality points per credit hour
C  pass with 2.0 quality points per credit hour
F  failed with 0.00 quality points per credit hour

P  passing: this grade may be employed for seminar courses and special projects, and under limited circumstances for MS thesis credits. Approval for a "P" grade for project or thesis credit requires the approval of the department chair, (or comparable administrative unit), Dean of the school, and the Dean of the Graduate School/Provost.

S  Satisfactory progress towards the completion of on-going project thesis, or dissertation work for the semester. The S grade is removed and replaced with a "P" grade when the
final report, thesis or dissertation is accepted by the Graduate School.

U Current Unsatisfactory progress towards the completion of on-going project, thesis, or dissertation work for the semester. The U grade is removed and replaced with a "P" grade when the final report, thesis or dissertation is accepted by the Graduate School.

I Incomplete grade given only in cases described in the paragraph below. An I grade must be replaced by one of the above letter grades as required by the rules in the paragraph below.

Incomplete Grades

• A student who is unable to complete the requirements of a course because of extenuating circumstances may seek an Incomplete grade (I) for the course. Whether or not an "I" grade is given is entirely at the discretion of the faculty member for the course, although the faculty member may ask the Dean of Students' Office if it has relevant information regarding students' requests. The conferring of an "I" grade carries the presumption that it is possible for the course to be completed with a passing grade; in cases where the missing work is such that it cannot be completed after the end of the semester, or where completion of the missing work could not possibly result in a passing grade for the course, an "I" grade should not be given.

• Requests for an "I" grade shall be made on a form available from Student Administrative Services. Faculty members indicate on the form whether they approve or disapprove the "I" grade request for their course(s) and return the completed form to Student Administrative Services. If the faculty member approves the request, he or she lists on the form the work that must be completed to remove the "I" grade and the due date for this work and submits an "I" for the student on the course grade roster. If the faculty member disapproves the request, he or she submits a letter grade for the student on the course grade sheet. Unless otherwise stated on the form, or if no form is received, the work required to remove an "I" grade must be completed no later than the end of the 7th week of classes of the next semester in which the student registers at the University, otherwise a grade of "F" is recorded. All requests for "I" grades by a student in the same semester shall be made on a single form, and students seeking more than two "I" grades in the same semester must consult with the Dean of Students prior to seeking faculty approval for their requests.

• To remove an "I" grade, the instructor shall submit a completed Change of Grade form to the instructor's department chair (or comparable administrative officer), and upon approval, it is sent to Student Administrative Services. Then the specified grade shall replace the "I" grade in the semester(s) in which the student registered for the course.

GRADUATE POLICY ON COMMENCEMENT

In order for a graduate student to receive a diploma at the May Commencement ceremony:

• All coursework and seminar credits must be completed as specified by the degree requirements.
• Master’s theses or Doctoral dissertations must be approved by the student’s research committee, department, school, and dean of the Graduate School. All associated final and signed copies and paperwork must be submitted to the appropriate school office by the published deadline. This deadline is generally 10 working days before commencement to confer degrees.
• Projects for non-thesis Master’s students must be approved by the advisor and department. All associated paperwork must be submitted to the appropriate school office by the published deadline. This deadline is generally 2 working days before the faculty vote to confer degrees.

Students who do not meet these requirements and deadlines may be allowed to participate in graduation ceremonies in the following cases.

A student may receive a diploma “on condition” at the May commencement if:
• He or she is in the CUSB MBA program at Clarkson and is registered for up to three hours of coursework in the Clarkson international summer program. OR
• He or she is enrolled in the Doctor of Physical Therapy program for the final three hours of coursework that is not complete at the time of the faculty vote.

Requests for graduation with “on condition” status must be approved by the dean of the appropriate school or comparable unit administrator and submitted to the dean of the Graduate School at least 10 working days before the faculty vote to confer degrees at the May graduation.

For students voted “on condition,” the degree will be awarded when the respective School receives a final grade for the remaining course(s), as appropriate. All conditions for graduation must be met by June 15 to ensure accurate reporting of May graduates to the New York State Education Department.

