Clarkson is a nationally recognized research university with rigorous programs in engineering, arts, sciences, business and health sciences. Clarkson’s 3,000 students learn and live in a close-knit residential environment augmented by award-winning career service and experiential learning initiatives. As one of the smallest ranked research institution, Clarkson makes its size its advantage by readily affording students and faculty the flexibility to span the boundaries of traditional academic areas. As a result, Clarkson is at the forefront of exploring the creation of wealth and bridging the processes of discovery, engineering innovation and enterprise. Founded in 1896, Clarkson's 640-acre wooded campus is located in the foothills of the Adirondack Mountains. Potsdam is the quintessential "college town" with four higher education institutions within a 10-mile radius offering exceptional cultural and recreational venues. 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.

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
Transfer (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
315-268-3856
E-mail ise@clarkson.edu

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

Department of Physical Therapy
315-268-3786
E-mail csmith@clarkson.edu
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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 precollegiate, 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 allows 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 30 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:

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

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

• Among the nation’s most environmentally responsible colleges, *Princeton Review’s Guide to 322 Green Colleges 2013.*

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

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

• One of the best undergraduate engineering programs in the country, *U.S. News & World Report, America’s Best Colleges 2014.*

• #34 on the Great Schools, Great Prices, list of 50 national universities ranked according to their quality to price ratio, *U.S. News & World Report, America’s Best Colleges 2013.*

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

• Among the top 15 entrepreneurship undergraduate programs in the nation, *Entrepreneur magazine* and *The Princeton Review 2014.*

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


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

• Clarkson University is one of only 150 of 3,500 colleges worth the investment, *Former Secretary of Education William Bennett.*

• Digital Arts & Sciences major at Clarkson has been named the most innovative program in North America, *International Digital Media and Arts Association (iDMAa) 2010.*

• Top 50 Undergraduate Game Design Programs, *The Princeton Review 2010.*
• 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.

• School of Business supply chain management program ranks in the top 20 nationally, U.S. News & World Report, America's Best Colleges 2013.

• ROTC service ranked #2 in the nation, Washington Monthly 2013.

• U.S. News & World Report, America’s Best Graduate Schools 2014, ranks Clarkson programs:
  34th in environmental engineering
  56th in civil engineering
  60th in chemical engineering

• Ranks #31 for faculty receiving significant research awards in the national universities category, Washington Monthly 2013.

• A top-ranked military friendly school, Victory Media 2014.

• Clarkson is one of only 330 of the country's best and most interesting colleges and universities featured in the 2011 Edition of the Fiske Guide to Colleges.

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 Division of Research, and the Clarkson School, a distinctive program through which accelerated high-school students begin college studies.

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 Engineering and Environmental Health Sciences, attending seminars or getting involved in research activities. 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 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.

The Center for Health Sciences at Clarkson houses both Clarkson’s DPT program in physical therapy and Physician Assistant Studies department.

Clarkson’s physical facilities are valued at $269.4 million. They comprise approximately 1,321,083 square feet of assignable space, of which almost 90 percent has been built since 1970. More than 329,366 sq. ft. are dedicated exclusively to academic programs, including 49,330 sq. ft. in traditional classrooms and 162,334 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, 73.8 percent of freshmen completed their studies for a bachelor’s degree within six years; 71.5 percent in five years; and 58.0 percent in four years or less. *Among transfer students, 46.0 percent complete their bachelor’s degrees in two years and 84.5 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 71.6 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, woodwork 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 Cheel 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 shrunk 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 physical therapy, and Physician Assistant Studies, as well as some research facilities related to the Center for Rehabilitation Engineering, Science and Technology.

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**
- American Studies
- 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**
- Environmental Health Science
- Environmental Science & Policy
- Liberal Arts & Business Double Major (Areté)
- 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.

**Arts & Sciences**
- American Studies
- Anthropology
- Biology
- Biology, Behavior & Society
- Biophysics
- Chemistry
- Cognitive Neuroscience
- Communication
- Computational Science
- Computer Science
- Gender & Sexuality Studies
- History
- Humanities
- International and Cross-Cultural Perspectives
- Literature and Arts
- Mathematics
- Physics
- Political Science
- Psychology
- Science, Technology and Society
- Social Sciences
- Software Engineering
- Statistics
- War Studies

**Business**
- Business
- Economics
- Human Resources Management
- Law Studies
- Quality-based Project Management

**Engineering**
- Electrical Engineering
- Engineering Science
- Environmental Engineering
- Software Engineering
- Sustainable Systems Engineering

**Interdisciplinary**
- Biomedical Engineering
- Biomedical Science and Technology
- Environmental Health Science
- Environmental Policy
- Environmental Science
- Information Technology
- Liberal Arts & Communication Double Major (Social Documentation)
- **ISE**
- Sustainable Solutions for the Developing World

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.
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
Manufacturing Engineering
Materials Engineering
Structural Engineering

Engineering and Management
Global Supply Chain Management

Pre-Health Professions Programs
Students may prepare for further professional study in medical (including 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.

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.
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. 335). For information about specific programs, contact schools through the addresses shown on p. 2 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:

Business

Master of Business Administration
Master of Science in Engineering and Global Operations Management
Master of Science in Engineering Management

Engineering

Master of Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Mechanical Engineering

Master of Science
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Engineering Science
- Mechanical Engineering

Doctor of Philosophy
- Chemical Engineering
- Civil and Environmental Engineering
- Electrical and Computer Engineering
- Engineering Science
- Mechanical Engineering
- Materials Science and Engineering

Science

Master of Science
- Basic Science
- Chemistry
- Mathematics
- Physics

Master of Science in Physician Assistant Studies

Doctor of Philosophy
- Bioscience & Biotechnology
Chemistry
Computer Science
Mathematics
Physics
Doctor of Physical Therapy

Interdisciplinary
Master of Science
Computer Science
Engineering and Global Operations Management
Engineering Management
Environmental Politics & Governance
Environmental Science and Engineering
Information Technology

Doctor of Philosophy
Environmental Science and Engineering
Materials Science and Engineering

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 is accredited by both ABET and AACSB. The graduate physical therapy professional curriculum 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 Provisional Accreditation to the Physician Assistant Studies Program. 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 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.
PRE-LAW
Katherine Hannan Wears, 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 and have SAT scores of at least 1950 or demonstrate outstanding academic or leadership achievements. The Clarkson University Honors Program admits 30 new students per year.

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; small sections of just 10 to 20 students in Honors classes; special project and research opportunities through all four years; and interaction with students from a variety of academic areas.

Students must maintain a grade-point average of 3.25. Students may enter as incoming first-year students or during their first year.

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 program for entering 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.
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. Students 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.
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)
- Contemporary and Global Issues (CGI)
- Imaginative Arts (IA)
- Science, Technology, and Society (STS)
- Economics and Organizations (EC)
- 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: A, B+, B, C+, C, D+, D, F (4, 3.5, 3, 2.5, 2, 1.5, 1, 0 quality points). Therefore, a student who passes a 3-hour course with an A will earn 3 x 4 or 12 quality points; a B, 3 x 3 or 9 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, 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 D+, 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 1.0 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.
UNIVERSITY OUTREACH AND STUDENT AFFAIRS

ABOUT THE DIVISION OF UNIVERSITY OUTREACH AND 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 Vice President works closely with student leaders, student groups, and individual students to assess student needs and develop programs and services to meet those needs. The Student Affairs professionals 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 University Outreach and 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

- University Outreach and 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 creation and delivery of developmental opportunities in a collaborative and respectful campus community.
- We enhance faculty/staff 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.

**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**

Orientation is a formal introduction to life at Clarkson. During this period, newcomers meet housemates, classmates, advisors, and other members of the campus community. Students may choose to become involved in a pre-Orientation trip as a way of being introduced to Clarkson life before the comprehensive Orientation Program begins. 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. To assist new students, every first-year residence hall floor is assigned a resident advisor OR PEER MENTOR. 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 any number of possible routes available. Counseling Services 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.
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, 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 accommodation, 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 help ensure that accommodations will be available in a timely fashion.

The student will meet with the Director of Accommodative Services to review documentation and determine appropriate accommodations. The Office of Accommodative Services will assist the student with faculty notification 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.

First-Year Transition
The Clarkson Union Board, Residence Life staff, and Residence Hall Association take over where the First-Year Seminar ends. Each group plans and coordinates a number of activities and co-curricular programs open to all students. Activities such as a trip to Toronto to see Miss Saigon and Phantom of the Opera or opportunities to attend professional sporting events in Ottawa, Montreal, or Buffalo might be 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. Peer mentors 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.

Wellness Outreach
The Wellness staff is dedicated to helping discover the maximum potential they possess and are capable of maintaining through Experiential Learning Theories by using a positive approach to enhance learning by helping to reduce health-related barriers to academic success. The Wellness staff conducts activities that encourage thinking and stepping out of the box and relating these emotional states to the tasks and environment the individuals interact with. The overall outcome is to use active participation in these activities to help individuals develop a sense of awareness during decision making to encourage a happier, healthier existence.

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.

**Cheel Campus Center**

The Cheel Campus Center is the focal point of activities on the Hill campus. The facility combines the programs offered by a comprehensive student center and a 3,000-seat multipurpose arena. Students use the Center on a daily basis to pick up their mail, grab a meal at the Main Street Cafe, shoot a game of pool, attend a meeting or a movie, listen to a comedy performance, visit an art show, or simply to hang out in one of the lounges. Club ‘99 is a coffeehouse/pub located on the first floor of the Cheel Center.
The Cheel Arena within the Center, home of men’s and women’s Golden Knights Hockey, is also the place to attend an orientation picnic, an opening convocation, a concert, or to part in an intramural broomball or hockey game. The spacious, versatile facility offers many opportunities for large-scale gatherings, no matter what time of year.

**Academic Advising**

By tradition and practice all members of the Clarkson faculty and administration are available to consult with students. In addition, every student is assigned a faculty or professional staff advisor. This advisor provides students with a direct contact for advising on academic matters and professional planning.

First-Year Advising is another place for students to get assistance. It is not unusual for students to experience many changes in their first year on campus, and we provide resources to help them. Advising is an important function of Clarkson's faculty and staff. Although all students have a faculty or professional staff advisor, 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 their career direction.

Clarkson's First-Year Advising helps students identify campus resources so they can take advantage of the opportunities available at the university. For example, they can help students connect with people to answer questions about counseling, special learning needs, tutoring, majors and academic options, residence life, and more.

Many times the first person contacted about academic problems is the instructor of the course. Faculty members are readily accessible before and after class and maintain posted office hours for conferences. Each year special recognition is given to those faculty members judged by the students to be the most effective advisors.

**Student Administrative Services (SAS)**

Student Administrative Services (SAS) provides Clarkson undergraduates and graduate students with a single location for information regarding transcripts, course scheduling, and academic procedures, costs and billing, and financial assistance through scholarships, grants, and loans.

To make these critical administrative services more accessible and convenient, Clarkson has combined the traditional functions of the offices of the Registrar, Bursar, and Financial Aid into its SAS. To further streamline the flow of information, SAS is staffed by service representatives who are able to provide and explain data in both the academic and financial areas. For more information, call 315-268-6451.

**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
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 www.clarkson.edu/activitiescalendar 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.

Student Center
The Student Center is the focal point of activities at Clarkson. The Residence Halls can be seen as the student's bedroom and many consider the Student Center their living room. Students use the Center on a daily basis to pick up their mail, grab a meal in the dining hall, shoot a game of pool, attend a meeting or a movie, listen to a comedy performance, play a video game in the virtual game room, or simply to hang out in one of the lounges. The building houses a coffeehouse/pub/game room, graduate student lounge, Multicultural/International room, and meditation room all located on the first floor. All three floors are connected to the breathtaking forum which houses a gigantic media wall. The Center also contains the office of the student newspaper (the Integrator), the Student Senate office, the Office of Student Organizations/Student Center, the radio station, the TV station, and the Clarkson Union Board.
Clarkson Union Board
The Clarkson Union Board (CUB) is one of the programming organizations for the students, faculty, alumni and guests of the University. Through its operating committees and staff, CUB provides a cultural, social and recreational program that complements 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 dances, concerts and a major annual concert titled Spring Fest.

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 Involvement and Service
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 monthly volunteer opportunities on campus and information about local organizations that are seeking volunteers in Potsdam, see volunteering.

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 and Rotary, whose members become involved in numerous community service projects.

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 three 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. Housing exemption requests to live at chapter houses are considered by the Office of Student Organizations in conjunction with the Housing Office and are made according to housing policies. Costs of joining social fraternities and sororities vary. Questions may be directed to the Associate Dean of Students for Student Center & Organizations 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), Sigma Tau Iota is a local honor society available to Engineering and Management students, Tri-Beta (biology), Sigma Nu Tau Entrepreneurship Honor Society.

IFC/Pan-Hellenic Activities
The councils’ activities include several annual events such as Greek Week, Ice Carnival and the Annual Spring Survival Challenge. The fraternity and sorority community also sponsors its own intramural programs as well as numerous community-service events.

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, and to maintain a Judicial Board that hears cases related to misconduct on the part of fraternities or sororities.

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 Clarkson Union Board and the Residence Hall Association. 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; 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; and Society of Women Engineers; Society of Human Resource Management.

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 Potsdam and an active Muslim Student Association. There are Seventh Day Adventist and Unitarian Universalist churches in nearby 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. Many students participate in religious life by singing in the choirs or teaching Sunday school. There are occasional meditation, yoga, and Buddhist groups that are open to students. For more information please see http://www.clarkson.edu/activities/spiritualresources.html.

Special Interest Clubs
Among the campus organizations for students with special interests are: Alpha Phi Omega, American Chemical Society, American Society of Civil Engineers, Anime Club, Arnold Air Society, Association for Creative Thought, Badminton Club, Bahath Orphans Fund, Ballroom Dance Club, Bowling Club, CU Doctors Without Borders, CUB, Campus Scouts, Clarkson Archery Club, Clarkson Belly Dance Club, Clarkson Community Orchestra, Clarkson CrossFit, Clarkson Cycling, Clarkson Football Club, Clarkson Goldies Dance Team, Clarkson Guard, Clarkson Jazz Ensemble, Clarkson Mini Baja, Clarkson Soccer Club, Clarkson Sports Car Club, Clarkson Strategic Investment Group, Clarkson Theatre Club, Clarkson Ultimate Frisbee Club, Clarkson University Broomball Club, Clarkson University Crew Club, Clarkson University Dance Ensemble, Clarkson University Figure Skating Club, Clarkson University History Club, Clarkson University Laser Tag, Clarkson University Outing Club, Clarkson University Pep Band, Clarkson University Rocketry Club, Clarkson University Ski and Snowboard Club, Clarkson University Student Chapter of the ACM, Clarkson University Tea Association, Clarkson Women in Business (CWiB), Clarkson Women’s Rugby, Colleges Against Cancer, D’Amuge Fund, Drill Team Club, Electric Snowmobile Team, Engineering & Management Society, Engineers Without Border-USA Clarkson University Student Chapter, Environmental Conservation Organization (ECO), Flying Club, Formula SAE, Gaming Club, Gay Straight Alliance, Golden Knotes, HvZ (Humans versus Zombies), IDEA, InterVarsity Christian Fellowship, International Student Organization, Iranian Student Association of Clarkson University, Knight’s K.O. Club, Leadership Corps, Longboarding Club, Martial Arts Club, Math Club, Men’s Club Ice Hockey, NYWEA, National Society of Black Engineers, Neon Nights, Newman Club, Organized Chaos, Philosophy Club, Photo Club, Physics Club, Pi Tau Sigma, Ping Pong Club, Racquetball Club, SCUBA Club, Sci-Fi Club, Silver Wings Organization, Society of Asian Scientists and Engineers, Society of Women Engineers, Sustainable Remediation Forum, Sustainable Synergy, Tau Beta Pi Engineering Honor Society, Tennis Club, The Clarkson Integrator, WCKN Television, WTSC - The Source, Water Ski Club, Women’s Club Hockey.
STUDENT DEVELOPMENT SERVICES

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 several 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 center on the second floor of Price Hall. Students with special concerns or problems with alcohol or drug abuse should also contact the Counseling Center at the same location.

Health Center
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 the Health Center and many of its services are free of charge. The Health
Center 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.

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 who 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 including networking and utilization of the Internet. 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. Clarkson’s annual study reveals that in 2010 over 95 percent of respondents, all recent graduates, find professional employment in their field or enter full-time graduate study or military service within six to 12 months of graduation. Employment statistics for recent classes are available upon request from the Center.

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

**Cooperative Education (Co-op) Program**

The Cooperative Education office 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 themselves 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 are 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/exp_ed/coop_requirements/index.html](http://www.clarkson.edu/career/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/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/study_exchange/colleges_universities.html or call the Career Center at 315-268-6477.

**Exchange Partners by Country**

<table>
<thead>
<tr>
<th>Country</th>
<th>University</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Griffith University</td>
<td>Gold Coast</td>
</tr>
<tr>
<td></td>
<td>Monash University</td>
<td>Melbourne</td>
</tr>
<tr>
<td></td>
<td>RMIT University</td>
<td>Melbourne</td>
</tr>
<tr>
<td></td>
<td>University of Newcastle</td>
<td>Newcastle</td>
</tr>
<tr>
<td></td>
<td>University of Technology, Sydney</td>
<td>Sydney</td>
</tr>
<tr>
<td>Austria</td>
<td>Upper Austria University of Applied Sciences</td>
<td>Steyr &amp; Wels</td>
</tr>
<tr>
<td>China</td>
<td>ESSCA School of Management</td>
<td>Shanghai</td>
</tr>
<tr>
<td>Denmark</td>
<td>Technical University of Denmark</td>
<td>Lyngby</td>
</tr>
<tr>
<td>England</td>
<td>Bader International Study Centre</td>
<td>East Sussex</td>
</tr>
<tr>
<td></td>
<td>Northumbria University</td>
<td>Newcastle</td>
</tr>
<tr>
<td></td>
<td>University of Bradford</td>
<td>Bradford</td>
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<tr>
<td></td>
<td>University of Brighton</td>
<td>Brighton</td>
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<tr>
<td></td>
<td>University of Leicester</td>
<td>Leicester</td>
</tr>
<tr>
<td>Country</td>
<td>University Name</td>
<td>City</td>
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<tr>
<td>-------------</td>
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</tr>
<tr>
<td>France</td>
<td>BEM/KEDGE</td>
<td>Talence</td>
</tr>
<tr>
<td></td>
<td>Ecole de Management Strasbourg</td>
<td>Strasbourg</td>
</tr>
<tr>
<td></td>
<td>ESSCA School of Management</td>
<td>Angers</td>
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<tr>
<td></td>
<td>Grenoble Ecole de Management</td>
<td>Grenoble</td>
</tr>
<tr>
<td></td>
<td>Reims School of Management</td>
<td>Reims</td>
</tr>
<tr>
<td></td>
<td>Universite Catholique de Lyon</td>
<td>Lyon</td>
</tr>
<tr>
<td></td>
<td>Universite de Technologie de Troyes</td>
<td>Troyes</td>
</tr>
<tr>
<td>Germany</td>
<td>Konstanz University</td>
<td>Konstanz</td>
</tr>
<tr>
<td></td>
<td>Universität Potsdam*</td>
<td>Potsdam</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>City University, Hong Kong</td>
<td>Kowloon</td>
</tr>
<tr>
<td>Hungary</td>
<td>ESSCA School of Management</td>
<td>Budapest</td>
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<tr>
<td>India</td>
<td>Indian Institute of Technology Madras</td>
<td>Chennai</td>
</tr>
<tr>
<td>Ireland</td>
<td>National University of Ireland, Galway</td>
<td>Galway</td>
</tr>
<tr>
<td>Japan</td>
<td>Kyushu Institute of Technology</td>
<td>Fukuoka</td>
</tr>
<tr>
<td>Korea</td>
<td>Sungkyunkwan University</td>
<td>Seoul</td>
</tr>
<tr>
<td>Mexico</td>
<td>Universidad de Monterrey*</td>
<td>Monterrey</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Auckland University of Technology</td>
<td>Auckland</td>
</tr>
<tr>
<td>Scotland</td>
<td>University of Strathclyde Business School</td>
<td>Glasgow</td>
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<tr>
<td>Singapore</td>
<td>National University of Singapore</td>
<td>Singapore</td>
</tr>
<tr>
<td>Spain</td>
<td>Comillas Pontifical University</td>
<td>Madrid</td>
</tr>
<tr>
<td>Sweden</td>
<td>Jönköping University</td>
<td>Jönköping</td>
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<tr>
<td></td>
<td>Luleå University</td>
<td>Luleå</td>
</tr>
<tr>
<td>Wales</td>
<td>University of South Wales</td>
<td>Pontypridd</td>
</tr>
</tbody>
</table>

*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.
INSTITUTIONAL DIVERSITY INITIATIVES

The office of Institutional Diversity Initiatives is focused upon the creation of an academic experience that prepares all students to excel in the 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 Institutional Diversity Initiatives office has a commitment to the recruitment of a diverse campus community and the provision of academic support for all students on campus.

The core goals of the Institutional Diversity Initiatives office are the recruitment and retention of a community of learners that are diverse and inclusive in their approaches to problem solving. The following programs and initiatives facilitate the development of the Clarkson student.

The **Collegiate Science and Technology Entry Program (CSTEP)** is funded by a grant from New York State 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 Black, Hispanic or Native American, or demonstrate 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 unable to attend 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.

**PHYSICAL EDUCATION**
There are a variety of optional physical education courses offered. Physical education at Clarkson concentrates on individual sports and recreational pursuits. The Alumni Gymnasium, Walker Center, and Bagdad Field are available for team and intramural sports. The Andrew M. Schuler Recreation Building, containing a field house and swimming pool, was completed in 1981 and offers opportunities for such individual recreational activities as racquetball, tennis, swimming, and jogging, as well as team sports. The Deneka Family Fitness Center is utilized for weight training and individual development. Outdoor recreation enthusiasts may wish to make use of our Adirondack Lodge located on campus adjacent to our outdoor trails for skiing and walking.

**Recreation and Intramural Athletics**
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 Dodgeball and Racquetball as well as “Fun Runs” both semesters.

The Club Athletics program includes the followings:

- 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 Athletics program includes the following:

<table>
<thead>
<tr>
<th>Canoeing</th>
<th>Hiking</th>
<th>Overnight Camping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kayaking</td>
<td>Mountain Biking</td>
<td>Cross Country Skiing</td>
</tr>
<tr>
<td>Down Hill Skiing</td>
<td>Rock Climbing</td>
<td>Ice Climbing</td>
</tr>
<tr>
<td>White Water Rafting</td>
<td>Aerobic Exercise</td>
<td>Yoga</td>
</tr>
<tr>
<td>Strength &amp; Toning</td>
<td>Kick Boxing</td>
<td>Swimming</td>
</tr>
</tbody>
</table>

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.

Athletes in all our sports have been consistently honored with academic recognition such as:

Verizon All-American, Smith-Corona Academic Team, University Presidential Scholars, and Liberty League All-Academic. We have also had some NCAA Post-Graduate Scholarship recipients.

During 2007-08, our women's volleyball program returned to dominance in New York State with a 23-17 record and hosted the Liberty League Tournament. The men's and women's Nordic and alpine ski teams returned to the national stage where they earned top-10 finishes. Our men's and women's hockey teams were not only successful within ECAC Hockey but they were one of only two schools that had both teams ranked in the top 10 in the nation for a majority of the year. The men's lacrosse team and the baseball team are looking to return to postseason play for the fifth time in as many years.

In the past five years, Clarkson athletic programs have competed in 11 different NCAA Tournaments, highlighted by the volleyball program reaching the NCAA Tournament four consecutive years, including hosting the NCAA New York Regional in both 2011 and 2012. The men's and women's nordic and alpine ski teams have each enjoyed top-five finishes at the USCSA Nationals. The women's hockey team has a pair of NCAA appearances in the past four seasons and has reached as high as number-two in the national polls.

Clarkson is a member of the National Collegiate Athletic Association (NCAA), the Eastern Collegiate Athletic Conference (ECAC), the Liberty League, and the USCSA (United States Collegiate Ski and Snowboard Association)."

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 an 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. Several of the lecture halls are fully networked with access ports for laptops at every seat for student use. Wireless access (WiFi compatible, 802.11b or 802.11g) is now available in group study areas and several lecture halls across campus.
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 make extensive use of the Web for dissemination of instructional material and interactions with students.

Laptop Purchase Program
Students may either bring a PC or buy one through the University. To eliminate the guesswork associated with purchasing a computer, Clarkson students can contact OIT to purchase a laptop preconfigured to meet University curriculum requirements.

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 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 600,000 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 6400 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.
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, PO 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><strong>Engineering, Science, and Engineering and Management Programs</strong></th>
<th><strong>Business and Liberal Arts</strong></th>
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<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>
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</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
Clarkson University is a member of the Common Application. Students may submit the Common Application either online or in paper format. Applicants will also be asked to submit a Supplement Information Form. 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 February of the senior year if all materials have been received.

Deposit
A $300 deposit is requested 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.

EARLY ENTRANCE COLLEGE PROGRAM: THE CLARKSON SCHOOL
Through The Clarkson School, the University offers a unique, specially designed program for talented high school students who have completed eleventh grade or are otherwise accelerated, and are ready to begin college studies. The Clarkson School has been bringing academically advanced students to campus since the fall of 1978. The Clarkson School provides a more supportive and gradual transition to college life than the typical early admission program.

Students who are accepted to The Clarkson School live together on campus, with specially trained house advisors. Commuting day students from St. Lawrence County are accepted in limited numbers. Clarkson School students are fully matriculated as University students and earn approximately 30 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 school staff and faculty mentors, students design their
programs of study to meet their individual needs and interests. The curriculum is academically challenging.

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.

For a detailed description of this program, see the Clarkson School section under the Academic Program Options of the catalog.

**Applying to The Clarkson School**

Application is made via a Clarkson School Application Portfolio. 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; e-mail tcs@clarkson.edu. We encourage interested students to visit our Web site at www.clarkson.edu/tcs for additional information, as well as access to our online application.

**PROJECT CHALLENGE AND THE YOUNG SCHOLARS PROGRAM**

These pre-collegiate programs are designed for high school students and administered by The Clarkson School.

**Project Challenge**

Project Challenge is held during the winter months on five consecutive Saturdays. The program brings area high school students to campus on Saturday mornings to study courses that might not typically be available in a high school. Courses are taught by Clarkson faculty and staff and highlight the various disciplines at Clarkson. Recent courses have included psychology, management, chemistry, biology, health sciences, engineering, computer programming, and humanities.

**Young Scholars**

The Clarkson Young Scholars Program is an innovative, challenging summer program at Clarkson University that attracts some of the brightest, most creative students in New York and the New England states. The week-long, team-based project course is led by three Clarkson professors and includes lectures and laboratory investigations, field trips, and guest speakers. Working together and in small groups, students address a real-world problem by: conducting research, providing recommendations, and making a final presentation to community leaders. Young Scholars is a stimulating program that fosters intellectual development, communications skills, and cooperative problem solving.

**TRANSFER ADMISSION**

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, PO Box 5610, Potsdam, NY 13699-5610 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 Transfer Admission at the address above.
- Submit two Letters of Recommendation, including one from an academic professor/instructor.
- A personal statement (optional essay) 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, PO Box 5610, Potsdam, NY 13699-5610 or visit 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**

Graduate students should see the Graduate School pages of this catalog for application procedures (p. 335)

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, PO Box 5605, Potsdam, NY 13699-5605, 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. Those international students wishing to apply for Master’s (MBA, ME, MS) or Doctorate (PhD) graduate programs should contact the appropriate graduate program director.

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 2013 ranged from $3,000 to $20,000 per year.

Students who accept the offer of admission must submit a $300 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 a composite SAT score of 1950. 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. $7.25 per hour. The number of positions available varies from year to year.

Loans: Clarkson has developed a list of lenders that you may want to consider when making your financing decision. 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.

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, PO Box 5651, Potsdam NY 13699-5651, 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/isse.

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.

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 2013-2014 academic year follows:

**Fixed Charges: 2013-2014**

Tuition

Undergraduate full-time charge (12 to 19 credit hours) $39,700

Credit Hour Rate (11 hours or less) $1,324

Graduate Students: Tuition per credit-hour rate $1,324

Undergraduate student 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.

Room (based on two person in freshman housing) $6,886

Meal Plans $6,112

Fees

Undergraduate Students $840
Clarkson School Students $1,390
Graduate Students $590

Undergraduate Full-Time Direct Costs $55,538
Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $3,976 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 student. The funds are nonrefundable and are applied toward operating 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 2013-2014 is $1375 for coverage from 8/1/13 – 7/31/14.

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 attorney’s 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
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:

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

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.

All refunds will be made directly to lenders, or directly to the Title IV allocation accounts for federal loans and grants.

For further information or clarification, call Student Administrative Services at 315-268-6451.

**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 areas are listed below. Credit in most other subjects is awarded when a score of 4 or greater is received. 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>
</tr>
</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>
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</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>
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<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</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Intro. to Computer Science I</td>
</tr>
<tr>
<td>5</td>
<td>CS141/142 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>
<th>Language and Composition</th>
<th>Literature and Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>COMM210 Theory of Rhetoric (c2)</td>
<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>
<th>Calculus AB</th>
<th>Calculus BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4 or 5</td>
<td>MA131 Calculus I</td>
<td>4</td>
<td>MA131 Calculus I</td>
</tr>
<tr>
<td></td>
<td></td>
<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>
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<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>SC131 Intro to Physics I</td>
</tr>
<tr>
<td>5</td>
<td>SC131 Intro to Physics I</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 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 quickest and easiest method to apply is online at www.fafsa.gov. The paper form may be available from high school guidance offices, the Office of Undergraduate Admission, or Student Administrative Services at Clarkson. 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 each type of financial aid is clearly enumerated on the annual Financial Aid Award Notification (FAN) issued to each student who qualifies for assistance.

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 options from the federal government, state, and/or the institution. 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. Stipends vary according to the financial need and academic achievement of the student. 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 and student 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, Extracurricular 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 of the five 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. Students receive Tuition Rewards from multiple "sponsors" (for example, parents and grandparents). A sponsor designates the tuition rewards to students when they begin their senior year of high school. If the students do 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 that 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 tuition grant 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 tuition grant for up to four years (total
$48,000). If students receive multiple tuition-based awards, combined tuition scholarships/grants from all sources cannot exceed full tuition plus fees. 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 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)

**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 that attended Clarkson, you may qualify for a $500 scholarship. Only one scholarship will be granted no matter how many alumni family members you have. Must notify Clarkson of family connection at the by December 1 for Early Decision and February 15 for Regular Decision.

**New York State Tuition Assistance Program (TAP)**
New York State residents may be eligible for awards ranging from $500 to $5,000 annually. No repayment is required. NYS residents must file a FAFSA application and an Express TAP application (ETA) annually to be considered for assistance. Awards are based on multiple factors including family size, number in college and New York State taxable income. Students are notified directly by the New York Higher Education Authority Corporation (HESC) of their awards. 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>
<tr>
<td>0 3 9 21 33 45 60 75 90 105</td>
</tr>
<tr>
<td>With at least this grade point average:</td>
</tr>
<tr>
<td>0 1.1 1.2 1.3 2.0 2.0 2.0 2.0 2.0 2.0</td>
</tr>
</tbody>
</table>

**State Scholarships**
New York, New Jersey, Pennsylvania, Vermont, and many other states have state-sponsored scholarship programs. It is suggested that students contact their high school guidance offices or state education departments for information on state scholarships.

**State 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 $500 - $800 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 — $40,540 - tuition and fees - 2013-2014
- 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 $450 per semester, a monthly tax free stipend of: Freshman - $250; Sophomore - $300; Junior - $350, and Senior - $400 and the Clarkson ROTC Incentive Scholarship of $13,268 to be used for housing and meal expenses.

Army Reserve Officers’ Training Corps (ROTC) Scholarships
Army ROTC Scholarship winners receive tuition and fee benefit of $40,540 for the 2013-2014 academic year. This amount represents the total tuition and fees for the academic year. Winners will also receive a book allowance of $1,200 per year and a tax-free stipend of $300-$500 per month for 10 months. All Army ROTC Scholarship winners are eligible to receive the

Clarkson ROTC Incentive Scholarship (Army and Air Force)
Eligible ROTC Scholarship recipients may receive the Clarkson ROTC Incentive Scholarship. This scholarship is valued at $13,268 for the 2013-2014 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 or in the community.

ARAMARK (University Food Service)
ARAMARK hires about 200 students each year. Students may inquire at the ARAMARK office when they arrive for classes.

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, PO 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 upper-class students who maintain outstanding averages and meet other specified criteria. Awards are made by the Office of Financial Aid. 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. Amounts are credited to the student’s account.

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
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
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 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
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
Ralph S. Damon Endowed Scholarship Fund
David E. Davies ’77 Endowed Scholarship Fund
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
Richard C. ‘55 and Joy M. Dorf 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. Silcox Endowed Scholarship
J. Ronald Frazer ’45 Endowed Fellowship
Phil Garda ’67 Memorial Endowed Scholarship Fund
FLIR Systems, Inc. Endowed Scholarship Fund
Fred and Betsy Garry Endowed Scholarship Fund
William B. Gero Memorial Scholarship Fund
Christopher W. Gilmore ’88 Memorial Endowed Scholarship
The Ruth and Sandy ’54 Ginsberg Endowed Scholarship Fund
The Joel ’57 and Lynda Goldschein Endowed Scholarship Fund
Frank C. Goodrich Memorial Endowed Scholarship 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
Erwin C. ’48 and Jeanne Hamm Scholarship Fund
Hammam Endowed Scholarship
Terry O. Harden ’76 Memorial Scholarship Fund
Frank M. Hardiman Scholarship Fund
The Lynn P. Harrison, Ill and Tonya P. Harrison Endowed Scholarship Fund
William P. Harrison Endowed Scholarship Fund
Ralph E. ’55 and Solita Hawes Endowed Scholarship Fund
William Randolph Hearst Endowed Scholarship Fund
Ellen Herrick Endowed Scholarship Fund
George O. and Clara E. Hodge Endowed Scholarship Fund
Harry and Florence P. Hull and Katherine Hull Endowed Scholarship Fund
William ’61 and Elaine Hurd Endowed Scholarship Fund
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
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 Fund
Cecile and Herman Lieberman Endowed Scholarship Fund
Barbara Hewett Lowers Endowed Scholarship Fund
The Norman '51 and Pat Maggione Scholarship Fund
Egon Matijevic’ Endowed Chemistry Scholarship Fund
Peter M. Mayo '71 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
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
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
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 Fund
William J. Rowley Endowed Scholarship Fund
Albert L. and Mary S. Sayer Endowed Scholarship Fund
Joseph Scaturro Endowed Scholarship Fund
Fred Schoenhut '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
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
The Thompson Family Endowed Scholarship Fund
Fay ’62 & Nadine Tolman Endowed Scholarship Fund
Toole-O'Donnell Families and MVW Endowed Scholarship Fund
Earle E. Towson ’27 Memorial Endowed Scholarship Fund
Edward F. Tucker Endowed Scholarship Fund
Merton Van Sant/Industrial Development Agency 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
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
Zieger Endowed Scholarship Fund

Sponsored Scholarships
Alcoa Sponsored Scholarship
Alcoa Minority Sponsored Scholarship
Andrew Joseph Jankowiak Sponsored Scholarship
Babcock & Wilcox Company Sponsored Scholarship
Bechtel Diversity Scholarship Fund
Bechtel Engineering Sponsored Scholarship
Central Hudson Gas & Electric Sponsored Scholarship
Comstock Memorial Trust Sponsored Scholarship
Crane Company MBA Scholarship for Supply Chain
Richard C. ’55 and Joy M. Dorf Annual Sponsored Scholarship
Eastman Kodak Focus Sponsored Scholarship
Richard H. Gallagher Memorial Sponsored Scholarship
GE Fund Sponsored Scholarship
Gleason Foundation Sponsored Scholarship
Beecher ’50 and Elinore Greenman Sponsored Scholarship
Edwin E. Hatch Foundation Sponsored Scholarship
William ’61 and Elaine Hurd Sponsored Scholarship
Michael Lewis Jaeger Memorial Sponsored Scholarship
Andrew Joseph Jankowiak Memorial Sponsored Scholarship
Key Bank Scholarship
Kiewit Construction Company Sponsored Scholarship
Lockheed Martin Sponsored Scholarships
Richard H. Miller ’63 Sponsored Scholarship Fund
Edward Misiaszek Sponsored Scholarship
Michael W. Morrison ’89 Memorial Sponsored Scholarship
National Starch & Chemical Company Sponsored Scholarship
NewPage Corporation Sponsored Scholarship
Niagara National Inc. Sponsored Scholarship
North Country Friends Sponsored Scholarship
O’Brien & Gere Sponsored Scholarship
Karen Mazzella Olmstead ’84 Memorial Sponsored Scholarship Fund
Procter & Gamble Global Business Programs Sponsored Scholarship
Proctor & Gamble Minority Sponsored Scholarship
Raytech Technical Sponsored Scholarship
Gerald ’58 and Judith Reinman Sponsored Scholarship
Gerald ’58 and Judith Reinman Sponsored Scholarship II
Gerald ’58 and Judith Reinman Sponsored Scholarship III
The David Scaringe ’01 Memorial Scholarship
Todd Stanley Seafoss ’79 Memorial Sponsored Scholarship
Stantec Consulting Services Incorporated Sponsored Scholarship
Norman Westerman Thurston ’63 Sponsored Scholarship
UTC/Carrier Corporation Women’s Scholarship
Wyeth-Ayerst Sponsored Scholarship
Xerox Corporation Sponsored Scholarship