A student may “walk through” the May graduation ceremony if:
• The student has defended his or her dissertation, thesis or presented their project, yet has failed to meet the published deadline for submission of the final signed thesis copies and completion documentation. OR
• The student is in the DPT degree program and is currently enrolled in the final six (or less) credits of coursework. OR
• The student is in a Master’s degree program, has submitted an approved and signed thesis or project report, and requires no more than three additional credits of coursework.

Student requests to walk through the graduation ceremony require explicit approval by the dean of the appropriate school or comparable unit administrator and submission to the dean of the Graduate School at least 10 working days before the faculty votes to confer degrees at the May graduation.

In the case of an incomplete dissertation, thesis or project, the petition must be initiated by the thesis or project advisor and be approved by the department or program chair, and the Dean of the respective School or comparable unit administrator. This petition should (a) certify that a successful presentation or defense of thesis had occurred prior to the published deadlines, and (b) carry the signatures of the thesis or project advisor, and all other members of the thesis examining committee.

Students who are allowed to walk through the graduation ceremony under these conditions will receive their diploma and be counted as graduates at the next graduation ceremony following the completion of their degree requirement.

EXPENSES, FINANCIAL ASSISTANCE, STUDENT STATUS

Expenses
Tuition and other charges at Clarkson are set at the minimum permissible for financially responsible operation and are considerably less than actual costs. Gifts and grants received through the generosity of
alumni, industry, foundations, and friends play an important part in reducing the difference. Although Clarkson will make every effort to maintain charges at current levels, the University reserves the right to revise or change financial requirements.

**Tuition and Fees**
Tuition for the 2015-2016 graduate programs is at the rate of $1,457 per credit hour. Under normal circumstances, full-time graduate students must register for a minimum of nine credit hours per semester for each semester in residence until the credit hour requirements for the degree have been completed. At such time a graduate student must continue to register for one credit hour each semester until all degree requirements have been completed. Graduate students (other than MBA candidates) may not register for more than 15 credit hours per semester. Full-time on-campus graduate students are subject to a $295 facilities usage fee each semester.

In order to remain a candidate for a graduate degree, a graduate student not on campus who has not completed all degree requirements must continue to register for one credit hour each semester until all degree requirements have been completed. These students are not required to pay an activity fee, but may be required to begin re-payment of outstanding loans. Exception from payment of the tuition for this credit hour may be granted to the student (when circumstances warrant) by the dean of the respective School upon written request or personal interview.

**Financial Assistance**
Various types of financial assistance are available to full-time graduate students including Assistantships, Fellowships, and Scholarships. These awards are granted by each graduate school. US students enrolled at least half-time are eligible to apply for Federal Direct Unsubsidized and GraduatePLUS Loans. Students must file a FAFSA annually. Refer to [www.clarkson.edu/sas/financial/graduate](http://www.clarkson.edu/sas/financial/graduate) for more information on Federal Loan Programs and application procedures. The schedule for student eligibility for New York State financial assistance can be found in the Clarkson Regulations.

The programs currently available include the following:

**Teaching Assistantships**
During 2015-2016 these assistantships carry stipends of $24,510 plus tuition. Instructional requirements are up to 20 hours of service per week in laboratory or other designated work for the University during the academic year, or 12 hours of service per week in the above designations during the calendar year. (Not available in all graduate programs.)

**Research Assistantships**
These assistantships permit concentration in the student’s research field during the period of study. Stipends for 2015-2016 are $24,510 or more per year plus full tuition. Forty hours of service per week, inclusive of classroom work and research duties, are required. (Not available in all graduate programs.)

**Industrial and Governmental Fellowships**
These permit concentration on the student’s research problem during the entire period of study. Stipends for 2015-2016 range from $24,510 to $30,000 per year plus full tuition.
**Graduate Assistant**
Funding may cover full or partial tuition and/or a stipend. The stipend must be at least minimum wage and duties may not exceed 40 hours per week including time to attend classes.