Share Clarkson Direct Scholarships
Gilbert and Ruth Adams Share Clarkson Direct Scholarship
Bouchard/Mountjoy Share Clarkson Direct Scholarship II
Bayard Delafield Clarkson Share Clarkson Direct Scholarship
Bayard Clarkson Jr. Share Clarkson Direct Scholarship
Virginia Clark Clarkson Share Clarkson Direct Scholarship
John D. Correnti ’69 Share Clarkson Direct Scholarship
Lauren M. (LaPine) ’88 and Michael J. Coleman II Share Clarkson Direct Scholarship
The Sylvia Johnson Dillenback Share Clarkson Direct Scholarship
Sean ’89 and Lori ’89 Donohoe Share Clarkson Direct Scholarship
Joseph and Ruth Ferrer Share Clarkson Direct Scholarship
Everett and Judith Foster Share Clarkson Direct Scholarship
Elbridge W. Fuller ’33 Share Clarkson Direct Scholarship
Joel ’57 and Lynda Goldschein Share Clarkson Direct Scholarship
Goldman Share Clarkson Share Clarkson Direct Scholarship
Elinore and Beecher Greenman ’50 Share Clarkson Direct Scholarship IV
Elinore and Beecher Greenman ’50 Share Clarkson Direct Scholarship V
Elinore and Beecher Greenman ’50 Share Clarkson Direct Scholarship VI
Elinore and Beecher Greenman ’50 Share Clarkson Direct Scholarship VII
Rosemary A. Harrington Share Clarkson Direct Scholarship
W. Jon Harrington Share Clarkson Direct Scholarship
Daniel C. Heintzelman ’79 Share Clarkson Direct Scholarship II
Ellen Herman ’85 Share Clarkson Direct Scholarship
Bryan Hochstein ’87 Share Clarkson Direct Scholarship
M. Hubbard Construction Inc. Share Clarkson Direct Scholarship II
John B. and Susan Johnson Share Clarkson Direct Scholarship II
Rodney D. Johnson ’82 Share Clarkson Direct Scholarship II
Jolyn Foundation Share Clarkson Direct Scholarship II
Matthew J. Maslyn ’77 Share Clarkson Direct Scholarship
McDonald Mascott Share Clarkson Direct Scholarship
The Joseph F. McCarthy ’85 Share Clarkson Direct Scholarship
Lisa A. Napolione ’87 Share Clarkson Direct Scholarship II
The Dr. John Perry Share Clarkson Direct Scholarship
Kathryn A. Premo ’84 Share Clarkson Direct Scholarship II
David D. Reh ’62 Share Clarkson Direct Scholarship V
David D. Reh ’62 Share Clarkson Direct Scholarship VI
David D. Reh ’62 Share Clarkson Direct Scholarship VII
David D. Reh ’62 Share Clarkson Direct Scholarship VIII
The Share Clarkson Direct Scholarship in Honor of Katherine H. Wears established by Richard R. ’69 and Connie Griffith
John ’60 and Verna Sherrick Share Clarkson Direct Scholarship II
William D. ’54 and Shirley Smith Share Clarkson Direct Scholarship
Structural Associates Share Clarkson Direct Scholarship
Ron Terry ’72 Memorial Share Clarkson Direct Scholarship III
Ron Terry ’72 Memorial Share Clarkson Direct Scholarship IV
John A. ’56 and Bunny Thompson Share Clarkson Direct Scholarship III
Alissa, Donna and Steve Tritman ’68 Share Clarkson Direct Scholarship
Susan J. and Ellsworth F. Vines ’65 Share Clarkson Direct Scholarship II
Rita Fadale Wagner Share Clarkson Direct Scholarship
Rita Fadale Wagner Share Clarkson Direct Scholarship II
Nelson ’79 and Barbara Wetmore ’79 Share Clarkson Direct Scholarship
Wolfley Family Share Clarkson Direct Scholarship III
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 all of the 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
Demeree-Toohey Scholarship Incentive Loan Fund
Charles A. Frueauff Scholarship Incentive Loan Fund
Ada Howe Kent Foundation Scholarship Incentive Loan Fund
John H. Koerner, Jr., Loan Fund
Robert and Jane LaHair Scholarship Incentive Loan Fund
Lambda Phi Epsilon Student Loan 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 the Office of Student Affairs 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 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, 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, Physics, Physical Therapy and Physician Assistant Studies. Faculty and students also participate in the interdisciplinary Environmental Science and Engineering 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>
<th>Interdisciplinary Liberal Studies (pg. 136)</th>
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<tbody>
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<td>Interdisciplinary Social Sciences (pg. 136)</td>
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<td>Applied Mathematics &amp; Statistics (pg. 99)</td>
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<tr>
<td>Areté Double Major (pg. 292)</td>
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<tr>
<td>Biology (pg. 102)</td>
<td>Political Science (pg. 154)</td>
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<td>Biomolecular Science (pg. 108)</td>
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<tr>
<td>Computer Science (pg. 121)</td>
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<td>History (pg. 131)</td>
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<td>Humanities (pg. 131)</td>
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### Undergraduate Minors

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<td>American Studies</td>
<td>International &amp; Cross-Cultural Perspectives</td>
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<td>Anthropology</td>
<td>Literature &amp; the Arts</td>
</tr>
<tr>
<td>Biology</td>
<td>Mathematics</td>
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<tr>
<td>Biology, Behavior, and Society</td>
<td>Physics</td>
</tr>
<tr>
<td>Biophysics</td>
<td>Political Science</td>
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<tr>
<td>Chemistry</td>
<td>Psychology</td>
</tr>
<tr>
<td>Cognitive Neuroscience</td>
<td>Science, Technology &amp; Society</td>
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<tr>
<td>Communication</td>
<td>Social Sciences</td>
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<tr>
<td>Computational Science</td>
<td>Sociology</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>Gender &amp; Sexuality Studies</td>
<td>Statistics</td>
</tr>
<tr>
<td>History</td>
<td>War Studies</td>
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<tr>
<td>Humanities</td>
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<tr>
<td>Information Technology</td>
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### Graduate Programs

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<td>Materials Science &amp; Engineering</td>
</tr>
<tr>
<td>Bioscience &amp; Biotechnology</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Physical Therapy</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Physician Assistant Studies</td>
</tr>
<tr>
<td>Environmental Science &amp; Engineering</td>
<td>Physics</td>
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<tr>
<td>Information Technology</td>
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</table>
**Pre-Professional Programs**

**Pre-Physical Therapy and Physical Therapy**
Clarkson offers an undergraduate Pre-PT concentration and a graduate degree program in Physical Therapy. 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 new and 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.)

Areté: Business and Liberal Arts Double Major
This unique interdisciplinary option allows students to combine the study of the liberal arts with business. Areté is designed to unite the broadening perspectives of the liberal arts with a solid grounding in business principles. The program emphasizes ethics and social responsibility, an appreciation of international perspectives, problem solving and critical thinking, oral and written communication, and individual values and goals clarification.

Upon graduation, Areté students receive a B.S. degree with a double major combining one of the business majors with one of the liberal arts disciplines. With the assistance of two advisors (one in the School of Business, one in Liberal Arts), students can match their personal interests and strengths to courses that promote individual development and cultivate business expertise. (For further information, see the Areté 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 offers master’s and doctoral degrees in biology, chemistry, computer science, Information technology, mathematics, and physics, Professional programs leading to a Masters of Physician Assistant Studies or a Doctor of Physical Therapy are also offered. See also Research and Academic Centers.

Faculty
Biology
Professors Thomas Lufkin – Bayard and Virginia Clarkson Endowed Chair of Biology, Michael R. Twiss, Craig Woodworth; Associate Professors Tom A. Langen, James Schulte, Kenneth Wallace; Assistant Professors Cintia Hongay, Damien Samways, Illona Gillette-Ferguson; Instructor Patricia Burdick

Chemistry and Biomolecular Science
Professors Silvana Andreescu, Dan Goia – CAMP Distinguished Professor, Evgeny Katz – Milton Kerker Chair of Colloid Chemistry, Egon Matijevic’ – Distinguished University Professor and Victor K. LaMer Chair, Sergiy Minko – Egon Matijevic’ Chair of Chemistry, Richard E. Partch – Senior University Professor, Devon A. Shipp; Associate Professors Phillip A. Christiansen, Artem Melman, James C. Peploski – Director of Freshman Chemistry; Assistant Professors Costel Darie, He Dong, Paul Goulet, Mario Wriedt; Petr Zuman – Distinguished Emeritus Professor; Visiting Assistant Professor, Daniel Andresscu, Galina Melman

Communication & Media
Professors Stephen D. Farina, Johndan Johnson-Eilola; Associate Professors W. Dennis Horn, Bill Karis; Assistant Professors Bang Geul Han, Alex M. Lee, Steven M. Pedersen; Instructor, Dan Dullea

Computer Science
Professors Christopher Lynch, James Lynch; Associate Professors Daqing Hou, Alexis Maciel, Jeanna Neefe Matthews, Christino Tamon; Assistant Professor Yaoqing Liu; Instructor Janice Searleman
Humanities and Social Sciences
Professors Daniel Bradburd, Owen E. Brady, Joseph Duemer, Bill Vitek, Sheila F. Weiss; Associate Professors Ellen C. Caldwell, Laura E. Ettinger, Jerry W. Gravander, Sarah C. Melville, Christopher C. Robinson, Annegret Staiger; Assistant Professors Jennifer Ball, Stephen Bird, Stephen Casper, Michael Garcia, Brian Hauser, Lou Ann Lange, S.N. Nyeck, JoAnn Rogers, Christina Xydias; Instructor Frances W. Bailey; Visiting Assistant Professor Lisa Propst; Professor Emeritus David M. Craig, Lewis P. Hinchman, John N. Serio, Jan Wojcik

Mathematics
Professors Daniel ben-Avraham, Erik Boltt, Scott Fulton, Brian Helenbrook, Christopher Lynch, Peter Turner; Associate Professors Kelly Black, Kathleen Fowler, Sumona Mondal, Joseph Skufca; Assistant Professors Matthew Beauregard, Adom Giffin, Rana Parshad, Guohui Song, Jie Sun, Guangming Yao; Instructor Michael Felland, Christopher Martin, Sara Morrison; Professor Emeritus A. George Davis, M. Lawrence Glasser, Abdul Jerri, David Powers

Physical Therapy
Associate Professors George Fulk, Scott Minor, Leslie Russek; Clinical Associate Professor Stacey Zeigler; Clinical Assistant Professors Vicki LaFay, Rebecca Martin, Jay K. Rigsbee; Clinical Instructor Christopher Towler; Professor Emeritus Samuel B. Feitelberg

Physician Assistant Studies
Clinical Associate Professor and Chair Michael Whitehead; Clinical Assistant Professors Jeremy Welsh, Dawn White, Keith Young; Assistant Professor Mario Ciani, Wilton Remigio; Adjunct Clinical Instructor Laura Goshko, Ryan Titus; Medical Director Robert Rogers

Physics
Professors Daniel ben-Avraham, Erik Boltt - W Jon Harrington Professor, Vladimir Privman – Robert A. Plane Chair, Dipankar Roy, Lawrence Schulman; Associate Professor Ming-Cheng Cheng; Assistant Professors Maria Gracheva, Michael Ramsdell – Director of First-Year Physics Program Jan Scrimgeour, Joshua Thomas; Visiting Assistant Professor Dmitriy Melnikov; Professor Emeritus M. Lawrence Glasser; Gabor Forgacs, Distinguished University Professor; Vyacheslav Gorshkov, Research Professor

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

B.S. in American Studies
Program Chair: Bill Vitek

Program Goals
Clarkson’s American Studies major provides students with a historically grounded, multidisciplinary and multicultural approach to the American experience. Through coursework and research in literature, history, politics, anthropology, sociology, philosophy and media, program majors will be introduced to the rhetoric and reality of such American ideals as individual freedom, social equality and material opportunity. The American studies major aims to give students the tools to understand and address many of the pressing issues facing American society in a global, highly interconnected world.

Students majoring in American Studies will:

- acquire a broadly based understanding of American society and culture built upon a foundation of history, politics and literature.
- gain an understanding of how to identify a research problem, how to choose the appropriate methodology to investigate the problem, and how to analyze and interpret the data necessary to report on this problem.
- acquire knowledge that places American society and culture in a global context or an international perspective.

Through their American 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

Requirements *
120 credit hours that satisfy the requirements of the Clarkson Common Experience and also include

- 1 credit Introduction to the Liberal Arts pre-seminar
- the Humanities/Social Sciences Research Seminar
- 30 credit hours in American Studies including:
  - the American Studies Online, a one-credit module
  - the American Studies Foundation comprising at least three of the following five courses:
American Lit I; American History I; American Politics; American Lit II or American History II
- a concentration of seven courses organized either by discipline or by a theme, an issue, a problem or a period.
- two courses providing an international or non-United States perspective OR a study abroad experience.

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

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

### American Studies Sample Curriculum

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<tr>
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<td>Math Course (MA180 recommended)</td>
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<td></td>
<td>Science Course</td>
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<td>American Studies Foundation Course</td>
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<td>Science Course</td>
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## SOPHOMORE YEAR

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16
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B.S. in Applied Mathematics & Statistics
Program Chair: Christopher A. Lynch

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.

REQUIREMENTS

<table>
<thead>
<tr>
<th>Areas of Study</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Mathematics and Statistics*</td>
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<td>Computer Science (CS141)</td>
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<td>Physics (PH131 and PH132)</td>
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<td>Science (BY, CM, or PH)</td>
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<tr>
<td>Application electives **</td>
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Applied Mathematics & Statistics Sample Curriculum

**FIRST YEAR**

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<th>Course</th>
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<tr>
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<td>CS141</td>
<td>Comp Sci I</td>
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<td>MA200</td>
<td>Math Modeling &amp; Software</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
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<td>Knowledge Area Course</td>
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<td>(CS142 rec.)</td>
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**Total** 120

* Required courses are MA131, MA132, MA200, MA211, MA231, MA232, MA339, MA363, MA377, MA499, and STAT383; three of MA331, MA332, STAT381, STAT382, STAT384; and either MA451 or MA453 and MA431.

** Application electives are chosen from an approved list in fields such as biology, chemistry, economics, engineering, and physics; check with the mathematics department for details.

*** 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.
<table>
<thead>
<tr>
<th>SOPHOMORE YEAR</th>
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<tbody>
<tr>
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<td>MA232</td>
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<td><strong>Course</strong></td>
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<td>MA377</td>
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<td>Application Elective</td>
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<td><strong>Course</strong></td>
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<td>Free Electives</td>
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<tr>
<td><strong>Total</strong></td>
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**Mathematics Courses**
Mathematics courses are listed under the Mathematics major.
B.S. in Biology
Program Chair: Craig Woodworth

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 through 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 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.

### REQUIREMENTS

<table>
<thead>
<tr>
<th>Areas of Study</th>
<th>Credit Hours</th>
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<td>Chemistry</td>
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## Biology Sample Curriculum

### FIRST YEAR

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<td>BY160</td>
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<td>BY142</td>
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<td>BY162</td>
<td>Biology II Lab</td>
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<td>Structure &amp; Bonding</td>
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<td>Equilibrium &amp; Dynamics</td>
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<td>BY222 Ecology)</td>
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<td>BY352</td>
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<td>CM241</td>
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</tbody>
</table>

**Core Biology Courses (24 credits)**

These courses are required for all biology majors:

- BY140 Biology I: Inheritance, Evolution and Diversity (3 cr.)
- BY142 Biology I Laboratory (2 cr.)
- BY160 Biology II: Cell and Molecular Biology (3 cr.)
- BY162 Biology II Laboratory (2 cr.)
- BY214 Genetics (3 cr.)
- BY422 Undergraduate Seminar (1 cr.)

Students must take two of the following lecture-laboratory courses:

- BY222 General Ecology and BY224 General Ecology Laboratory (5 cr.)
- BY320 Microbiology and BY322 Microbiology Laboratory (5 cr.)
- BY350 Comparative Anatomy and BY352 Comparative Anatomy Laboratory (5 cr.)
- BY360 Physiology and BY362 Physiology Laboratory (5 cr.)
- BY471 Human Anatomy & Physiology I and BY473 Laboratory (5 cr.)
- BY472 Human Anatomy & Physiology II and BY474 Laboratory (5 cr.)

**Professional Experience requirements (1-3 credits):**
One of the following courses; BY405, BY410, BY495, BY498, or BY499

**Core Chemistry Courses** (17-19 credits)
These courses are required for all Biology majors:
CM103/105  Structure and Bonding/Lab (3/2 cr.) or CM131 General Chemistry I (4 cr.)
CM104/106  Equil and Dynamics/Lab (3/2 cr.) or CM132 General Chemistry II (4 cr.)
CM241    Organic Chemistry I (3 cr.)
CM242    Organic Chemistry II (3 cr.)
CM244    Organic Chemistry Lab (3 cr.)

**Core Physics Courses** (8 credits)
These courses are required for all Biology majors:
PH131    Physics I (4 cr.) or PH141 Physics I for Life Sciences (4 cr.)
PH132    Physics II (4 cr.) or PH142 Physics II for Life Sciences (4 cr.)

**Core Mathematics & Computer Science Courses** (9 credits)
Three mathematics or computer science courses numbered 100 or above, to include a statistics course and at least one calculus course.

**Professional Specializations**
**BIOLOGY ELECTIVES:** (18 credits) Students must complete 18 credits of biology electives, examples of which are given below.

<table>
<thead>
<tr>
<th>Health-related biology electives:</th>
<th>Molecular biology-related biology electives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY310    Developmental Biology (3 cr.)</td>
<td>BY312 Advanced Cell Biology (3 cr.)</td>
</tr>
<tr>
<td>BY350    Comparative Anatomy (3 cr.)</td>
<td>BY314 Bioinformatics (4 cr.)</td>
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<tr>
<td>BY352    Comparative Anatomy Lab (2 cr.)</td>
<td>BY412 Molecular Biology Laboratory (4 cr.)</td>
</tr>
<tr>
<td>BY358    Animal Learning &amp; Cognition (3 cr.)</td>
<td>BY420 Evolution (3 cr.)</td>
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<tr>
<td>BY360    Human Physiology (3 cr.)</td>
<td>BY426 Introduction to Biophysics (3 cr.)</td>
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<td>BY362    Human Physiology Lab (2 cr.)</td>
<td>BY450 Biochemistry I (3 cr.)</td>
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<tr>
<td>BY416    Principles of Toxicology and Epidemiology (3 cr.)</td>
<td>BY451 Biochemistry II (3 cr.)</td>
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<tr>
<td>BY444    Medicinal Chemistry (3 cr.)</td>
<td><strong>BY470 Biochemistry and Biotechnology Laboratory (3 cr.)</strong></td>
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<td>BY452    Pharmacology (3 cr.)</td>
<td><strong>General biology electives:</strong></td>
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<td>BY454    Physiological Psychology (3 cr.)</td>
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<td>BY455</td>
<td>Cell and Molecular Biology of Cancer (3 cr.)</td>
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<td>BY458</td>
<td>Cognitive Neuroscience (3 cr.)</td>
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<td>BY460</td>
<td>Neurobiology (3 cr.)</td>
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<td>BY471</td>
<td>Human Anatomy &amp; Physiology I (3 cr.)</td>
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<td>BY474</td>
<td>Human Anatomy &amp; Physiology II Lab (2 cr.)</td>
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<tr>
<td>BY476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<tr>
<td>BY480</td>
<td>Advanced Cell Biology (3 cr.)</td>
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<td>BY313</td>
<td>Biogeochem Earth Systems Science (3 cr.)</td>
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<td>BY302</td>
<td>Introductory Botany (4 cr.)</td>
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<td>BY328</td>
<td>Conservation Biology (3 cr.)</td>
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<tr>
<td>BY340</td>
<td>Behavioral Ecology (3 cr.)</td>
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<td>BY420</td>
<td>Evolution (3 cr.)</td>
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<td>BY425</td>
<td>Biological Systems &amp; Environmental Change (3 cr.)</td>
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<td>BY431</td>
<td>Limnology (4 cr.)</td>
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<td>BY300</td>
<td>Advances in Biology Research (1 cr.)</td>
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<td>BY476</td>
<td>Current Topics in Biology and Medicine (3 cr.)</td>
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<td>BY400</td>
<td>Directed Study in Bioscience (1-4 cr.)</td>
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<td>BY405</td>
<td>Undergraduate Research in Bioscience (1-4 cr.)</td>
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<td>BY410</td>
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<tr>
<td>BY495</td>
<td>Undergraduate Teaching Assistantship in Bioscience (1-3 cr.)</td>
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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 biomolecular 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 (26 credits)**
- BY140/142 Life’s Diversity with Lab
- 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**

**CM347/372 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

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**Biomolecular Science Sample Curriculum**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course</th>
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<td>CM105</td>
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<tr>
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<td>Biology I Lab</td>
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17
## SOPHOMORE YEAR

<table>
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<tr>
<th>Course</th>
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<tr>
<td>CM221</td>
<td>Spectroscopy</td>
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<td>CM242</td>
<td>Organic Chemistry II</td>
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<td>BY214</td>
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## JUNIOR YEAR

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## SENIOR YEAR

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<td>Molecular Biology Lab</td>
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<td>Free Elective</td>
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<td>13</td>
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</table>
B.S. in Chemistry
Program Chair: Phillip Christiansen

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 program leading to the 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 (46 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
CM402 Senior Seminar
CM121 Freshman Seminar
CM221/223 Spectroscopy with Lab

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>
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<tr>
<th>Course</th>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td>CM103</td>
<td>Structure and Bonding¹</td>
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<td>CM104</td>
<td>Equilibrium and Dynamics¹</td>
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<td>CM105</td>
<td>Chemistry Lab I¹</td>
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16
### SOPHOMORE YEAR

<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<tr>
<td>CM221</td>
<td>Spectroscopy</td>
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<tr>
<td>CM223</td>
<td>Spectroscopy Lab</td>
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<td>CM241</td>
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<td>MA232</td>
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### JUNIOR YEAR

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</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<td>CM345</td>
<td>Advanced Laboratory</td>
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<tr>
<td>CM371</td>
<td>Physical Chemistry I</td>
</tr>
<tr>
<td>CM320</td>
<td>Separations and Electrochemistry</td>
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<tr>
<td></td>
<td>Professional Experience</td>
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<tr>
<td></td>
<td>Free Elective</td>
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### SENIOR YEAR

#### (Standard Option)

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</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<tr>
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<td>Free Electives ²</td>
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#### (Thesis Option)

<table>
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<tr>
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<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
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<tr>
<td>CM491</td>
<td>Undergraduate Thesis</td>
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<td>Free Electives ²</td>
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<tr>
<td></td>
<td>12</td>
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</tbody>
</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 take advantage of Clarkson’s technological environment to provide instruction in writing, speaking, graphic design, digital video, digital audio, web design, information architecture, usability testing, public relations, environmental rhetoric, 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 221 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. COMM490 (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:

<table>
<thead>
<tr>
<th>GENERAL REQS: 26 hrs</th>
<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>Mathematics Courses (include. Stat 282)</td>
<td>6-7</td>
<td>COMM210</td>
<td>Theory of Rhetoric for Business, Science and Engineering</td>
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<tr>
<td>Science Courses (include. lab course)</td>
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<td>COMM3xx</td>
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<td>Computer Courses</td>
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<td>COMM341</td>
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<td>Add'l Math, Science, or Computer Course</td>
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COMMUNICATION REQS: 36 hrs.

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<tr>
<td>COMM210</td>
<td>Theory of Rhetoric for Business, Science and Engineering</td>
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<tr>
<td>COMM3xx</td>
<td>From C&amp;M List</td>
<td>3</td>
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<tr>
<td>COMM341</td>
<td>Intro. to Web Design</td>
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</tr>
<tr>
<td>COMM4xx</td>
<td>Communication Internship</td>
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<td>COMM490</td>
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<tr>
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<tr>
<td>FY100, First-Year Seminar</td>
<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
- Environmental Science & Policy
- History
- Information Technology
- Mathematics
- Physical Therapy
- Physics
- Psychology

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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<tbody>
<tr>
<td><strong>Course</strong></td>
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<td>&amp; Society</td>
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### SOPHOMORE YEAR

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<td>External Field</td>
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## JUNIOR YEAR

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<tbody>
<tr>
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<td>MA/SC/Computing Elective</td>
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## SENIOR YEAR

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<tbody>
<tr>
<td><strong>Course</strong></td>
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<td>COMM490</td>
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<td>Electives</td>
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</table>

### Topical Listing of Communication Courses

Not all courses are offered each year or each semester

- COMM210 Theory of Rhetoric for Business, Science and Engineering
- COMM214 Computer Applications and Concepts
- COMM217 Introduction to Public Speaking
- COMM221 2D Digital Design
- COMM310 Mass Media and Society
- COMM312 Public Relations
- COMM313 Professional Communication
- COMM320 Digital Photography
- COMM322 Typography and

- COMM417 Business and Professional Speaking
- COMM420-425 Independent Study
- COMM427 Digital Video Production II
- COMM428 Public Debate and the Environment
- COMM440 PHP/MySQL Interactive Design
- COMM441 JavaScript Interactive Design
- COMM442 Advanced World Wide Web Interface Design
- COMM444 Unix Web System Administration
- COMM470 Internships
- COMM480 Teaching Assistant C&M
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<tr>
<th>Code</th>
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<th>Course Title</th>
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<tr>
<td>COMM327</td>
<td>Digital Video Production I</td>
<td>COMM490</td>
<td>Internships</td>
</tr>
<tr>
<td>COMM221</td>
<td>2D Digital Design</td>
<td>COMM540</td>
<td>PHP/MySQL Interactive Design</td>
</tr>
<tr>
<td>COMM320</td>
<td>Digital Photography</td>
<td>COMM541</td>
<td>JavaScript Interactive Design</td>
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<tr>
<td>COMM330</td>
<td>Science Journalism</td>
<td>COMM542</td>
<td>CGI Programming with Perl</td>
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<tr>
<td>COMM341</td>
<td>Introduction to Web Design</td>
<td>COMM544</td>
<td>Unix Web System Administration</td>
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<td>COMM345</td>
<td>Information Architecture</td>
<td>COMM620-625</td>
<td>Independent Study Administration</td>
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<td>COMM360</td>
<td>Audio Production</td>
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<td>COMM391-395</td>
<td>Special Topics</td>
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<tr>
<td>COMM410</td>
<td>Theory and Philosophy of Communication</td>
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<tr>
<td>COMM412</td>
<td>Organizational Communications and Public Relations Theory</td>
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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 THE 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.
REQUIREMENTS

Computer Science (14 courses, 43 credits)

CS141 Introduction to Computer Science I
CS142 Introduction to Computer Science II
CS241 Computer Organization
CS242 Advanced Programming Concepts
CS341 Programming Languages
CS344 Algorithms and Data Structures
CS345 Automata Theory and Formal Languages
CS350 Software Design and Development
CS444 Operating Systems

Mathematics (5 courses, 15 credits)

MA131 Calculus I
MA132 Calculus II
MA211 Foundations
MA339 Applied Linear Algebra (or MA239 Elementary Linear Algebra)
STAT383 Applied Statistics I (or MA381 Probability)

Science (12 credits, 3 or 4 courses)

A two-course sequence with lab in physics or chemistry

Three advanced CS courses (see CS student handbook)
Two advanced courses in CS or related disciplines (see CS student handbook)
Four additional credits of physics, biology or chemistry

Computer Science Sample Curriculum

FIRST YEAR

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### Computer Science Electives

- CS442 Computational Complexity
- CS443 CS Parallel Programming
- CS445 Compiler Construction
- CS446 Computer Graphics and Geometry
- CS447 Computer Algorithms
- CS449 Computational Learning
- CS451 Artificial Intelligence
- CS452 Computer Graphics
- CS453 Data Center Architecture
- CS455 Computer Networks
- CS456 Cryptography
- CS457 Computer and Network Security
- CS458 Formal Methods for Program Verification
- CS462 Software Development for the Web
- CS463 Wireless Networks
- CS464 Computer Games Development
- CS497 Undergraduate Research
- CS643 Parallel Computation
- CS644 Current Issues in Operating Systems Research
- CS647 Advanced Topics in Algorithms
- CS652 Computer Vision
- CS653 Automated Reasoning
- CS654 Current Issues in Computer Networks Research
CS459 Human-Computer Interaction
CS460 Database Systems
CS461 Virtual Environments: Principles and Applications

CS657 Advanced Topics in Computer Security
CS658 Current Issues in Program Analysis and Verification Research
CS659 Systems Biology
CS661 Symbolic Logic
B.S. in Digital Arts & Sciences
Co-Program Chairs: Bill Karis

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 graphic arts. The program prepares students for career opportunities in a wide range of fields — such as working with movie and video game companies, educational groups (Web-based delivery of exciting educational materials), computational science research (scientific visualization) and graphics for virtual reality applications.

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 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 and traditional 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
- Internet Teaching 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>
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<td>Mathematics and Computer Science (MA, STAT, and CS)</td>
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**Digital Arts & Sciences Sample Curriculum**

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<td>DA120</td>
<td>Elements of Design</td>
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<td>DA140</td>
<td>Intro to Digital Art: Form &amp; Code</td>
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**15**

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
- 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 are required to take at least one course in the history of their host country.
- Do Historical Internships, for example, at local historical museums.

*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:**

- HIST211 Ancient Greece
- HIST220 American History, 1776-1877
- HIST221 American History, 1877-present
- HIST230 Science and Society
- HIST240 War and Society
- HIST241 War Literature I
- HIST250 Twentieth-Century Germany

**300-level courses:**

- HIST320 Medicine and Society in America
- HIST325 Sexuality and Health in American History
- HIST326 Modern Sex: Sexualities and Genders in Modern America
- HIST327 History of Women in America
- HIST328 History of Gender and Sexuality in the transatlantic World
- HIST329 History of the American Family

A list of Humanities and Social Sciences Courses can be found at: https://www.clarkosn.edu/people/softphp

**300-level courses:**

- 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
- HIST360 Voices of the Past
- HIST390-99 Special Topics in History
- HIST390 ST: Reformation Europe
- HIST391 Medieval Survey
- HIST392 ST: Freedom from Fear: Depression and war, 1929-1945
- HIST393 Renaissance Survey
## History Sample Curriculum

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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 Interdisciplinary Humanities, Social Sciences and 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.

Humanities and Social Sciences has two interdisciplinary double majors. Areté combines business and liberal arts in a program that unites the broad education and critical thinking skills of the liberal arts with the practical skills essential for contemporary business success. Social Documentation combines humanities and social sciences with communication and media in a program that emphasizes critical inquiries into societal issues along with the study of recording and documenting theories, techniques and technologies. For more information, see either the Areté or the Social Documentation curriculum

* Courses taken to fulfill requirements for a Humanities/Social Sciences Major cannot be used to fulfill requirements for a Humanities and Social Sciences Minor.
# H&SS Sample Curriculum

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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.

Current as of July 2013, 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 220 Sex and Commerce
- ANTH 225 Global Perspectives on Sexuality
- ANTH 330 Men and Masculinities
- HIST 325 Sexuality and Health in American History
- 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 342 War and Gender: The Modern Period
- SOC 310 Women and Religion
- SOC 330 Health, Wealth, Inequality, and the Environment
- POL 355 Women and Politics

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 type 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**

UNIV190  The Clarkson Seminar

**ANTHROPOLOGY**

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<td>Peoples &amp; Cultures Through Film and Fiction</td>
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<td>POL320</td>
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B.S. in Mathematics  
Program Chair: Christopher A. Lynch

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

<table>
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<tr>
<th>Area of Study</th>
<th>Credit Hours</th>
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<tr>
<td>Mathematics and Statistics*</td>
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<tr>
<td>Computer Science (CS141)</td>
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<td>Physics (PH131 and PH132)</td>
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<td>Free electives**</td>
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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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
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<td>Calculus II</td>
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<td>Physics II</td>
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<td>MA200</td>
<td>Math Modeling &amp; Software</td>
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** 15**

** 16
## SOPHOMORE YEAR

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<tr>
<td>MA211</td>
<td>Foundations</td>
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<td>MA231</td>
<td>Calculus III</td>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
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<td>MA339</td>
<td>Applied Linear Algebra</td>
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<td>Science Elective</td>
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<td>Probability and Statistics</td>
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## JUNIOR YEAR

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<td>MA 322</td>
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<tr>
<td>MA311</td>
<td>Abstract Algebra (or MA313)</td>
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<td>MA451/453</td>
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## SENIOR YEAR

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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.

<table>
<thead>
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<th>Course Code</th>
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<th>Course Code</th>
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<tbody>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>MA431</td>
<td>Mathematics Course Assistance</td>
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<tr>
<td>MA132</td>
<td>Calculus II</td>
<td>MA442</td>
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<td>MA180</td>
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<td>MA447</td>
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<td>MA181</td>
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<td>MA451</td>
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<td>and Software</td>
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<td>Foundations</td>
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<td>Instruction</td>
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<td>MA230</td>
<td>3-D Space and Projective</td>
<td>MA453</td>
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<td>Geometry</td>
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<td>Algebra*</td>
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<td>STAT282</td>
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<td>MA511</td>
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<td>MA514</td>
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<td>MA526</td>
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<td>MA339</td>
<td>Applied Linear Algebra</td>
<td>MA571</td>
<td>Numerical Solution of Differential Equations</td>
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<td>MA345</td>
<td>Automata Theory and Formal Languages</td>
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<td>MA351</td>
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<td>Matrix Theory and Computations</td>
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<td>MA362</td>
<td>Complex Analysis with Applications</td>
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<td>MA368</td>
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<td>MA580</td>
<td>Introduction to Monte Carlo Simulations</td>
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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.

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<td>Total</td>
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\(^{(1)}\)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).

\(^{(2)}\)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.

\(^{(3)}\)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).

\(^{(4)}\)All of these must be in one area outside of Physics; an area need not be a department.

\(^{(5)}\)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)**

**FIRST YEAR**

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**Second Semester**

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**Sample Curricula for the Engineering Physics, Materials Science and Biological Physics concentrations** can be obtained from the Physics Department Office. 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](http://www.clarkson.edu/sas/courses_schedules/index.html).

**UNDERGRADUATE COURSES**

- **PH121** Physics First-Year Seminar
- **PH131** Physics I
- **PH132** Physics II
- **PH141** Physics for Life Sciences I
- **PH142** Physics for Life Sciences II
- **PH143** Physics for Life Sciences III
- **PH211** Mathematical Methods
- **PH221** Theoretical Mechanics I
- **PH231** Fundamentals of Modern Physics
- **PH232** Modern Physics laboratory
- **PH381** Senior Seminar
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<td>SC132</td>
<td>Introduction to Physics II</td>
<td>PH322</td>
<td>Theoretical Mechanics II</td>
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<td>SC133</td>
<td>Collective Behavior in Physical, Biological, and Other Systems</td>
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<td>PH445</td>
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<td>PH542</td>
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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 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 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**

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<td>POL362</td>
<td>Human Rights, Law and Politics</td>
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<td>POL220</td>
<td>American Politics</td>
<td>POL371</td>
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<td>POL250</td>
<td>Politics in Cross-National Perspective</td>
<td>POL380</td>
<td>(PHIL380) The Law and Bioethics</td>
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<td>POL251</td>
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<td>POL470/570</td>
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<td>POL471/571</td>
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**Cognate Philosophy Courses**

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### Sample Curriculum

#### Second Semester

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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

**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  PY460  Neurobiology
PY310  Human Sexuality  PY462  Abnormal Psychology
PY315  Personal Relationships  PY463  Health Psychology
PY317  Psychology of Psychoactive Drugs  PY480  Directed Study in Psych.
PY319  Current Readings in Animal Behavior  PY481  Directed Study in Social Psych.
PY321  Consumer Behavior
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
PY459  Neuroscience and 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.

Sample Curriculum

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<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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<tr>
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<td>Intro. to Psychology</td>
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<td>Mathematics Course</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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<td>PY456</td>
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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.

Goals 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

- become 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

- 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, 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 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

<table>
<thead>
<tr>
<th>Course</th>
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<td>Use of the Computer</td>
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<td>MA211</td>
<td>Foundations</td>
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<td>EE264</td>
<td>Intro. to Digital Design</td>
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<td>ES250</td>
<td>Electrical Science</td>
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<td>EE361</td>
<td>Fundamentals of Software</td>
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<td>Intro. to Programming and</td>
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<td>EE221</td>
<td>Linear Circuits</td>
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<td>or Computer Science I</td>
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<td>EE261</td>
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<td>CS344</td>
<td>Algorithms and Data Structures</td>
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<td>EE407</td>
<td>Computer Networks</td>
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<td>EE360</td>
<td>Microprocessors</td>
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<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
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<td>EE408</td>
<td>Software Design for Visual Env.</td>
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<td>EE462</td>
<td>Software System Architecture</td>
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<td>EE468</td>
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### SENIOR YEAR

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<td>CS444</td>
<td>Operating Systems</td>
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<tr>
<td>EE466</td>
<td>Computer Architecture</td>
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<td>CS458</td>
<td>Formal Methods for</td>
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<td>CS341</td>
<td>Programming Languages</td>
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<td>Program Verification</td>
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<td>Professional Elective</td>
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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]
- BYPY357 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 SA&S499 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]
Minor in Biophysics
A minor in Biophysics is available to students in any degree program. To obtain a minor, the student must complete the following course requirements:

Biology (9 credits)—3 courses beyond the freshman level, including Biochemistry I.
Physics (9 credits)—3 courses beyond the freshman level, including Introduction to Biophysics or an appropriate replacement.
Chemistry (3 credits)—Organic Chemistry I (prerequisite for Biochemistry I).

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 15 credits

Total Chemistry Credits: 23 or 25

Minor in Cognitive Neuroscience
Required Basic Science Courses (29 credits)

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<tr>
<td>PY151</td>
<td>Introduction to Psychology</td>
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<tr>
<td>BY140</td>
<td>Biology I: Inheritance, Evolution and Diversity</td>
<td>3 cr.</td>
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<td>BY142</td>
<td>Biology I Laboratory</td>
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<tr>
<td>BY160</td>
<td>Biology II: Cellular and Molecular Biology</td>
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<td>BY162</td>
<td>Biology II Laboratory</td>
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<td>CM131</td>
<td>General Chemistry I</td>
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<td>CM132</td>
<td>General Chemistry II</td>
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<td>PH141</td>
<td>Physics for Life Sciences I</td>
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</tr>
<tr>
<td>PH142</td>
<td>Physics for Life Sciences II</td>
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Required Cognitive Neuroscience Courses (9 credits)

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<tr>
<td>PY458</td>
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<tr>
<td>PY/PY454</td>
<td>Physiological Psychology</td>
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<tr>
<td>BY/PY460</td>
<td>Neurobiology</td>
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Elective Psychology Courses: 2 courses (6 credits) chosen from the following:

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<td>PY317</td>
<td>Psychology of Psychoactive Drugs</td>
<td>3 cr.</td>
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<tr>
<td>BY/PY358</td>
<td>Animal Learning and Cognition</td>
<td>3 cr.</td>
</tr>
<tr>
<td>PY357</td>
<td>Human Cognitive Evolution</td>
<td></td>
</tr>
<tr>
<td>PY359</td>
<td>Perception</td>
<td>3 cr.</td>
</tr>
<tr>
<td>PY360</td>
<td>Learning and Memory</td>
<td>3 cr.</td>
</tr>
<tr>
<td>PY462</td>
<td>Abnormal Psychology</td>
<td>3 cr.</td>
</tr>
<tr>
<td>PY463</td>
<td>Health Psychology</td>
<td>3 cr.</td>
</tr>
</tbody>
</table>
Elective Biology Courses: 2 courses (6 credits) chosen from the following:
BY360   Physiology (3 cr.)
BY312   Cell Biology (3 cr.)
BY214   Genetics (3 cr.)
BY310   Developmental Biology (3 cr.)
BY350   Comparative Anatomy (3 cr.)
BY471   Anatomy and Physiology I
BY472   Anatomy and Physiology II

1CM103/105 and CM104/106 will also satisfy the Chemistry requirement.
2PH131 and PH132 will also satisfy the Physics requirement.
3Biology 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
COMM220   Writing for New Media
COMM312   Public Relations
COMM313*  Professional Communication
COMM330   Science Writing
COMM428*  Public Debate and the Environment: Reading and Writing Environmentally

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

Design
COMM214   Computer Applications in Media
COMM221  2D Digital Design
COMM320  Photography
COMM322  Typography and Design
COMM327  Digital Video Production I
COMM341  Introduction to Web Design
COMM345  Information Architecture
COMM391  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  Unix Web System Administration

Theory
COMM310  Mass Media and Society
COMM410  Theory and Philosophy of Communication
COMM412  Organizational Communications
COMM426  Gender and Communication
COMM428* Public Debate and the Environment: Reading and Writing Environmentally

*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, or CSE, → (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  General/Applied 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**

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

Current as of July 2013, 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 220 Sex and Commerce
- ANTH 225 Global Perspectives on Sexuality
- ANTH 330 Men and Masculinities
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 Minors 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. American Studies
2. International and Cross-Cultural Perspectives
3. Literature and the Arts
4. Science, Technology and Society
5. 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.