**Partial Tuition Scholarships/Assistantships**
A number of partial tuition scholarships/assistantships are made available each year. These scholarships may be awarded to deserving students on a merit basis, and may be in addition to other types of financial assistance.

**Vacation**
All graduate students, appointed for one year under a Research Assistantship, Teaching Assistantship, or Fellowship are entitled to receive two weeks’ vacation plus all holidays when the University is officially closed.

**Satisfactory Academic Progress for Federal Financial Aid**
Federal regulations require that schools monitor the academic progress of every federal financial aid recipient and certify that the student is making satisfactory academic progress towards earning his/her degree. Standards of satisfactory academic progress include both quantitative and qualitative measures. These measures include:
1. **Cumulative Grade Point Average** - a cumulative 3.0 is required. Students with less than a 2.7 GPA are not eligible for federal aid.

2. **PACE** - A minimum percentage of attempted credits hours must be earned every semester. PACE is determined by:

   $$\frac{\text{Cumulative # of Earned Hours}}{\text{Cumulative # of Attempted Hours}}$$

   Students must maintain a minimum PACE of 67%

3. The maximum time frame for meeting degree requirement Student must complete their degree within 150% of the published length of the program.

   Satisfactory academic progress is evaluated at the conclusion of each term.

   A student who whose cumulative GPA is between 2.700 and 2.999 and/or whose PACE is less than 67% is not making Satisfactory Academic Progress for Financial Aid. The student is notified by the Financial Aid Office that he/she is on Financial Aid Warning for the subsequent term of attendance. During the Financial Aid Warning term, the student retains eligibility for federal financial aid. A student whose GPA is less than 2.7 is ineligible for federal financial aid.

   A student who meets both the PACE and GPA standards at the conclusion of the Financial Aid Warning term is again meeting Satisfactory Academic Progress for Financial Aid and is eligible for federal aid for the subsequent term of attendance.

   A student who does not meet both the PACE and GPA standards at the conclusion of the Financial Aid Warning term is notified by the Financial Aid Office that he/she is not making Satisfactory Academic
Progress for Financial Aid and is ineligible for federal aid for subsequent terms. A student may not have two consecutive Financial Aid Warning terms.

A student may regain federal aid eligibility by taking courses at Clarkson without receiving federal aid that raises the PACE percentage to 67% or the Cumulative GPA to 3.0.

Students may only receive federal aid for courses that are required for degree completion. For purposes of determining SAP, all grade changes including incompletes must be submitted to SAS and recorded by the Registrar by the 10th day of classes. This deadline may differ from academic departmental guidelines. Any academic grade changes occurring after the 10th class day of the term will have no effect on a student’s SAP status for that term.

**Total Withdrawal from the University – Treatment of Federal Title IV and Institutional Aid**

There are occasions when a student may leave the University prior to the completion of a semester. If a student officially withdraws from the University, takes a leave of absence, unofficially withdraws or is dismissed during the semester, for the purposes of financial aid each of these situations is treated as a withdrawal.

A student intending to leave the University must contact their Academic Department Office to begin the official withdrawal process.

The law specifies how Clarkson must determine the amount of Title IV program assistance that you earn if you withdraw from school. The Title IV programs that are covered by this law are: Federal Pell Grants, Iraq and Afghanistan Service Grants, Federal Direct Student Loans, PLUS loans, Federal Supplemental Educational Opportunity Grants (FSEOG) and Federal Perkins Loans.

When you withdraw from the University during the semester, the amount of Title IV program assistance that you have earned up to that point in time is determined by a specific formula. If you received less assistance than the amount that you earned, you may be able to receive those additional funds. If you received more assistance than you earned, the excess funds must be returned to the US Department of Education.

The amount of assistance that you have earned is determined on a pro rata basis. The formula is based upon the number of days the student has attended as a percentage of the total number of days in the semester. For example, if you completed 30% of the semester, you earn 30% of the assistance you were originally awarded. Once you have completed more than 60% of the semester, you have earned all of the assistance that you were awarded for the semester. Federal regulations require this calculation if the student officially or unofficially withdraws, is dismissed or otherwise leaves the University during a semester.