* Courses taken to fulfill requirements for a Humanities/Social Science Minor can not 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:

- MA131 Calculus I
- 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.
Graduate Programs in Arts & Sciences

Master of Science, Doctor of Philosophy

Bioscience and Biotechnology

James Schulte, Director
jschulte@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)
BY520  Microbiology (3 cr)
BY540  Introduction to Biomedical Rehabilitation Engineering and Science (3 cr)
BY554  Physiological Psychology (3 cr)
BY560  Physiology (3 cr)
BY652  Pharmacology (3 cr)
BY655  Cell and Molecular Biology of Cancer (3 cr)
BY660  Neurobiology (3 cr)
ME380  Special Topics: Biomechanics (3 cr)

**Computational Biology & Bioinformatics**
BY514  Bioinformatics (4 cr)
BY659  Systems Biology (3 cr)
CS511  Foundations of Computer Science (3 cr)
ESS05  Design of Experiments and Analysis of Data (3 cr)
MA501  Advanced Engineering Mathematics I (3 cr)
MA502  Advanced Engineering Mathematics II (3 cr)
MA570  Fundamentals of Scientific Computation (F, 3 cr)
MA571  Numerical Solution of Differential Equations (3 cr)
MA580  Introduction to Monte Carlo Simulation (3 cr)
STAT582  Mathematical Statistics (3 cr)
STAT584  Advanced Applied Statistics (3 cr)
Ecology, Evolution, & the Environment
BY525 Biological Systems & Environmental Change (3 cr)
BY531 Limnology (4 cr)
BY620 Evolution (3 cr)
ES533 Human Exposure Analysis (3 cr)
ES534 Air Pollution Control (3 cr)
CE575 Coastal Engineering (3 cr)
CE577 Atmospheric Chemistry (3 cr)
CE579 Water and Wastewater Treatment Processes (3 cr)
CE580 Environmental Chemistry (3 cr)
CE583 Modeling Natural Aquatic Systems (3 cr)
CH509 Receptor Modeling in Environmental Chemistry (S, 3 cr)
IH550 Environmental, Health & Safety Systems Analysis (3 cr)
IH581 Advanced Topics in Environmental & Occupational Health (S, 3 cr)

Biology, Society, and Bioethics
BY567 Current Topics in Biology and Medicine (3cr)
POL571 Environmental Law (3 cr)
POL580 The Law and Bioethics (3 cr)

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 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.
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. 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 microscopes, atomic absorption, infrared, visible and ultraviolet spectrophotometers, nuclear magnetic resonance spectrometers, 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, quantum information, machine learning, networked systems, future internet architecture, software defined networking, automated deduction, software verification, cryptographic protocol analysis, virtual reality, operating systems, network security, and systems biology.

Details of the M.S. in Computer Science are in 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.

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. Doctoral candidates should expect to spend a minimum of two years beyond the Master’s in meeting degree requirements.

Active research interests in the department include: chemical physics, energy storage and conversion, nonlinear phenomena, quantum computing, condensed matter physics, transport properties, effects of disorder, statistical mechanics, phase transitions, scaling, finite size effects, percolation, self-avoiding walks, surface and interface physics, optics, atomic and molecular physics, biophysics, and self-assembly of nanomaterials.
SCHOOL OF BUSINESS

Dayle Smith, Dean; Katherine Hannan Wears, Associate Dean, Boris Jukic, Associate Dean

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 prepare the next generation of leaders through premier business education programs that span disciplinary boundaries and are focused on innovation and global supply chain management. These programs anticipate and respond to the need of our current and potential employers, students, alumni, the global economy and society as a whole. Our learning community creates and disseminates knowledge through high quality academic research and teaching focusing on building and sustaining globally responsible enterprises."

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
Professor Larry Compeau, Augustine A. Lado, Rajesh Sethi; Associate Professors Sandra Fisher, Michael Wasserman; Assistant Professors Na-Eun Cho, William Brown, C. Fred Miao, Floyd Ormsbee, Stephen Sauer, Anju Sethi; Instructors Marc Compeau

Economics and Financial Studies
Professors Clifford Brown, John K. Mullen; Associate Professors, Luciana Echazu, Mark R. Frascatore, Martin Heintzelman, Diego Nocetti, Alasdair Turnbull, Allan Zebedee; Assistant Professors, Bebonchu Atems, Katherine Hannan Wears, Susan Wright; Instructors Gasper Sekelj

Engineering & Management
Professor Amy Zander; Assistant Professor H. Cecilia Martinez, R. John Milne; Instructor, Marshall Issen

Operations and Information Systems
Professors Boris Jukic, Farzad Mahmoodi; Associate Professors Weiling Ke, Santosh Mahapatra, Somendra Pant, Dennis Yu; Assistant Professors, Chester Xiang; Instructors William MacKinnon, 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>First Year — First Semester</th>
<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></td>
<td>EC150</td>
<td>Principles of Microeconomics</td>
<td>3</td>
<td>EC151</td>
<td>Principles of Macroeconomics</td>
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</tr>
<tr>
<td></td>
<td>SB113</td>
<td>Entrepreneurship and Business Innovation I*</td>
<td>3</td>
<td>SB114</td>
<td>Entrepreneurship and Business Innovation II*</td>
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<td>UNIV190</td>
<td>Clarkson Seminar Science Course</td>
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<td>Non-Business Elective to satisfy Clarkson Common Area requirement</td>
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<td>MA180</td>
<td>Intro to College Math or Non-Business Elective **</td>
<td>4/3</td>
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<td>Experience Knowledge</td>
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<td>MA181 Basic Calculus **</td>
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<td>Experience Knowledge</td>
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<td>Non-Business Elective **</td>
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<tr>
<td></td>
<td></td>
<td>Non-Business Elective</td>
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<td></td>
<td></td>
<td>TOTAL</td>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td></td>
<td></td>
<td>Clarkson Seminar Science Course</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Non-Business Elective</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Course</td>
<td>Title</td>
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<td>Course</td>
</tr>
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<td>---------</td>
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</tr>
<tr>
<td>IS211</td>
<td>Introduction to ERP</td>
<td>3</td>
<td>OS286</td>
</tr>
<tr>
<td>AC205</td>
<td>Accounting for Decision Analysis</td>
<td>3</td>
<td>MK320</td>
</tr>
<tr>
<td>LW270</td>
<td>Law and Society I</td>
<td>3</td>
<td>OM331</td>
</tr>
<tr>
<td>PHIL243</td>
<td>Business Ethics (recommended or other non-business elective)</td>
<td>3</td>
<td>EC311</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>STAT282</td>
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<td>TOTAL</td>
</tr>
<tr>
<td>IS237</td>
<td>Intro. to Programming and Application Development Science</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*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 CS141 Introduction to Computer Science (4 credits) in the sophomore year or IS237 Introduction to Programming and Application Development.
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 Name</th>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC451</td>
<td>Industrial &amp; Supply Chain Economics</td>
<td>SB361</td>
<td>Supply Chain Environmental Management</td>
</tr>
<tr>
<td>IS428</td>
<td>Information Systems for Supply Chain Management</td>
<td>SB441</td>
<td>Advanced Topics in Global Supply Chain Management</td>
</tr>
<tr>
<td>MK431</td>
<td>Supply Chain Distribution Channels</td>
<td>OS466</td>
<td>Negotiations &amp; Relationship Management</td>
</tr>
<tr>
<td>OM341</td>
<td>Global Sourcing &amp; Supply Chain Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MK431</td>
<td>Quality Management &amp; Lean Enterprise</td>
<td></td>
<td></td>
</tr>
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</table>

Students choose one professional elective from the following list:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</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>MK437</td>
<td>Retail Marketing</td>
</tr>
<tr>
<td>MK436</td>
<td>Creativity, Innovation &amp; New Product Development</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>
<td>3</td>
<td></td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<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>
<td>TOTAL</td>
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<td>TOTAL</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

### SENIOR YEAR

<table>
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<th>Cr. Hrs.</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS466</td>
<td>Negotiations &amp; Relationship Management</td>
<td>3</td>
<td>SB441 Advanced Topics in Global Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MK431</td>
<td>Supply Chain Distribution Channels</td>
<td>3</td>
<td>EC451 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 Supply Chain Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area Requirement</td>
<td>3</td>
<td>Area Requirement</td>
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</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>15</td>
<td>TOTAL</td>
<td>15</td>
</tr>
</tbody>
</table>
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>
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<tbody>
<tr>
<td>EC370</td>
<td>Economics of Innovation</td>
</tr>
<tr>
<td>SB322</td>
<td>Designing and Leading Innovative Ventures</td>
</tr>
<tr>
<td>MK321</td>
<td>Consumer and Buyer Behavior</td>
</tr>
<tr>
<td>MK332</td>
<td>Marketing Research</td>
</tr>
<tr>
<td>MK436</td>
<td>Creativity, Innovation and New Product Development</td>
</tr>
<tr>
<td>MK437</td>
<td>Commercializing Innovation</td>
</tr>
<tr>
<td>SB437</td>
<td>Innovation and New Products</td>
</tr>
<tr>
<td>SB440</td>
<td>Innovation and Entrepreneurship</td>
</tr>
<tr>
<td>MK431</td>
<td>Supply Chain Distribution Channels</td>
</tr>
<tr>
<td>AC407</td>
<td>Taxation of Business Entities</td>
</tr>
<tr>
<td>OM476</td>
<td>Management of Technology</td>
</tr>
<tr>
<td>OM480</td>
<td>Project Management</td>
</tr>
<tr>
<td>LW471</td>
<td>Law and Society II</td>
</tr>
<tr>
<td>FN455</td>
<td>Venture Capital and Private Equity</td>
</tr>
<tr>
<td>OM476</td>
<td>Management of Technology</td>
</tr>
<tr>
<td>AC407</td>
<td>Taxation of Business Entities</td>
</tr>
<tr>
<td>ES305</td>
<td>Virtual Tools in Engineering Design</td>
</tr>
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Students choose three Professional Electives:
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.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Title</strong></td>
<td><strong>Cr. Hrs.</strong></td>
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<tr>
<td>EC370 Economics of Innovation</td>
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</tr>
<tr>
<td>OS352 Strategic Human Resource Management (or SB322)</td>
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</tr>
<tr>
<td>FN361 Financial Management I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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15
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs</th>
<th>Course Title</th>
<th>Cr. Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK436 Creativity, Innovation and New Product</td>
<td>3</td>
<td>SB437 Commercializing Innovation</td>
<td>3</td>
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<tr>
<td>Development</td>
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<tr>
<td>Professional Elective</td>
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<td>SB440 Innovation and Entrepreneurship Strategy</td>
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<td>Non-Business Elective:</td>
<td>3</td>
<td>OS432 Organizational Policy and Strategy</td>
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<tr>
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<tr>
<td>requirement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Free or Non-Business Elective</td>
<td>3</td>
<td>Non-Business Elective:</td>
<td>3</td>
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<tr>
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</tr>
<tr>
<td>Non-Business Elective</td>
<td>3</td>
<td>Professional Elective</td>
<td>3</td>
</tr>
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</table>

|                  |         |                                                  |         |
| 15               |         |                                                  |         |
|                  |         |                                                  |         |
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 Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB305</td>
<td>Cost Accounting</td>
<td>FN464 Financial Management II</td>
</tr>
<tr>
<td>AC403</td>
<td>Financial Reporting &amp; Analysis I</td>
<td>FN470 Strategic Financial Management</td>
</tr>
<tr>
<td>AC404</td>
<td>Financial Reporting &amp; Analysis II</td>
<td>FN462 Investments</td>
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</table>
**Students choose three Professional Electives:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC407</td>
<td>Taxation of Business Entities</td>
<td>FN455 Venture Capital and Private</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equity</td>
</tr>
<tr>
<td>AC421</td>
<td>Accounting Information Systems</td>
<td>FN467 International Finance</td>
</tr>
<tr>
<td>AC431</td>
<td>Advanced Accounting: Investment and Ownership</td>
<td>FN475 Portfolio Management</td>
</tr>
<tr>
<td></td>
<td>Interests</td>
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</tr>
<tr>
<td>FN/EC468</td>
<td>Financial Markets and Institutions</td>
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</tr>
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</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>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management I</td>
</tr>
<tr>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area Requirement</td>
<td>3</td>
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<tr>
<td>SB305</td>
<td>Cost Management</td>
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<tr>
<td>Free Elective</td>
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<tr>
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<tr>
<td><strong>Total</strong></td>
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<td>First Semester</td>
<td>Second Semester</td>
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<td>-----------------</td>
</tr>
<tr>
<td><strong>Course</strong></td>
<td><strong>Cr. Hrs.</strong></td>
</tr>
<tr>
<td>FN462 Investments</td>
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</tr>
<tr>
<td>FN464 Financial Management II</td>
<td>3</td>
</tr>
<tr>
<td>AC404 Fin. Reporting &amp; Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
</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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS237</td>
<td>Intro. To Programming and Application Development or IS415 Data Warehousing and Data Mining</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS141</td>
<td>Intro to Computer Science or IS437 Business Application Development and Applications: Analysis &amp; Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE261</td>
<td>Intro to Programming and Software Design OM480 Project Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IS314</td>
<td>Database Design and Management IS400 Business Processes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students choose four professional electives, in consultation with their academic advisor, from the following list:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM340</td>
<td>Client Side Interactive Design - TECH IS426 Enterprise Architecture and Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM341</td>
<td>Introduction to Web Design-IA:C2 COMM440 PHP/My SQL Interactive Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE361</td>
<td>Fundamentals of Software Engineering COMM442 Advanced Worldwide Web</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM345</td>
<td>Information Architecture CS460/EE468 Database Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE408</td>
<td>Software Design for Visual Environments CS459 Human-Computer</td>
<td></td>
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</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. 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

<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>IS400</td>
<td>Business Processes and Applications: Analysis and Design</td>
<td>3</td>
<td>IS415</td>
<td>Data Warehousing and Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>IS314</td>
<td>Database Management</td>
<td>3</td>
<td></td>
<td>Free or Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management</td>
<td>3</td>
<td></td>
<td>Non-Business Elective: Clarkson Common</td>
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### SENIOR YEAR

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<td>IS437</td>
<td>Business Application &amp; Development</td>
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<td>Professional Elective</td>
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<td>OS432</td>
<td>Organizational Policy and Strategy</td>
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<td>Experience Knowledge Area Requirement</td>
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<td>Free or Non-Business Elective</td>
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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
- EC151 or EC350* Principles of Macroeconomics or Economic Principles and Engineering
- 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.

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
- POL371 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.

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<td>ANTH332</td>
<td>Cities and Social Justice</td>
<td>COMM428</td>
<td>Public Debate and the Environment</td>
</tr>
<tr>
<td>PHIL240</td>
<td>Contemporary Moral Issues</td>
<td>COMM310</td>
<td>Mass Media and Society</td>
</tr>
<tr>
<td>PHIL/POL380</td>
<td>Law and Bioethics</td>
<td>PHIL405</td>
<td>Sustainability Theory and Practice</td>
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<td>PHIL243</td>
<td>Business Ethics</td>
<td>POL362</td>
<td>Human Rights Law &amp; Politics</td>
</tr>
<tr>
<td>LW490</td>
<td>Internship (subject to availability)</td>
<td>POL/SOC470</td>
<td>Environmental Policy</td>
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<tr>
<td>PHIL341</td>
<td>Professional Ethics</td>
<td>POL471</td>
<td>Energy Policy (Univ:STS&amp;EC:1)</td>
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</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>COMM210</td>
<td>Theory of Rhetoric for Business, Science and Engineering</td>
<td>COMM410</td>
<td>Theory and Philosophy of Communication</td>
</tr>
<tr>
<td>PHIL330</td>
<td>Logic for Critical Thinking</td>
<td>COMM217</td>
<td>Introduction to Public Speaking</td>
</tr>
</tbody>
</table>

**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)
OS466  Negotiations and Relationship Management (Prerequisite: OS286)

OM/EM331  Operations and Supply Chain Management
       (Pre/Corequisite: IS211 or IS200; Prerequisite: statistics)
OM/EM476  Management of Technology (Prerequisite: OM331)

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
MK 431  Supply Chain Distribution Channels
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.

SPECIAL OPTIONS
Arete: Liberal Arts and Business Double Major
This unique interdisciplinary option allows students to combine the study of liberal arts with
business. Areté is designed to unite the broadening perspectives of the liberal arts with a solid grounding in business principles. The program emphasizes ethics and social responsibility, an appreciation of international perspectives, problem solving and critical thinking, oral and written communication, and individual values and goals clarification.

Upon graduation, Areté students receive a B.S. degree with a double major combining one of the business majors with one of the liberal arts disciplines. During their undergraduate careers, Areté students are involved in the development of their own academic program. With the assistance of two advisors (one in the School of Business, one in Liberal Arts), students can match their personal interests and strengths to courses that promote professional development and cultivate business expertise.

Areté emphasizes team-building by involving students in planning co-curricular activities, collaborating with faculty in selecting and designing special courses, and participating in development of the guidelines and policies of the program. Areté offers a wide scope of experiences and opportunities and is well suited to students who seek educational breadth and want to take an energetic role in decisions that influence their personal development and professional goals. (For more information, see the Areté section in under Interdisciplinary Undergraduate Programs.)

**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.

**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
EC604  Applied Economics
OS608  Organizational Behavior & Performance Management
FN607  Financial Management
OS610  Strategic Planning
IS605  Information Systems
MK609  Marketing Management
OM602  Decision Analysis and Supply Chain Modeling
SB609  Corporate Ethical Decision Making

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:

AC623  Financial Statement Analysis
AC636  Auditing
AC648  Seminar in Accounting Information Systems and Auditing
AC650  Accounting Research and Theory
EC660  Environmental Economics
EC651  Industrial Organization in Supply Chain
FN655  Venture Capital and Private Equity
FN672  Investments
FN680  Strategic Financial Management
IS629  Global Outsourcing of Information Systems and Services
MK689  New Product Marketing
MK696  Marketing Methods
OM676  Developing and Managing Technology
OM680  Strategic Project Management
OM685  Quality Management and Process Improvement
OM671  Supply Chain Environmental Management
OS657  Leading Organizational Change
OS666  Negotiations and Relationship Management
SB611  Clarkson Consulting Group
SB693  Seminar in International Business
SB696  Advanced Topics in Supply Chain Management

In 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
- MK610 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:

- EC651  Industrial Organization in Supply Chain
- OM680  Strategic Project Management
- OM685  Quality Management and Process Improvement
- OS657  Leading Organizational Change
- OS666  Negotiations and Relationship Management
- SB696  Advanced Topics in Supply Chain Management

The Reh Center for Innovation and Entrepreneurship

The Entrepreneurship Center
Augustine Lado, Interim Director
Erin Draper, Director of Operations

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

Pre-Physical Therapy Leading into the Doctor of Physical Therapy Graduate Program
Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should contact the Physical Therapy Department at 315-268-3786.

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, Philip K. Hopke, John B. McLaughlin, Don H. Rasmussen, R. Shankar Subramanian, Ian I. Suni, Ross Taylor, William R. Wilcox; Associate Professors Sandra L. Harris, Richard J. McCluskey; Assistant Professors Sitaraman Krishnan, Selma Thagard; Research Associate Professors Roshan Jachuck; Adjunct Professor Raghunathan Rengaswamy

Civil and Environmental Engineering Stefan J. Grimberg — Chair; Professors James S. Bonner, John P. Dempsey, Thomas M. Holsen, Feng-Bor Lin, Levon Minnetyan, Susan E. Powers, Hayley H. Shen, Hung Tao Shen, Poojitha D. Yapa; Professor Emeritus Norbert L. Ackermann, Gordon B. Batson; Associate Professors Andrea R. Ferro, Kerop D. Janoyan; Assistant Professors Christopher Bellona, Sulapha Peethamparan, Shane Rogers, Tyler Smith, Khiem Tran, Lifeng Wang; Adjunct Associate Professors Spencer F. Thew;

Electrical and Computer Engineering William Jemison — Chair; Professors Cetin Cetinkaya, William D. Jemison, Paul B. McGrath, Thomas H. Ortmeyer, Vladimir Privman, Charles Robinson, Robert J. Schilling, Distinguished Service Professor Susan E. Conry; Associate Professors James J. Carroll, Ming-Cheng Cheng, Abul N. Khondker, Jack Koplowitz, Jeanna Mathews, Robert A. Meyer, Stephanie Schuckers, James A. Svoboda; Assistant Professors Daqing Hou, Chen Liu, Edward Sazonov, Jeremiah Remus, Lei Wu; Distinguished Research Professor Liya L. Regel; Visiting Instructor Timothy Fanelli, Daniel Rissacher, Ajay Sonar

Mechanical and Aeronautical Engineering Daryush K. Aidun — Chair; Professors Goodarz Ahmadi, Daryush K. Aidun, Cetin Cetinkaya, Suresh Dhaniyalal, Brian Helenbrook, John C. Moosbrugger, Kenneth Willmert; Associate Professors Frederick M. Carlson, Kathleen Issen, Ratneshwar Jha, James H. Kane, Ronald S. LaFleur, Piergiovanni Marzocca, David J. Morrison, Daniel T. Valentine, Kenneth D. Visser, Steven W. Yurgartis; Assistant Professors Ajit Achuthan, Doug Bohl, Byron Erath, Kevin Fite, James Gibe, Laurel Kuxhaus, Parisa Mirbod, Philip Yuya
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.

ENVIRONMENTAL ENGINEERING CURRICULUM i

<table>
<thead>
<tr>
<th>FRESHMAN - FALL</th>
<th>Design Credit</th>
<th>FRESHMAN – SPRING</th>
<th>Design Credit</th>
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<tbody>
<tr>
<td>CM 131 General Chem. I (4 cr)</td>
<td>4</td>
<td>CM 132 General Chem. II (4 cr)</td>
<td>4</td>
</tr>
<tr>
<td>ES110 or PH 131 Fund. Physics I</td>
<td>3</td>
<td>PH131 or PH 132 Fund. Physics II</td>
<td>4</td>
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<tr>
<td>UNIV 190 Clarkson Seminar</td>
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<td>Knowledge Area (KA) Elective</td>
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<tr>
<td>MA 131 Calculus I</td>
<td>3</td>
<td>MA 132 Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>FY/PE 100 First Year Seminar (0 cr)</td>
<td>0</td>
<td>ES 100 Intro Computer (2 cr)</td>
<td>2</td>
</tr>
</tbody>
</table>

| SOPHOMORE - FALL | | SOPHOMORE - SPRING | |
|-----------------| |-------------------| |
| CE 212 Intro. Eng. Des. (F) | 1.5 | CE 340 Intro to Environmental Eng (S) | 1 |
| ES 220 Statics | 3 | BY 320 Microbiology | 3 |
| CH210 Chemical Engineering Principles I | 3 | ES 330 Fluid Mechanics | 3 |
| MA 231 Calculus III | 3 | MA 232 Differential Equations | 3 |

<p>| Junior and Senior Years | | |
|-------------------------| | |
| CH220 Chemical Engineering Principles II | 3 | Elective – KA or UC | 3 |
| CM 241 Organic Chemistry (F) | 3 | EC 350 Econ. Principles &amp; Engineering Economics | 3 |
| CE 330 Water Resources I (F) | 1 | ES 340 Thermodynamics I | 3 |
| CE 479 Water &amp;Wastewater Treatment OR CE 480 Chemical Fate &amp; Trans. in Envir’t | 3 | STAT 383 Applied Statistics | 3 |</p>
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CE 313</td>
<td>Biogeochemical Earth Systems (F) OR CE435/535</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Groundwater Hydrology and Geochemistry(^2) (F)</td>
<td></td>
</tr>
<tr>
<td>CE 301</td>
<td>Geospatial Analysis &amp; Appl. (S)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CE 491 Sr. Design (Envir./Wat. Res) (S)</td>
<td>3</td>
</tr>
</tbody>
</table>

\(^1\) All courses are 3 credits unless otherwise noted.
\(^2\) A total of 16.5 design credits is required.
\(^3\) If CE435/535 is selected the curriculum must include either CE477 Atmospheric Chemistry or CE480 Chemical Fate and Transport in the Environment

### SUGGESTED SOC/HUM ELECTIVES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 360</td>
<td>Environmental Economics</td>
</tr>
<tr>
<td>EV 430</td>
<td>Environmental Law</td>
</tr>
<tr>
<td>LC 225</td>
<td>Environment, Technology and Society</td>
</tr>
<tr>
<td>LP 342</td>
<td>Environmental Ethics</td>
</tr>
<tr>
<td>LP 343</td>
<td>Environmental Literature and Policy</td>
</tr>
<tr>
<td>TC 428</td>
<td>Public Debate and the Environment</td>
</tr>
</tbody>
</table>

### SUGGESTED PROFESSIONAL ELECTIVES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BY 222/224</td>
<td>Ecology + Lab</td>
</tr>
<tr>
<td>BY 328</td>
<td>Conservation Biology</td>
</tr>
<tr>
<td>BY 431</td>
<td>Limnology</td>
</tr>
<tr>
<td>*CE 310</td>
<td>Geotechnical Engineering</td>
</tr>
<tr>
<td>CE 430</td>
<td>Water Resources Engineering II</td>
</tr>
<tr>
<td>CE433/ES533</td>
<td>Human Exposure Analysis ()</td>
</tr>
<tr>
<td>CE 477</td>
<td>Atmospheric Chemistry</td>
</tr>
<tr>
<td>CE 478</td>
<td>Solid Waste Management and Landfill Design</td>
</tr>
<tr>
<td>CE 488/588</td>
<td>Analysis of Human Exposure to Pollutants</td>
</tr>
<tr>
<td>CH 434</td>
<td>Air Pollution Control</td>
</tr>
<tr>
<td>CH 460</td>
<td>Environmental Applications of Mass Transfer</td>
</tr>
<tr>
<td>CH 465</td>
<td>Biochemical Eng</td>
</tr>
<tr>
<td>CM 406</td>
<td>Treatment of Exp Data</td>
</tr>
<tr>
<td>CM 406</td>
<td>Treatment of Exp Data</td>
</tr>
<tr>
<td>CM 430</td>
<td>Colloids and Interfaces</td>
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<tr>
<td>CM 452</td>
<td>Aerosol Dynamics</td>
</tr>
<tr>
<td>CM 460</td>
<td>Biochemistry I</td>
</tr>
<tr>
<td>*ES 222</td>
<td>Strength of Materials</td>
</tr>
<tr>
<td>ES 405</td>
<td>Design of Exp and Analysis of Data</td>
</tr>
<tr>
<td>ES 431</td>
<td>Eng. Reliability</td>
</tr>
<tr>
<td>ES 464</td>
<td>Corrosion Eng</td>
</tr>
<tr>
<td>EV 430</td>
<td>Environmental Law</td>
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<tr>
<td>IH 309</td>
<td>Industrial Hygiene</td>
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<td>IH 406</td>
<td>Industrial Hygiene Control Methods</td>
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<td>IH/BY 416</td>
<td>Occupational Toxicology</td>
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<td>OM 331</td>
<td>Operations/Prod. Management</td>
</tr>
<tr>
<td>OM 471</td>
<td>Supply Chain Environmental Management</td>
</tr>
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</table>

*Recommended Electives
# 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 (or ES 110 Engineering and Society)</td>
<td>4 (3)</td>
<td>PH131 or PH132</td>
<td>Physics II</td>
<td>4</td>
</tr>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>4</td>
<td>MA132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td>KA Elective*</td>
<td>3</td>
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</tr>
<tr>
<td>FYPE100</td>
<td>First-Year Seminar</td>
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<td>ES100</td>
<td>Introduction to Engineering</td>
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</tr>
<tr>
<td></td>
<td>Use of the Computer</td>
<td>2</td>
<td></td>
<td></td>
<td>16 (15)</td>
</tr>
</tbody>
</table>

**Knowledge Area or University Course Electives**

There are 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.

**Mechanical, Aeronautical, Electrical, Computer, and Software Engineering majors can substitute BY 160 for CM 132. 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.**

## 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>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS/AS</td>
<td>Military Science/</td>
<td></td>
<td>MS/AS</td>
<td>Military Science/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerospace Studies</td>
<td></td>
<td></td>
<td>Aerospace Studies</td>
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</tr>
<tr>
<td></td>
<td>(if elected)</td>
<td>1</td>
<td></td>
<td>(if elected)</td>
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### 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>
</thead>
<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
<td>ES222</td>
<td>Strength of Materials</td>
<td>3</td>
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<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
<td>ES223</td>
<td>Rigid Body Dynamics</td>
<td>3</td>
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<tr>
<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
<td>AE/ME212</td>
<td>Intro to Engineering</td>
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<tr>
<td>MA232</td>
<td>Elementary Differential Equations</td>
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<td>MA231</td>
<td>Calculus III</td>
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<tr>
<td>KA/UC Elective</td>
<td></td>
<td>3</td>
<td>AE201</td>
<td>Mechanical Engineering Lab I</td>
<td>1</td>
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### JUNIOR YEAR

<table>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>ES330</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>AE/ME425</td>
<td>Aerodynamics</td>
<td>3</td>
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<tr>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
<td>AE429</td>
<td>Aircraft Performance and Flight Mechanics</td>
<td>3</td>
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<tr>
<td>AE/ME350</td>
<td>Aircraft Structures</td>
<td>3</td>
<td>AE458</td>
<td>Design of Aircraft Structures</td>
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<td>MA330</td>
<td>Advanced Engineering Math**</td>
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<td>AE401</td>
<td>Mechanical Engineering Lab III</td>
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<td>AE/ME455</td>
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<td>AE301</td>
<td>Mechanical Engineering Lab II</td>
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<td>Professional 1 Elective</td>
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16
<table>
<thead>
<tr>
<th>Course</th>
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<th>Cr. Hrs.</th>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>AE450</td>
<td>Aircraft Design I</td>
<td>3</td>
<td>AE451</td>
<td>Aircraft Design II</td>
<td>3</td>
</tr>
<tr>
<td>AE430</td>
<td>Stability Control of Aerospace Vehicles</td>
<td>3</td>
<td>AE427</td>
<td>Design of Propulsion Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE/ME431</td>
<td>Gas Dynamics</td>
<td>3</td>
<td></td>
<td>Professional Elective</td>
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<td>Professional Elective</td>
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<td></td>
<td>KA/UC Elective</td>
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</tr>
<tr>
<td></td>
<td>Economics Elective</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
<td>15</td>
<td></td>
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<td>12</td>
</tr>
</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>
</tr>
<tr>
<td>CH220</td>
<td>Chemical Engineering Principles II Material Balances</td>
</tr>
<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
</tr>
<tr>
<td></td>
<td>Elective (ES)</td>
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<tr>
<td>OR PH132</td>
<td>Physics II</td>
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Total Credits: 15
<table>
<thead>
<tr>
<th>Course Title</th>
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<th>Course Title</th>
<th>Cr.</th>
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<tbody>
<tr>
<td>CH320 Applied Phase &amp; Chemical Equilibria</td>
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<td>CH350 Chemical Engineering Lab</td>
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</tr>
<tr>
<td>CH330 Transfer Process Fundamentals</td>
<td>3</td>
<td>CH360 Chemical Reactor Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>CM244 Organic Chemistry Lab</td>
<td>3</td>
<td>CH370 Design of Transfer Process Equipment</td>
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<tr>
<td>EC350 Micro &amp; Engr. Economics</td>
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<td>Math Elective</td>
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<td>Elective (Engineering)</td>
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<td>Elective (Engineering)</td>
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</tr>
<tr>
<td></td>
<td>15</td>
<td>Elective (Technical)</td>
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<tr>
<td></td>
<td>16</td>
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</tbody>
</table>

**SENIOR YEAR**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr.</th>
<th>Course Title</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH410 ChE Lab II</td>
<td>2</td>
<td>CH460 Process Dynamics &amp; Control</td>
<td>3</td>
</tr>
<tr>
<td>CH420 Process Economics &amp; Conceptual Design</td>
<td>3</td>
<td>KA/UC Elective</td>
<td>3</td>
</tr>
<tr>
<td>Elective (ES)</td>
<td>3</td>
<td>Technical Elective</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td>3</td>
<td>Undesignated Electives</td>
<td>6</td>
</tr>
<tr>
<td>Elective (Engineering)</td>
<td>3</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>14</td>
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<td>15</td>
</tr>
</tbody>
</table>

1 The seven 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; two courses in engineering, science, or mathematics; three undesignated electives. An “undesignated elective” is any course that does not contain a significant amount of material already covered in the student’s program.

2 Six credits of Military Science or Aerospace Studies may be used to satisfy the requirement for two of the undesignated electives.

3 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.

**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, Manufacturing 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 be admitted 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

3. A minimum of three credits of undergraduate research.

**Course Descriptions**
Descriptions of all undergraduate and graduate courses will be supplied upon request.
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)

## 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>
</tr>
<tr>
<td>ES220</td>
<td>Statics</td>
</tr>
<tr>
<td>CE212</td>
<td>Intro. to Engineering</td>
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<tr>
<td></td>
<td>Design</td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
</tr>
<tr>
<td>ES Elective¹</td>
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<td>KA/UC Elective</td>
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<tr>
<th>JUNIOR YEAR</th>
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<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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</tr>
<tr>
<td>Mathematics</td>
<td>Geospatial Science</td>
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<tr>
<td>Elective</td>
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</tr>
<tr>
<td>CE320</td>
<td>Structural Analysis</td>
</tr>
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<td></td>
<td>w/lab</td>
</tr>
<tr>
<td>CE330</td>
<td>Water Resources</td>
</tr>
<tr>
<td></td>
<td>w/lab</td>
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<tr>
<td>Professional Elective</td>
<td>3</td>
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<tr>
<td>KA/UC Elective</td>
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15
SENIOR 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>
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<tbody>
<tr>
<td>EC350</td>
<td>Engineering Economics</td>
<td>3</td>
<td>CE490</td>
<td>CE491, or CE492</td>
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</tr>
<tr>
<td></td>
<td>Professional Electives</td>
<td>12</td>
<td></td>
<td>Professional Electives</td>
<td>12</td>
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<td></td>
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</table>

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CE491</td>
<td>CE493</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Senior Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Professional Electives</td>
<td>12</td>
</tr>
</tbody>
</table>

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.

ARCHITECTURAL

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CE446</td>
<td>Reinforced Masonry</td>
</tr>
<tr>
<td>CE447</td>
<td>Timber Design</td>
</tr>
<tr>
<td>CE448</td>
<td>Introduction to Architectural Eng.</td>
</tr>
<tr>
<td>CE455</td>
<td>Structural Damage, Rehabilitation and Repair</td>
</tr>
<tr>
<td>CE457</td>
<td>Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE492</td>
<td>Senior Design (Bld. Architectural)</td>
</tr>
</tbody>
</table>

STRUCTURAL

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE420</td>
<td>Computational Methods of Structural Analysis</td>
</tr>
<tr>
<td>CE452</td>
<td>Advanced Mechanics of Materials</td>
</tr>
<tr>
<td>CE453</td>
<td>Properties &amp; Performance of Concrete Materials</td>
</tr>
<tr>
<td>CE457</td>
<td>Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE512</td>
<td>Fundamentals of Dynamics &amp; Vibrations</td>
</tr>
<tr>
<td>CE521</td>
<td>Analysis of Advanced Composite Struct.</td>
</tr>
<tr>
<td>CE532</td>
<td>Engineering Elasticity</td>
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</table>
CONSTRUCTION
CE405 Construction Planning Mgmt.  CE538 Finite Element Methods
CE406 Construction Engineering  CE541 Bridge Engineering
CE407 Construction Estimating and Scheduling  CE542 Advanced Steel Design
CE411 Construction Materials Eng.  CE544 Advanced Design of Structural Concrete and Scheduling  Structural Concrete

ENVIRONMENTAL
CE433 Human Exposure Analysis  CE546 Prestressed Concrete Design
CE477 Atmospheric Chemistry  CE546 Reinforced Masonry Design
CE478 Solid Waste Management and Landfill Design  CE547 Timber Design
CE479 Water and Wastewater Treatment Processes  GEOTECHNICAL
CE480 Chemical Fate and Transport in the Environment  CE415 Foundations, Stability, and Retaining Structures
CE572 Shallow Water Hydrodynamics  CE512 Fundamentals of Dynamics & Vibrations
CE481 Hazardous Waste Management Engineering  CE514 Groundwater Flow
CE573 Sediment Transport  CE516 Advanced Soil Mechanics I
CE574 Hydrodynamic Dispersion  CE517 Laboratory and In-Situ
CE576 Hydraulic Engineering in Cold Regions

WATER RESOURCES
CE583 Modeling Natural Aquatic Syst.  CE430 Water Resources Engineering II
CE586 Industrial Ecology  CE510 Groundwater Flow
CE587 Contaminant Transport in Groundwater  CE570 Advanced Hydrology
CE589 Limnology  CE572 Shallow Water Hydrodynamics
CE582 Environmental Systems Analysis and Design  CE573 Sediment Transport
CE584 Chemodynamics  CE574 Hydrodynamic Dispersion
CE461 Transportation Systems Design  CE576 Hydraulic Engineering in Cold Regions
CE468 Traffic Engineering  CE468 Traffic Engineering
CE493 Senior Design (Transportation)

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 become 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 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 a course in one of the required knowledge areas. Five knowledge area or courses
including a university course are required over the four years of study, and one of these knowledge area courses must be in economics. 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++ Java, and learn to use modern software development tools, 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>
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</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>MA232 Differential Equations</td>
<td>MA231 Calculus III</td>
</tr>
<tr>
<td>ES250 Electrical Science</td>
<td>EE211 ECE Lab I</td>
</tr>
<tr>
<td>ES260 Materials Science</td>
<td>EE221 Linear Circuits</td>
</tr>
<tr>
<td>EE261 Intro to Programming and Software Design</td>
<td>EE264 Intro to Digital Design</td>
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<tr>
<td></td>
<td>EE361 Fundamentals of Software Engineering</td>
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<tr>
<td><strong>KA/UC Elective¹</strong></td>
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<tr>
<td><strong>JUNIOR YEAR</strong></td>
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<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
<td><strong>Course</strong></td>
</tr>
<tr>
<td>EE321 Systems and Signal Processing</td>
<td>EE316 Computer Engineering</td>
</tr>
<tr>
<td>EE341 Microelectronics</td>
<td>EE360 Microprocessors</td>
</tr>
<tr>
<td>EE363 Generic Programming &amp; Software Components</td>
<td>EE462 Software Systems Architecture</td>
</tr>
<tr>
<td>EE365 Advanced Digital Circuit Design</td>
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<tr>
<td>STAT383 Probability and Statistics</td>
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<td><strong>KA/UC Elective¹</strong></td>
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<tr>
<td><strong>MA211 Foundations</strong></td>
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<tr>
<td>Course</td>
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<tr>
<td>EE416</td>
<td>Computer Eng.</td>
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<td>Senior Lab</td>
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<td>EE464</td>
<td>Digital Systems Design</td>
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<tr>
<td>EE466</td>
<td>Computer Architecture</td>
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<td>CS Elective$^2$</td>
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<td>KA/UC Elective$^1$</td>
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<tr>
<td>ES498</td>
<td>Professional Experience</td>
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$^1$ 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.

$^2$ The Computer Science Elective must be selected from computer science courses numbered 300 or higher or CS 242.

$^3$ The Professional Electives are ECE courses numbered 300 or higher, or other engineering course if approved by the ECE Department.

$^4$ 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. 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
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 a course in one of the required knowledge areas. Five knowledge area courses including a university course are required over the four years of study, and one of these knowledge area courses must be in economics. 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.

- 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 systems are signal process, 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.