Student transcripts are reviewed at the conclusion of each semester. If a student received all “F” grades during a semester, federal regulations require the Office of Financial Aid to obtain additional information from the Academic Department(s). If the Academic Department(s) determines that the student completed yet failed to meet the course objectives in at least one course, no changes to the student’s financial aid for that semester is required. If however, the Academic Department(s) determines that the student did not complete all courses (i.e. stopped attending all courses); the student is considered to have unofficially withdrawn from the University. In this case, the last date of an academic related activity (i.e. documented attendance in class, submission of a homework assignment or the taking of an exam) is used to determine the date of the unofficial withdrawal. If the last date of an academic related activity is after the 60% date of the semester, no adjustment to a student’s financial aid for that semester is required. If however, the date occurs prior to the 60% date, a Title IV refund calculation is required and necessary.
adjustments to a student’s financial aid for the semester will be made. In absence of a documented last date of an academic related activity, federal regulations require Clarkson to use the midpoint (50%) of the semester.

The Federal Title IV Refund Procedure is separate and distinct from the Office of Student Account’s refund policy for tuition, fees and other charges at Clarkson. Therefore, a student may still owe funds to cover unpaid institutional charges.

Satisfactory Academic Progress for students who return to the University for a subsequent semester will be reviewed and a determination will be made based on the Maximum Time Frame, PACE and GPA standards as stated above.

**Full–Time Status**

A graduate student will be classified as full-time in any semester in which he or she is registered for at least nine credit hours or until the credit-hour requirements for the degree have been satisfied. When such degree requirements have been met, the student will be required to register for at least one credit hour of project/thesis, be in residence, and be actively engaged full-time in completing the project/thesis in order to be classified as a full-time student.

**Withdrawal**

If the student withdraws:
- On or before start of classes.................................100% Refund
- After 1st day, 1-5 of classes.................................90% Refund
- After 10% through, 6-10 of classes......................75% Refund
- After 25% through, 11-15 of classes.................50% Refund
- Day 16-20 of classes...........................................25% Refund
- Day 21-75 of classes.............................................0% Refund

Graduate students planning to exit the University, whether permanently or for a leave of absence, must initiate the process in the appropriate academic school.

A leave of absence for a graduate student is permitted at the discretion of the graduate coordinator, department chair, or dean of the school. A leave of absence can only be granted to a graduate student in good academic standing, who has not yet completed credit-hour requirements for the degree.

If a student’s intent is to permanently leave the University or the student is not in good academic standing, the student will be withdrawn from the University. The effect of a withdrawal on a student’s transcript and finances is based on the date of the withdrawal. For information on grading policies relating to withdrawal, contact the SAS office or refer to the Clarkson Regulations. Refund policies for withdrawals are outlined on Page 66 of this catalog and can also be found in the Clarkson Regulations.

**GRADUATE HOUSING AND DINING**

Since Potsdam is a college town, a wide range of housing accommodations are available near the Clarkson campus. For detailed information or for copies of the listings of off-campus private rentals of rooms, apartments, or houses, contact the graduate coordinators for each program.

Residence halls are primarily for single undergraduate students. Graduate students may contract for meals in any of the University dining halls on a semester basis even though they do not reside in a residence hall. They may also eat on a cash basis in cafeterias in dining halls, the Student Center or in the Cheel Campus Center.
DIVISION OF RESEARCH

Gregory C. Slack, Director of Research and Technology Transfer; Shannon Robinson, Assistant Director of Research and Compliance; Anna Marie Dawley Grant and Contract Administrator/CAMP Financial Manager; Todd C. Travis, Award Administrator

The Division of Research (DOR) is the central office charged with overseeing the conduct and promotion of research activities at Clarkson University. It is the philosophy of the University that research supports and enhances its educational mission. The DOR strives to provide and constantly enhance services to the Clarkson community as well as individuals and companies that come in contact with the Division. Examples of such services include proposal development for faculty and staff; administration of grants and contracts established under federal, state, and private awards on behalf of the University; assurance of compliance with federal, state, private, and other regulations pertaining to grant sponsorship activities at the University; and the creation, submission, or provision of analyses, reports or policies as required. Through these activities, the DOR promotes innovation and creativity, thereby increasing knowledge and making the knowledge available and useful for scholarship and education.