**Electrical Engineering Curriculum**

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

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
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<td>Calculus III</td>
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<tr>
<td>ES250</td>
<td>Electrical Science</td>
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<td>EE211</td>
<td>ECE Lab I</td>
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</tr>
<tr>
<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
<td>EE221</td>
<td>Linear Circuits</td>
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<tr>
<td>EE261</td>
<td>Intro to Programming and</td>
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<td>EE264</td>
<td>Intro to Digital Design</td>
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<td>Software Design</td>
<td></td>
<td>EE324</td>
<td>Dynamical Systems</td>
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<tr>
<td></td>
<td>KA/UC Elective$^1$</td>
<td>3</td>
<td></td>
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**JUNIOR YEAR**

<table>
<thead>
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<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>STAT383</td>
<td>Probability and Statistics</td>
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<td>EE381</td>
<td>Electromagnetic Fields</td>
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</tr>
<tr>
<td>EE311</td>
<td>EE Junior Lab</td>
<td>3</td>
<td>and Waves</td>
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<td>3</td>
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<td>EE321</td>
<td>Systems and Signal Processing</td>
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<td>Math Elective$^4$</td>
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<tr>
<td>EE331</td>
<td>Energy Conversion</td>
<td>3</td>
<td>Area Electives$^2$</td>
<td></td>
<td>6</td>
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<tr>
<td>EE341</td>
<td>Microelectronics</td>
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<td>KA/UC Elective$^1$</td>
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<td></td>
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SENIOR YEAR

<table>
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<tr>
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<th>Second Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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</tr>
<tr>
<td>EE412</td>
<td>EE Senior Design or Professional Elective³</td>
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<td>Professional Elective³</td>
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<td>Area Electives²</td>
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<tr>
<td>ES499</td>
<td>Professional Experience</td>
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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.

²There 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.

⁴The Mathematics Elective must be numbered 300 level or higher and must include a significant amount of mathematical theory.

⁵The Engineering Science Elective is satisfied by ES 220 Statics, ES 340 Thermodynamics, or other ES course approved by the ECE Department.

⁶The 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

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 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>
</thead>
<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>
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<tr>
<td>PH132</td>
<td>Or Elective-UC/KA</td>
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### JUNIOR YEAR

<table>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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</tr>
<tr>
<td>STAT383</td>
<td>Applied Statistics</td>
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<td>CM241</td>
<td>Organic Chemistry (F)</td>
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<td>CE330</td>
<td>Water Resources w/lab (F)</td>
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<tr>
<td>CE479</td>
<td>Water &amp; Wastewater Treatment or</td>
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<tr>
<td>CE480</td>
<td>Chemical Fate &amp; Trans. in Envir’t</td>
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<tr>
<td>CH220</td>
<td>Chemical Engineering Principles II</td>
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**First Semester**
- 15

**Second Semester**
- 15

### SENIOR YEAR

<table>
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<tr>
<td><strong>Course</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>EC350</td>
<td>Engineering Economics</td>
</tr>
<tr>
<td>CE313</td>
<td>Biochemical Earth Systems (F) or</td>
</tr>
<tr>
<td></td>
<td>Professional Electives</td>
</tr>
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</table>

**Second Semester**
- 15

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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 and the process used to solve them lead directly to these generic program outcomes.

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>
<th>Title</th>
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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>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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<tr>
<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
<td>AE/ME212</td>
<td>Intro. to Engineering Design</td>
<td>3</td>
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<tr>
<td>KA/UC Elective</td>
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<td>KA/UC Elective</td>
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## JUNIOR YEAR

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<td>Fluid Mechanics</td>
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<td>ME326</td>
<td>Intermediate Fluid</td>
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<td>ES340</td>
<td>Thermodynamics</td>
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<td>ME341</td>
<td>Mech. of Machine Elements</td>
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<td>Dynamical Systems</td>
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<td>ME411</td>
<td>Intro. to Heat Transfer</td>
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<td>ME301</td>
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<td>Mech. Engineer. Lab III</td>
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<td>Thermodynamic Sys.</td>
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<td>Engineer. or</td>
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<tr>
<td>ME455</td>
<td>Mechanical Vibrations</td>
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<tr>
<td></td>
<td>&amp; Control</td>
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### SENIOR YEAR

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<th>Course</th>
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<th>Cr. Hrs.</th>
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<td>Engineering Analysis</td>
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<td></td>
<td>by FEM</td>
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<td>Professional 1 Elective</td>
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<tr>
<td>ME445</td>
<td>Integrated Design I</td>
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<td>Integrated Design II</td>
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<td>AE, ES, or ME Prof. Elective</td>
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<td>Undesignated Elective</td>
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<td>Economics Elective</td>
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<td>Undesignated Elective</td>
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<td>15</td>
</tr>
</tbody>
</table>

**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. 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
ME399 Computer-Aided Manufacturing
ME428 Computational Fluid Mechanics
ME443 Optimal Engineering
ME444 Computer-Aided Engineering

MATERIALS AND MANUFACTURING
ME390 Manufacturing Processes
ME393 Analyses of Materials Processing
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

MATERIALS AND MANUFACTURING
ME390 Manufacturing Processes
ME393 Analyses of Materials Processing
ME492 Welding Metallurgy

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 goal 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 contributing professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications
- 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
- 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
- Graduates are expected to have 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 attain the following student outcome:

- 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

<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</td>
<td>4</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics or</td>
<td>4</td>
<td>BY160</td>
<td>Biology II</td>
<td>3</td>
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<tr>
<td>ES110</td>
<td>Engineering and Society</td>
<td>3</td>
<td>PH132</td>
<td>Physics II</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>UNIV190</td>
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<td>FY100</td>
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<td>1</td>
<td>ES100</td>
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<tr>
<td></td>
<td></td>
<td>14 or 15</td>
<td></td>
<td>Use of the Computer</td>
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## SOPHOMORE 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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</thead>
<tbody>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>MA211</td>
<td>Foundations</td>
<td>3</td>
<td>EE264</td>
<td>Intro. to Digital Design</td>
<td>3</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
<td>EE361</td>
<td>Fundamentals of</td>
<td></td>
</tr>
<tr>
<td>EE261</td>
<td>Intro. to Programming and Software Design or</td>
<td>3</td>
<td></td>
<td>Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CS141</td>
<td>Computer Science I KA/UC Elective</td>
<td>3</td>
<td>EE221</td>
<td>Linear Circuits or</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 or 16</td>
<td>ES</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KA/UC Elective</td>
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## JUNIOR YEAR

### First Semester

<table>
<thead>
<tr>
<th>Course</th>
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<th>Course Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA383</td>
<td>Applied Statistics or</td>
<td>3</td>
<td>CS344 Algorithms and Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>MA381</td>
<td>Probability</td>
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</tr>
<tr>
<td>EE407</td>
<td>Computer Networks</td>
<td>3</td>
<td>EE360 Microprocessors</td>
<td>3</td>
</tr>
<tr>
<td>EE363</td>
<td>Generic Programming &amp;</td>
<td>3</td>
<td>EE368 Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Software Components</td>
<td></td>
<td>EE462 Software System Architecture</td>
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</tr>
<tr>
<td>EE408</td>
<td>Software Design for</td>
<td>3</td>
<td>EE468 Database Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Visual Env.</td>
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</tr>
<tr>
<td>KA/UC</td>
<td>Elective*</td>
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### Second Semester

<table>
<thead>
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<tbody>
<tr>
<td>EE418</td>
<td>Senior Design</td>
<td>3</td>
<td>CS444 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE466</td>
<td>Computer Architecture</td>
<td>3</td>
<td>CS458 Formal Methods for Program</td>
<td>3</td>
</tr>
<tr>
<td>CS341</td>
<td>Programming Languages</td>
<td>3</td>
<td>Program Verification</td>
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<td></td>
<td>Professional Elective</td>
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<td>Professional Elective</td>
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<td>KA/UC Elective</td>
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<td>Undesignated Electives</td>
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### SENIOR YEAR

### First Semester

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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>EE418</td>
<td>Senior Design</td>
<td>3</td>
<td>CS444 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>EE466</td>
<td>Computer Architecture</td>
<td>3</td>
<td>CS458 Formal Methods for Program</td>
<td>3</td>
</tr>
<tr>
<td>CS341</td>
<td>Programming Languages</td>
<td>3</td>
<td>Program Verification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>KA/UC Elective</td>
<td>3</td>
<td>Undesignated Electives</td>
<td>6</td>
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### Second Semester

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<thead>
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<th>Course Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>15</td>
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</tbody>
</table>

* 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.)

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.)
- 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.)
- CE589*  Limnology (4 cr.)
- 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**

- IH406  Industrial Hygiene Control Methods (3 cr.)

  **or**

- IH416  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.

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)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Energy Systems</td>
<td>ES238</td>
</tr>
<tr>
<td>Alternative Energy Systems</td>
<td>EE/ES438</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>ES340 or CH260</td>
</tr>
<tr>
<td>Capstone Design (with specific Energy Focus)</td>
<td>One of: AE451, CE490, CE491, CE492, CH481, EE412, ES456, ME446</td>
</tr>
<tr>
<td>Environmental Impacts Choice</td>
<td>One of: CE486, ES436</td>
</tr>
<tr>
<td>Policy Choice</td>
<td>One of: EV200/300, POL470, PHIL391, POL/SOC395, POL371, POL372, EC360</td>
</tr>
<tr>
<td>Technology Choice</td>
<td>One of: CH434, CH421, EE331, ME310, ME324, CE486*, ES436*</td>
</tr>
</tbody>
</table>

(*if not taken as Environmental Impacts choice)

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.
### 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.

<table>
<thead>
<tr>
<th>REQUIRED COURSES</th>
<th>PREREQUISITE</th>
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<tbody>
<tr>
<td>CE448 Introduction to Architectural Engineering (3 cr.)</td>
<td>ES220, CE212 CE320 and CE442 (corequisite)</td>
</tr>
<tr>
<td>CE 445 and Timber Design (3 cr.)</td>
<td>CE 441 or consent</td>
</tr>
<tr>
<td>CE 446 or Reinforced Masonry Design (3 cr.)</td>
<td>CE 441 or consent</td>
</tr>
<tr>
<td>CE 447 Reinforced Masonry and Timber Design (3 cr.)</td>
<td>CE 310</td>
</tr>
<tr>
<td>CE 415/515 Foundations Design (3 cr.)</td>
<td>CE 320</td>
</tr>
<tr>
<td>CE 441 Concrete Design (3 cr.)</td>
<td>CE 320</td>
</tr>
<tr>
<td>CE 442 Steel Design (3 cr.)</td>
<td>CE 320</td>
</tr>
<tr>
<td>CE 492 Senior (Building, Architectural) Design (3 cr.)</td>
<td>CE448, CE441, CE442, CE415, CE447 (corequisite)</td>
</tr>
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</table>

Choose at least two of the following (6 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>CE405</td>
<td>Construction Management</td>
<td>CE320 &amp; CE441 (corequisite)</td>
</tr>
<tr>
<td>CE 408</td>
<td>Building Information Modeling and Integrated Product Delivery</td>
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</tr>
<tr>
<td>CE411</td>
<td>Construction Materials</td>
<td></td>
</tr>
<tr>
<td>CE 420/520</td>
<td>Advanced Structural Analysis</td>
<td>CE320</td>
</tr>
<tr>
<td>CE 421/521</td>
<td>Composite Mechanics and Design</td>
<td>ES222 &amp; ES260</td>
</tr>
<tr>
<td>CE542</td>
<td>Advanced Steel Design</td>
<td>CE442, CE420/520 (corequisite)</td>
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<tr>
<td>CE 544</td>
<td>Advanced Concrete Design</td>
<td>CE441 &amp; 420/520</td>
</tr>
<tr>
<td>CE 453/553</td>
<td>Properties and Performance of Concrete Materials</td>
<td>ES260</td>
</tr>
<tr>
<td>CE 455/555</td>
<td>Structural Damage, Rehabilitation, and Repair</td>
<td>ES222</td>
</tr>
<tr>
<td>CE 457/557</td>
<td>Environmental Degradation of Concrete Structures</td>
<td>CE411/CE441/CE453</td>
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</tbody>
</table>
ME310  Thermodynamic System Engineering  ES340
ME411  Introduction to Heat Transfer  ES330, ES340, MA232
ME444  Computer Aided Engineering  ES100, MA231
CE438 or CE538  Finite Element Methods  ES222, ES330, MA232
CE401/501  Fracture Mech. of Concrete Structures  ES222 (corequisite)
CE486/586  Intro to Industrial Ecology  CE340 or CH250
IH 406  Industrial Hygiene Control Methods  IH 309 or consent
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:

- CE415/515 Foundations, Stability and Retaining Structures
- CE441 Reinforced Concrete Design
- CE442 Steel Design
- Any **two** of the following:
  - CE405 Constructional Planning and Management
  - CE406 Construction Engineering
  - CE411 Construction Materials Engineering
- And any **two** of the following:
  - CE 407 Introduction to Construction Estimating and Scheduling
  - CE 408 Building Information Modeling and Integrated Product Delivery
  - IH309 Introduction to Occupational Health or IH416 Principles of Occupational Health
  - IH416 Principles of Occupational Health
  - OS466 Negotiations and Relationship Management
  - OM480 Project Management
  - OM351 Quality Management & Lean Enterprise
  - LW466 Law of the Workplace
  - OM485 Quality Systems Management
  - LP341 Professional Ethics
  - Environmental & Occupational Health
  - or other course as designated by CEE Department Chair

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.
<table>
<thead>
<tr>
<th>COURSES</th>
<th>CREDIT PREREQUISITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 491 Senior Environmental Design OR</td>
<td>Senior Standing</td>
</tr>
<tr>
<td>MP 401 Environmental Remediation Design OR</td>
<td>3 Senior Standing</td>
</tr>
<tr>
<td>MP 444 EPA P3 Sustainable Design Competition</td>
<td>Senior Standing</td>
</tr>
<tr>
<td>CE 340 Introduction to Environmental Engineering OR</td>
<td>CM 132 or CM 104, and MA 132</td>
</tr>
<tr>
<td>CH 220 Chemical Engineering Principles II: Material Balance</td>
<td>3 BY 214, CM132</td>
</tr>
<tr>
<td>BY 320 Microbiology OR</td>
<td>4 CM 104 or CM 132</td>
</tr>
<tr>
<td>BY 222 and BY 224 General Ecology</td>
<td>CM 104 or 132,</td>
</tr>
<tr>
<td>CH 210 Chemical Engineering Principles I OR</td>
<td>MA 132 and PY 131</td>
</tr>
<tr>
<td>CM 241 Organic Chemistry OR</td>
<td>PH 132 (corequisite)</td>
</tr>
<tr>
<td>CM 371 Physical Chemistry</td>
<td></td>
</tr>
<tr>
<td>TWO of the following</td>
<td>6</td>
</tr>
<tr>
<td>CE 430 Water Resources Engineering II</td>
<td>CE 330</td>
</tr>
<tr>
<td>CE 478 Solid Waste Management and Landfill Design</td>
<td>Junior or Senior</td>
</tr>
<tr>
<td>CE 479 Water and Wastewater Treatment Processes</td>
<td>CE 340</td>
</tr>
<tr>
<td>CE 480 Chemical Fate and Transport in the Environment</td>
<td>CE 340</td>
</tr>
<tr>
<td>CE 481/581 Hazardous Waste Management Engineering</td>
<td>CE 340</td>
</tr>
<tr>
<td>CE 477/577 Atmospheric Chemistry</td>
<td>CM 370, CM 371 or ES 340</td>
</tr>
<tr>
<td>CE 580 Environmental Chemistry</td>
<td>consent</td>
</tr>
<tr>
<td>CE 482/582 Environmental Systems Analysis and Design</td>
<td>consent</td>
</tr>
<tr>
<td>CE 583 Modeling Natural Aquatic Systems</td>
<td>consent</td>
</tr>
<tr>
<td>CE 584 Chemodynamics</td>
<td>consent</td>
</tr>
<tr>
<td>CE 486/586 Introduction to Industrial Ecology</td>
<td>consent</td>
</tr>
<tr>
<td>CE 587 Contaminant Transport in Groundwater</td>
<td>consent</td>
</tr>
<tr>
<td>CE 589 Aspects of Freshwater Ecosystems</td>
<td>consent</td>
</tr>
<tr>
<td>CH 434/ES 434 Air Pollution Control</td>
<td>ES 330</td>
</tr>
<tr>
<td>ES 432/532 Risk Analysis</td>
<td>consent</td>
</tr>
<tr>
<td>ES 436 Global Climate Change: Science, Engineering &amp; Policy</td>
<td></td>
</tr>
<tr>
<td>ES 464 Corrosion Engineering</td>
<td>CM 132</td>
</tr>
<tr>
<td>EHS 406 Industrial Hygiene Control Methods, OR</td>
<td>EHS 309 or consent</td>
</tr>
<tr>
<td>EHS 416 Principles of Occupational Health</td>
<td>EHS 309 or consent</td>
</tr>
<tr>
<td>OR other course designated by CEE Department Chair</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL CREDITS FOR CONCENTRATION**

18

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.

**Manufacturing Engineering**

The Professional Concentration in Manufacturing Engineering provides engineering students the opportunity to expand their knowledge of manufacturing-related topics such as production management, statistical quality control, and manufacturing processes. The requirements for the professional concentration in Manufacturing Engineering are listed in the table below. Interested students must fill out an application form available from the MAE Department office. Changes to the Manufacturing Engineering concentration requirements must be approved by the MAE department chair or executive officer. Students successfully completing the following requirements receive a Dean’s Certificate in Manufacturing Engineering.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Elective Courses (three required)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES260 Materials Science</td>
<td>ME385 Design of Electromechanical Systems</td>
</tr>
<tr>
<td>STAT383 Applied Statistics I or ME444 Computer-aided Engineering</td>
<td></td>
</tr>
<tr>
<td>MA330 Advanced Engineering Mathematics</td>
<td>AE/ME457 Composite Mechanics and Design</td>
</tr>
<tr>
<td>OM331 Operations and Supply Chain Management</td>
<td>ME492 Welding Metallurgy</td>
</tr>
<tr>
<td>ME390 Manufacturing Processes</td>
<td>ES351 Materials Characterization Laboratory</td>
</tr>
<tr>
<td>OM351 Quality Management and Lean Enterprise</td>
<td>ES357 Microelectronic Circuit Fabrication</td>
</tr>
<tr>
<td></td>
<td>ES360 Materials Science II</td>
</tr>
<tr>
<td></td>
<td>ES365 Polymer Materials</td>
</tr>
<tr>
<td></td>
<td>ES405 Design of Experiments &amp; Analysis of Data</td>
</tr>
</tbody>
</table>

Other elective courses designated by the MAE department chair or executive officer. A complete list of courses is available in the MAE department office.
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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Title</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE411</td>
<td>Construction Materials Eng.</td>
<td>ME390</td>
<td>Manufacturing Processes</td>
</tr>
<tr>
<td>CM430</td>
<td>Colloids and Interfaces</td>
<td>ME393</td>
<td>Analysis of Materials Processing</td>
</tr>
<tr>
<td>CM450</td>
<td>Introduction to Polymer Chemistry</td>
<td>ME457</td>
<td>Composite Mechanics</td>
</tr>
<tr>
<td>EE439</td>
<td>Dielectrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES357</td>
<td>Microelectronic Circuit Fabrication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES365</td>
<td>Polymer Materials and Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES452</td>
<td>Biomaterials and Biomedical Engineering Applications</td>
<td>ME591</td>
<td></td>
</tr>
<tr>
<td>ES464</td>
<td>Corrosion Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM430</td>
<td>Colloids and Interfaces</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE420/S20</td>
<td>Advanced Structural Analysis</td>
</tr>
<tr>
<td>CE415/S15</td>
<td>Foundations, Stability, and Retaining Structures</td>
</tr>
<tr>
<td>CE441</td>
<td>Reinforced Concrete Design</td>
</tr>
<tr>
<td>CE442</td>
<td>Steel Design</td>
</tr>
<tr>
<td>CE490</td>
<td>Senior Design</td>
</tr>
</tbody>
</table>

And any two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE401/S01</td>
<td>Fracture Mechanics of Concrete Structures</td>
</tr>
<tr>
<td>CE411</td>
<td>Construction Materials Engineering</td>
</tr>
<tr>
<td>CE421/S21</td>
<td>Composite Mechanics and Design</td>
</tr>
<tr>
<td>CE438/S38</td>
<td>Finite Element Methods</td>
</tr>
<tr>
<td>CE444/S44</td>
<td>Advanced Reinforced Concrete</td>
</tr>
<tr>
<td>CE453/S53</td>
<td>Properties and Performance of Concrete Materials</td>
</tr>
<tr>
<td>CE455/S55</td>
<td>Structural Damage, Rehabilitation, and Repair</td>
</tr>
<tr>
<td>CE457/S57</td>
<td>Environmental Degradation of Concrete Structures</td>
</tr>
<tr>
<td>CE512</td>
<td>Fundamentals of Dynamics and Vibrations</td>
</tr>
<tr>
<td>ME444</td>
<td>Computer-aided Engineering</td>
</tr>
</tbody>
</table>

| Or other course as designated by CEE Department Chair. |

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, 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
Philip Hopke, Director and Bayard D. Clarkson Distinguished Professor; 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 mission of the Clarkson Institute for a Sustainable Environment is to facilitate the development, promotion and operation of environmental activities within the University and among its partners. The Institute fosters links and collaboration among faculty, students and partners who will actively participate in the activities required to meet its vision of excellence.