Some typical areas of sponsored research in engineering and science include: crystal growth, aerosol kinetics and scavenging, light scattering, stability of colloidal dispersion, strength of materials, metallic systems, ceramic surfaces, phase transitions, bio-engineering, heat transfer and mass transfer, thin film adsorption, film flow stability, transition and turbulence and active flow control, nonlinear wave motion, dynamical systems, chaos and control, computational applied math, optimization and numerical p.d.e.s., wave forces, surface shear viscosity, nutrient regeneration in lakes, flow slides, copper and zinc protein, nanotechnology, artificial intelligence, oxygenation of metal complexes, asynchronous networks, communication networks, detection of random signals, renewable energy production, power transmission, energy conversion, plasma deposition, osmotic work, and corrosion.

In the business area, studies have been conducted relative to dispute settlement techniques, scientific and technical information systems, effects of organizational changes, economic impact of environmental damage from acid rain, marketing approaches, pricing environmental alternatives, banking systems, and monetary policies.
ACADEMIC CENTERS

CENTER FOR ADVANCED MATERIALS PROCESSING (CAMP)
A New York State Center for Advanced Technology
S.V. Babu, Director

The essential roles of advanced materials in modern manufacturing include producing “small” particles for advanced ceramics, photo-imaging and inks and medical diagnostics; fabricating integrated circuit chips and electronic packages for computers; producing high-performance plastics and composites for aircraft, and myriad other uses.

Since its inception in 1986, the Center for Advanced Materials Processing (CAMP) has been dedicated to developing Clarkson’s research and education programs in high-technology materials processing. The Center emphasizes development of scientific and technological expertise in the field of colloids, thin films and surfaces. CAMP researchers produce, modify and convert solids and liquids for which “small” particles, colloidal media or surfaces play an important role, either in the processing or in the properties of the final product. CAMP is an interdisciplinary endeavor, bringing together participants from six departments of science and engineering.

CAMP was designated a New York State Center for Advanced Technology (CAT) in 1987. As one of the 15 CATs at New York State universities, CAMP receives one million dollars per year from the New York State Office of Science, Technology and Academic Research for applied research, technology transfer and operating expenses. In addition, CAMP-related work receives several million dollars each year from the federal government and private industry. CAMP places a particularly strong emphasis on cooperative projects with industry, including exchange programs for students, scientists, and engineers. Materials processing activities at Clarkson include undergraduate projects, educational lectures and seminars by international experts, special short courses, and research by graduate students, research associates, and visiting scientists from around the world.

A building funded by New York State was completed in 1991 to house CAMP’s educational and research activities. Occupying 190,000 square feet and containing 70 laboratories, 102 offices, and a variety of special facilities and equipment, the complex is a valuable resource for promoting cooperative research projects with New York State industries.

For more information, check out the CAMP Web site at www.clarkson.edu/camp.
CENTER FOR INNOVATIVE DEVICE TECHNOLOGIES
Vladimir Privman, Director

The Center’s research focuses on the device science of novel information processing and on the engineering approaches that offer alternatives and new capabilities for the computer, sensor and biosensor technologies in commercial use. This research involves synergistic collaborations across disciplines, between engineers and scientists, and serves as a catalyst to form dynamic teams of researchers.

The enabling role of the Center is to provide a synergistic unit for organizing faculty-teams aimed at research collaborations and project development. The Center activities include mentoring students/researchers, organization of conferences, sponsorship of conference sessions and scientific journal issues in relevant research topics, and participation in research endeavors that transcend single-investigator projects.

CENTER FOR AIR RESOURCES ENGINEERING AND SCIENCE (CARES)
Philip K. Hopke, Director; Thomas M. Holsen, Co-Director

The presence of contaminants in the atmosphere can produce a wide variety of adverse effects including increased adverse public health effects, decreased visibility, deterioration of buildings and monuments, acidification of lakes and rivers, and forest and crop damage. The health effects of atmospheric contaminants cannot be avoided by staying inside since ambient air is transported indoors along with its pollutants while indoor sources can add to the problems. Although we have substantially improved the ambient air quality over the past 35 years, there are still a number of problems that are attributed to air pollution. Recent studies have found strong correlations between changes in particle concentrations and increased mortality. There has been a sharp rise in childhood asthma, and many areas of the country continue to fail to meet national ambient air quality standards. Worldwide much of the world's air quality fails to meet the quality specified by the World Health Organization's guidelines.

Clarkson University has significant resources in people and equipment to bring to bear on the management of air pollution. These resources have been combined with those of a consortium of universities and research organizations to form the Syracuse Center of Excellence in Environmental and Energy Systems (CoEEES). CoEEES brings together multidisciplinary teams of investigators to measure, model, and suggest implementation strategies that will lead to improved atmospheric conditions including the ambient atmosphere, indoor atmospheres in homes and hospitals, and controlled atmospheres in commercial manufacturing operations and office workplaces. In this process, we are developing new modeling, measurement, and flow management tools that can provide the base for new or expanded commercial ventures as well as providing critical information to state and federal regulatory authorities that will help to improve the quality of life for New Yorkers. CARES is the center that brings together the world-class expertise that is available at Clarkson as part of CoEEES. Our expertise is focused in air sampling and analysis, receptor modeling, atmospheric deposition, and the application of experimental and computational fluid dynamics to air pollution problems. CARES laboratory and office space, and equipment including an aerosol wind tunnel, a high-speed aeronautical wind tunnel, a Beowolf computer cluster, field sampling systems, and analytical equipment are available to programs at Clarkson and throughout CoEEES's other participating institutions.
CENTER FOR SUSTAINABLE ENERGY SYSTEMS

*Kenneth Visser, Director*

Clarkson University has been engaged in energy research and education for over 30 years and our faculty's wide range of interests and activities span disciplines from Engineering to Business. The Center provides a vehicle to bring these efforts together, exchange ideas with each other and generate new concepts for innovative, sustainable, collaborative projects at local, national and international levels. The Center also supports the current efforts of the Institute for a Sustainable Environment (ISE) and the Center for Advanced Materials Processing (CAMP) and is closely linked to the Shipley Center for Innovation.

GREAT RIVERS CENTER

*Michael Twiss, Director*

Clarkson University faculty and researchers have a distinguished history of investigating and engineering solutions to a broad range of issues involving the lower Great Lakes and St. Lawrence River. Clarkson is best known for contributing to the solution of environmental problems such as eutrophication, toxic chemical pollution, and corrective measures to remediate contaminated environments; to the solution of water resources management concerns related to navigability for commerce and power generation, especially as affected by winter conditions and the formation and dynamics of ice; and for addressing socioeconomic issues such as binational trade and cultural concerns.

These activities have been undertaken by teams comprising faculty members, graduate students and undergraduates using Clarkson facilities and often involving collaborators from several other universities in New York State via the Great Lakes Research Consortium. Not only do these efforts create new knowledge that is essential to the education of students who pursue B.S., M.S., M.E. and Ph.D. degrees and to the professional development of the faculty members, this work provides environmental and economic benefits to the people of the region, the nation and, indeed, the international community.

Recognizing the multiplicative effect of interdisciplinary collaboration, in 1999 Clarkson initiated actions that resulted in the establishment of the Great Rivers Center on the Clarkson campus. The Great Rivers Center is integrated into the education, research and outreach missions of the Clarkson Institute for a Sustainable Environment.
The Center for Rehabilitation Engineering, Science and Technology was established at Clarkson University in 2005. Its mission is to educate, mentor and train students to be able to integrate and apply a combined scientific, analytic, technological and business approach to emerging biomedical engineering and biomedical science areas. It is of note that biomedical engineering is the most rapidly growing field of engineering, with outstanding biomedical job prospects, and with half of the undergraduates being female, a ratio that exists in no other engineering discipline.

The Center for Rehabilitation Engineering, Science and Technology takes a unique approach to the study of rehabilitation problems. First, through its focus on biomedical engineering, the Center studies how the nervous and skeletal muscle systems of the human body normally work. Secondly, through its rehabilitation science and technology components, it models the mechanisms by which these systems become impaired through disease or injury. Within its rehabilitation technology aspects, the Center investigates how technology can help to restore or replace functions such as hearing, speaking, seeing or moving through the use of artificial assistive or substitutive devices. Through a clinical link with Clarkson’s Physical Therapy program, the Center investigates the outcome of the applications of this assistive technology. The Center also organizes and presents seminars, campus lectures and classroom discussions by visiting leaders in the field of rehabilitation.

Medical and health care have become increasingly technology-based in recent years, with an increased demand for engineers with skills that integrate engineering principles with an understanding of the human physical and psychosocial characteristics. The Center for Rehabilitation Engineering, Science and Technology offers a concentration in Biomedical and Rehabilitation Engineering to meet this need. Obtaining an engineering degree with a concentration in biomedical and rehabilitation engineering is an attractive opportunity for university bound engineering students who have a strong desire to use their talents to improve the quality of life for people with medical conditions or disabilities. Clarkson offers this concentration to augment a degree from a traditional engineering department. This concentration is multi-disciplinary, and will include courses from multiple schools or departments across the University. The Biomedical and Rehabilitation Engineering Concentration is just one of the examples addressing Clarkson’s Coulter School of Engineering’s motto “Technology Serving Humanity.”

Further information can be found at www.clarkson.edu/crest/.

EASTMAN KODAK CENTER FOR EXCELLENCE IN COMMUNICATION

On the ground floor of Bertrand H. Snell Hall, the Center for Excellence in Communication (CEC) offers Clarkson students and faculty support for communication education across the curriculum, including graphics, and writing. The CEC has two primary missions: First, the CEC serves as a support facility for Clarkson’s goal of providing each student with the opportunity to develop and refine exceptional communication skills. Second, the CEC provides laboratory space for research and project work regarding the effective use of electronic media.

The CEC provides several important functions:

1. The CEC Lab (Snell 130) provides studio-style classroom space for communication and digital media software training for up to 21 students in a setting augmented by 22 Windows and Linux
workstations as well as an instructional projection system. The CEC Lab also houses teamwork spaces and a presentation area in order to support project-based learning. The workstations in the CEC Lab also include advanced digital art and media capabilities.

2. The CEC Advanced Digital Arts Lab (Snell 130E) offers individuals and small team’s access to professional-level digital art and media hardware and software for advanced courses and projects.

3. The CEC Usability Lab (Snell 130B) provides a dedicated space for conducting software, documentation and Web-site usability research. The Usability Lab includes systems for monitoring, recording and analyzing users’ experiences and compiling usability reports for clients.

4. The CEC Writing Center (Snell 139) provides individual tutoring (both face-to-face and online) for students and members of the Clarkson community working to improve personal or academic writing projects in any discipline.

REH Center

SHIPLEY CENTER FOR INNOVATION

Matthew Draper, Executive Director, Gabor Forgacs, Scientific Director

The Shipley Center for Innovation is a University-wide resource dedicated to bringing Clarkson innovations to market, gaining recognition for the technology created by our faculty and students, and creating local jobs for graduating Clarkson students. The Center will serve as an engine for economic development in the North Country by engaging in the creation of new enterprises that capitalize on emerging technologies.

Leading the Shipley Center as its managing director is Matthew Draper, Executive Director and Gabor Forgacs, Scientific Director, bringing together complementary knowledge from both areas into one resource.

The Shipley Center for Innovation is comprised of a business incubator which provides tools needed for the emerging technologies to be commercialized and developed into profitable companies. Workshops are also developed to assist with future technology.
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Pre-Health Professions and Arts & Sciences First Year Advising
Carolyn Zanta, Director
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TITUS, Ryan
WEST, Summar
Wiggins, Arderrick
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WULTSCH, Elisabeth
Instructor of School of Engineering
XU, Guangcan
YENOLI, Susanne
ZROKA, Amy

**ACADEMIC CALENDAR**

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<tr>
<td><strong>Fall Semester Events</strong></td>
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<tr>
<td>Graduate Residential Business Program</td>
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<tr>
<td>Classes Begin</td>
<td>17 Aug M</td>
<td>22 Aug M</td>
<td>21 Aug M</td>
<td>20 Aug M</td>
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<tr>
<td>New Student Check-In</td>
<td>21 Aug F</td>
<td>26 Aug F</td>
<td>25 Aug F</td>
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<tr>
<td>Returning Student Check-In</td>
<td>23 Aug SU</td>
<td>28 Aug SU</td>
<td>27 Aug SU</td>
<td>26 Aug SU</td>
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<tr>
<td>Classes Begin</td>
<td>24 Aug M</td>
<td>29 Aug M</td>
<td>28 Aug M</td>
<td>27 Aug M</td>
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<tr>
<td>Fall Recess Begins*</td>
<td>25 Sep F</td>
<td>7 Oct F</td>
<td>6 Oct F</td>
<td>5 Oct F</td>
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<tr>
<td>Classes Resume</td>
<td>30 Sep W</td>
<td>12 Oct W</td>
<td>11 Oct W</td>
<td>10 Oct W</td>
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<tr>
<td>Parent's/Family Weekend Begins</td>
<td>23 Oct F</td>
<td>28 Oct F</td>
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<tr>
<td>Enrollment For Spring Classes Begin</td>
<td>4 Nov W</td>
<td>9 Nov W</td>
<td>8 Nov W</td>
<td>7 Nov W</td>
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<tr>
<td>Thanksgiving Recess Begins*</td>
<td>24 Nov TU</td>
<td>22 Nov TU</td>
<td>21 Nov TU</td>
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<td>Classes Resume</td>
<td>30 Nov M</td>
<td>28 Nov M</td>
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<tr>
<td>Last Day of Class</td>
<td>4 Dec F</td>
<td>9 Dec F</td>
<td>8 Dec F</td>
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<tr>
<td>Event</td>
<td>Spring 2016</td>
<td>Spring 2017</td>
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<td>Classes Begin</td>
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<td>February Break Begins*</td>
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<td>Classes Resume</td>
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<td>Midterm Grades Due to SAS — Noon</td>
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<td>Graduate Residential Business Program</td>
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<td>Enrollment For Fall Classes Begin</td>
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<td>Last Day of Class</td>
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<td>Reading Days</td>
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<tr>
<td>Final Grades Due to SAS 5 p.m.*</td>
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<tr>
<td>Commencement</td>
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<td><strong>Summer Sessions</strong></td>
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<tr>
<td>Alumni Reunion Dates</td>
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</table>

**Notices:**

- Spring 2019: Graduation Residential Program Classes Begin
- Spring 2019: New Student Check-In
- Spring 2019: Returning Student Check-In
- Spring 2019: Classes Begin
- Spring 2019: February Break Begins
- Spring 2019: Classes Resume
- Spring 2019: Midterm Grades Due to SAS — Noon
- Spring 2019: Graduate Residential Business Program Spring Recess Begins
- Spring 2019: Spring Recess Begins
- Spring 2019: All Classes Resume
- Spring 2019: Enrollment For Fall Classes Begin
- Spring 2019: Last Day of Class
- Spring 2019: Reading Days
- Spring 2019: Exams Begin
- Spring 2019: Exams End
- Spring 2019: Final Grades Due to SAS 5 p.m.
- Spring 2019: Commencement
- Spring 2019: Summer Sessions
- Spring 2019: Alumni Reunion Dates
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Clarkson University is making a special effort to identify a broad spectrum of candidates in both employment and educational programs, including women, minorities, and people with disabilities.

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*For students entering Fall 2014 and earlier.*