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 two houses and a separate classroom. On site as well is our teacher/resident assistant to support and supervise students. Students can attend a fall or spring semester that is comprised of 7 two-week modules plus a final week during which students present their comprehensive team research projects.

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/.

**Interdisciplinary 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 Interdisciplinary Minors section of the Catalog.

**Interdisciplinary Graduate Programs**

The Institute houses two interdisciplinary graduate programs: the MS and PhD in Environmental Science & Engineering and the MS 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: athompso@clarkson.edu
PROGRAMS IN PHYSICAL THERAPY & PHYSICIAN ASSISTANT STUDIES

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 are autonomous practitioners who emulate the core values of the profession; and
- For faculty, graduates, and students to contribute to the profession, community, and society through education, research, and 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:
- Preparation for the DPT curriculum by taking all prerequisite courses while earning a Clarkson undergraduate degree in any major offered by the University;
- A physical therapy faculty advisor as an undergraduate in addition to the major advisor; and
- Reserved space in the DPT program provided all prerequisites are completed successfully, and the appropriate application is submitted.

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;
- A grade-point average of 3.0 (on a 4.0 scale) for all undergraduate courses;
- Completion of all prerequisite courses, with a grade-point average of 3.0 (on a 4.0 scale) for all prerequisites, and no prerequisite course grade lower than a “C-”; and
- A total of 30 hours of observation or volunteer experience in health-care settings - of which a minimum of 20 hours must be in a physical therapy setting under the supervision of a licensed 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
- Biological Science: 2 courses with lab, one of which must be human anatomy, human physiology, or a combined human anatomy and physiology course (minimum 4 credits each – total of 8 credits)
- Chemistry: 2 courses with lab (minimum 4 credits each – total of 8 credits)
- Physics: 2 courses with lab, which must include mechanics, electricity, and magnetism (minimum 4 credits each – total of 8 credits)
- Statistics: 1 course, which must be within a department of math, statistics, or psychology (3 credits)
- Psychology: 2 courses, which must include Introduction to Psychology and Developmental Psychology - which must be a life-span developmental psychology course, and not child psychology or adolescent psychology only (minimum 3 credits each); and
- Pre-PT Health Care – 4 credits (Physical Therapy Seminar I and Physical Therapy Seminar II). These are Clarkson courses, and similar content in courses at other colleges/universities is strongly recommended.

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.

<table>
<thead>
<tr>
<th>Fall — Semester 1</th>
<th>Cr. Hrs.</th>
<th>Spring — Semester 5</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT505</td>
<td></td>
<td>PT606</td>
<td>Neurumuscular Physical Therapy II</td>
</tr>
<tr>
<td>Foundational Sciences for Physical Therapy</td>
<td>9</td>
<td>PT615</td>
<td>Physical Therapy for Multiple Systems</td>
</tr>
<tr>
<td>PT506</td>
<td></td>
<td>PT618</td>
<td>Research Data Collection</td>
</tr>
<tr>
<td>Professional Foundation for Physical Therapy</td>
<td>2</td>
<td>Summer — Semester 6</td>
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<td>Research Data Collection</td>
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<td>Summer — Semester 6</td>
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<td>PT515</td>
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<td>Physical Therapy for Multiple Systems</td>
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<td>PT627</td>
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<td>Writing &amp; Presenting</td>
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<td>Physical Therapy Data Analysis</td>
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<td>PT608</td>
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<td>PT607</td>
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<tr>
<td>PT608</td>
<td></td>
<td>PT608</td>
<td>Physical Therapy Data Analysis</td>
</tr>
</tbody>
</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.
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/. A supplemental Clarkson University PA program application will be required for qualified CASPA applicants. Applications from either of the CASPA cycles (before or after March 1) are valid. A rolling acceptance policy is being used. The class size will be approximately 20 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)- applicants who possess a Master's or doctoral degree from an accredited US university may be exempt from this requirement
• 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)
• The application can be downloaded from http://www.clarkson.edu/pa/admission/Supplemental%20Application.pdf.

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

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<tr>
<td>Clinical Medicine I</td>
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<td>Basic Science I</td>
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<td>Patient Assessment I</td>
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<td>The Patient and the PA I</td>
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**Semester Total** 17

### Summer I

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**Semester Total** 13

### Fall I

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<td>Medical Informatics</td>
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**Semester Total** 17

### Spring II

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<td>Supervised Practice - Ambulatory Medicine</td>
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<td>Supervised Practice - Internal Medicine</td>
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**Semester Total** 8

### Summer II

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<td>Supervised Practice - Emergency Medicine</td>
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**Semester Total** 6

### Fall II
Supervised Practice – Pediatrics  PA604  3
Supervised Practice - Women’s Health  PA605  3
Supervised Practice - Behavioral Health  PA606  3
Supervised Practice - Elective I  PA607  3
*Semester Total*  12

**Spring III**
Supervised Practice – Elective II  PA608  3
Clinical Research Elective  PA609  3
Summative Review  PA610  1
Master’s Project  PA611  2
*Semester Total*  9
*Program Total*  82

**Length of Program**
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 applicants. Successful candidates will be accepted for the cohort beginning the following January.

The Clarkson pre-PA plan will also prepare graduates with most, if not all, of the required courses for other PA programs.

Accreditation
The program has been granted provisional accreditation by the ARC-PA as of September 16, 2011. 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.

Provisional accreditation is an accreditation status. The granting of provisional accreditation indicates that the plans and resource allocation for the proposed program appear to
demonstrate the program’s ability to meet the ARC-PA Standards, if fully implemented as planned. Provisional Accreditation does not ensure any subsequent accreditation status. Provisional status is limited to no more than three years. The date for the next accreditation site visit is October 2014 with the comprehensive review of the program by the ARC-PA scheduled for March 2015.

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
PO 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 and 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

<table>
<thead>
<tr>
<th>Course</th>
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<td>Biology/Environmental Science</td>
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<td>Technology course</td>
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<tr>
<td>Mathematics &amp; Statistics</td>
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<td>Physics</td>
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<td>EHS/Industrial Hygiene</td>
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<td>Policy Course</td>
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**TOTAL** 120
# Environmental Science & Policy Curriculum

## FIRST YEAR

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<tr>
<th>Course</th>
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<th>Cr. Hrs.</th>
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<tbody>
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<td>BY160</td>
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<td>BY142</td>
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<td>CM103</td>
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<td>CM104</td>
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<td>EV100</td>
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<td>MA181</td>
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<td>MA 180</td>
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18  16

## SOPHOMORE YEAR

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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>BY222</td>
<td>General Ecology</td>
<td>3</td>
<td>IH309</td>
<td>Intro to Industrial Hygiene</td>
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<tr>
<td>BY244</td>
<td>General Ecology Lab</td>
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<td>IH310</td>
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<tr>
<td>EV200</td>
<td>Environmental Sustainability</td>
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<td>BY320</td>
<td>Microbiology(^2)</td>
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<tr>
<td>PH131/141</td>
<td>Physics I</td>
<td>4</td>
<td>BY322</td>
<td>Microbiology Lab</td>
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<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
<td>3</td>
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<td>KA/UC (Environmental Policy)</td>
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<tr>
<td>EV313</td>
<td>Biogeochemical Systems Science</td>
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<td>Statistics Course</td>
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17  16
## JUNIOR YEAR

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<tbody>
<tr>
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<tr>
<td>KA (Micro Economics)</td>
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<tr>
<td>KA (Environmental Law)</td>
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<td>IH Elective</td>
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<tr>
<td>EV300 Environmental Leadership</td>
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<tr>
<td>Prof. Sci./Eng/Math</td>
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<tr>
<td>LW270 Law &amp; Society I</td>
<td>PHIL370 Environmental Ethics (KA)</td>
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| **Total**       |     | 16         |         |     |     | 16         |

## SENIOR YEAR

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<tr>
<td>Elective</td>
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<td>Prof. Sci./Eng./Math</td>
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<tr>
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<tr>
<td>Prof. Sci./Eng./Math</td>
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</tr>
<tr>
<td>POL371 Environmental Law</td>
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<tr>
<td>POL470 Environmental Policy</td>
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| **Total**       |     | 15         |         |     |     | 13         |

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. Or suitable technology course
   EC150 or EC350 is required as a prerequisite for Environmental Economics (EV360) and will satisfy a knowledge area requirement.

NOTES — 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.

### SCIENCE

<table>
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<td>Readings in Org. Biology</td>
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<td>Genetics</td>
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<td>BY302</td>
<td>Introduction to Botany</td>
<td>BY301</td>
<td>Readings in Cellular and Molecular Biology</td>
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<tr>
<td>BY312</td>
<td>Advanced Cell Biology</td>
<td>BY310</td>
<td>Developmental Biology</td>
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<tr>
<td>BY316</td>
<td>Immunobiology</td>
<td>BY314</td>
<td>Bioinformatics</td>
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<td>BY326</td>
<td>Invertebrate Biology</td>
<td>BY320</td>
<td>Microbiology</td>
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<tr>
<td>BY340</td>
<td>Behavioral Ecology</td>
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<td>Microbiology for Eng.</td>
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<td>BY358</td>
<td>Animal Learning</td>
<td>BY328</td>
<td>Conservation Biology</td>
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<td>BY412</td>
<td>Molecular Biology</td>
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<td>Vertebrate Biology</td>
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<td>BY426</td>
<td>Intro. to Biophysics</td>
<td>BY420</td>
<td>Evolution</td>
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<td>BY435</td>
<td>Freshwater Invertebrate Bio</td>
<td>BY431</td>
<td>Limnology</td>
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<td>BY451</td>
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<td>BY438</td>
<td>Biostatistical Analysis</td>
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<td>Organic Chemistry II</td>
<td>CM221</td>
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<td>Environmental Science II</td>
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<td>IH320</td>
<td>Principles of Ergonomics</td>
<td>IH405</td>
<td>Methods for Analysis</td>
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<td>IH406</td>
<td>IH Control Methods</td>
<td>IH416</td>
<td>Principles of Toxicology &amp; Epidemiology</td>
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<td>MA231</td>
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<td>PH132</td>
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<td>PH142</td>
<td>Physics for Life Sciences II</td>
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<td>Introductions to BioPhysics</td>
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### ENGINEERING

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<td>Eng. Measurement</td>
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<td>Intro to Environ. Engineering</td>
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<td>CE413</td>
<td>Geology for Engineers</td>
<td>CE478</td>
<td>Solid Waste Mgmt. and Landfill Design</td>
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<td>CE470</td>
<td>Hydraulic Engineering</td>
<td>CE477</td>
<td>Atmospheric Chemistry</td>
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<td>CE474</td>
<td>Environmental Hydrology</td>
<td>CE479</td>
<td>Water and Wastewater Treatment Proc.</td>
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<td>CE480</td>
<td>Environmental Quality</td>
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<td>Hazardous Waste Management</td>
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<td>CE490</td>
<td>Senior Design</td>
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<td>ES532</td>
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### BUSINESS

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<td>The Law of the Workplace</td>
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<td>Course Code</td>
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<td>Law and Society II</td>
<td>EC364</td>
<td>Structure of American Industry</td>
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<td>EC388</td>
<td>Game Theory and Economic Strat</td>
<td>OS386</td>
<td>Organizational Behavior</td>
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<td>Env., Tech., &amp; Society</td>
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<td>SOC/ANTH</td>
<td>Cities and Social Justice</td>
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<td>SOC/POC</td>
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<td>POL250</td>
<td>Politics in C-N Perspective</td>
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<td>HIST230</td>
<td>Science and Society</td>
<td>PHIL341</td>
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<td>Constitutional Law</td>
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<td>American Environmentalism</td>
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<td>Mass Media and Society</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/EV</td>
<td>Public Debate and Env.</td>
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<td>POL302</td>
<td>Society and Political Thought in the 20th Century</td>
<td>POL392</td>
<td>Environmental Political Theory</td>
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</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 (Industrial Hygiene-Environmental Toxicology)
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 specialist 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.
- b. 2 Math courses and one statistics course.
- c. Minimum of 16 hours in Chemistry.
d. Minimum of 13 credits in Biology.
e. Additional Minimum of 12 credits in Science and/or Engineering.
f. 8 credits in Physics.
g. Minimum of 18 credits of EHS courses.
h. 4 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>FIRST-YEAR FALL</th>
<th>Credits</th>
<th>FIRST-YEAR SPRING</th>
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<td>BY140 Biology I</td>
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<td>BY160 Biology II</td>
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<tr>
<td>BY142 Biology I Lab</td>
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<td>BY162 Biology II Lab</td>
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<tr>
<td>CM103 Structure &amp; Bonding</td>
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<td>CM104 Equilibrium &amp; Dynamics</td>
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<td>CM105 Chemistry Lab I</td>
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<td>EV313 Biogeochem Earth Sys Sci</td>
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<td>BY222 General Ecology</td>
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<td>EHS330 Safety Management</td>
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<td>STAT282 Gen. Statistics (or equiv.)</td>
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<td>EHS405 Methods &amp; Analysis</td>
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<td>EHS406 Ind. Hyg. Control Methods</td>
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FOURTH-YEAR FALL

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<td>EHS416 Principles of Tox &amp; Epi.</td>
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FOURTH-YEAR SPRING

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<tr>
<td>ES432 Risk Analysis¹</td>
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<tr>
<td>EV401 Capstone Project</td>
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<td>Knowledge Area Course #4</td>
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</table>

¹ or other suitable Engineering Elective

Note: CM131 and 132 are acceptable replacements for CM103/105 and CM104/106.

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

## 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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<tr>
<td>EM205</td>
<td>Accounting for Decision Analysis</td>
<td>3</td>
<td>EM211</td>
<td>Intro to Enterprise Information Systems</td>
<td>3</td>
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<tr>
<td>EM120</td>
<td>Team-Based Design &amp; Innovation&lt;sup&gt;1,3&lt;/sup&gt;</td>
<td>3</td>
<td>EM121</td>
<td>Technological Entrepreneurship&lt;sup&gt;1,3&lt;/sup&gt;</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td>PY151</td>
<td>Intro to Psychology</td>
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<tr>
<td>MA131</td>
<td>Calculus I</td>
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<td>MA132</td>
<td>Calculus II</td>
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<tr>
<td>CM131</td>
<td>Chemistry I</td>
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<td>CM132</td>
<td>Chemistry II or</td>
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<tr>
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<td>BY160</td>
<td>Cellular and Molecular Biology&lt;sup&gt;5&lt;/sup&gt;</td>
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## SOPHOMORE YEAR

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<th>Cr. Hrs.</th>
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<tr>
<td>EC350</td>
<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>
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<td>EM480</td>
<td>Project Management</td>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
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<td>STAT383</td>
<td>Applied Statistics I</td>
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<td>EM286</td>
<td>Organizational Behavior</td>
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<td>PH131</td>
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## JUNIOR YEAR

**First Semester**

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<td>Fluid Mechanics</td>
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<td>EM333</td>
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<td>MK320</td>
<td>Principles of Marketing</td>
<td>3</td>
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<td>Chain Management</td>
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<tr>
<td>MA231</td>
<td>Calculus III</td>
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<td>ES250</td>
<td>Electrical Science</td>
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<tr>
<td>EM360</td>
<td>Materials Science or</td>
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<td>EM351</td>
<td>Quality Management &amp; Lean</td>
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<td></td>
<td>Chain Management</td>
<td>3</td>
<td></td>
<td>Lean Enterprise</td>
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<tr>
<td>ES200</td>
<td>Strength of Materials or</td>
<td>3</td>
<td></td>
<td>Professional Elective</td>
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<tr>
<td></td>
<td>or Professional Elective</td>
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<tr>
<td>EE264</td>
<td>Digital Design(^1)</td>
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</table>

### Notes:
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 course
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 Liberal Arts and Business Double Major (Areté)
Frances Weller Bailey, Director

Students who want to combine practical skills with broad knowledge should consider Areté, an interdisciplinary double major integrating professional training in business with the skills and perspectives of the liberal arts. It provides students a broad base of leadership and communication skills, along with the analytical abilities essential for success in the emerging global business world.

Areté (pronounced ar-eh-tay) is an ancient Greek word describing an individual who embodies individual excellence combined with a strong sense of social responsibility. This word from the classical world perfectly captures the spirit of tomorrow’s leaders. Areté students are leaders.

The program was initially developed in response to Clarkson’s many business partners who demanded future managers who combine humanistic values and insights with business expertise, who are flexible and creative in their solution of contemporary problems.

Beyond the knowledge gained in each area of the student’s double major in business and liberal arts, Areté students will develop their understanding of:

- ethics and social responsibility;
- the global economy;
- the techniques of problem solving and critical thinking;
- the definition of individual values and goals; and
- the importance of oral and written communication skills to a successful career.

The U.S. Department of Education has recognized the Areté program as one of the most innovative in the country, awarding it a substantial grant from the Fund for the Improvement of Post-Secondary Education (FIPSE). In the years since its inception, Areté has also developed some alternative paths to an interdisciplinary degree, including the choice of an accelerated three-year bachelor’s degree in liberal arts with a final year pursuing a Clarkson MBA, and a number of other interdisciplinary options.

Teamwork, planning and discussion generate a collaborative environment where all viewpoints are allowed on the table. Personal attention is a high priority within the program and every student benefits from having two advisors — one from Liberal Arts and one from Business.
Employment
Areté graduates are currently pursuing careers in a wide range of businesses and industries, as well as in teaching, government agencies and not-for-profit foundations. The range of companies in which they hold leadership positions is large and growing, among them Accenture, Capital One, IBM, HSBC, Deloitte & Touche, GE, Morgan Stanley, TV Guide and Champion International. Areté grads can also be found working as legislative aides in the U.S. Senate and as teachers in public and private schools. Many graduates also pursue advanced degrees in business, law, science and education.

Curriculum
Students choosing to double major in liberal arts and business begin with the Clarkson Common Experience. Additionally, they complete all the specific requirements for the degree in each of the majors they have selected. Areté students also take a series of one-credit modules, intended to help integrate their learning in both of their major fields. In their senior year, they have the opportunity to draw together their two majors in a research project overseen by faculty from both schools. Areté brings together students with diverse interests and backgrounds who share the excitement of discovery, and the possibilities for Areté courses are virtually endless. The sample curriculum below indicates some examples of the kinds of courses available.

### Areté Sample Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td>Liberal Arts Major Course</td>
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<tr>
<td>MA180</td>
<td>Intro College Mathematics</td>
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<td>MA181</td>
<td>Basic Calculus</td>
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<td>Liberal Arts Major Course</td>
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<td>EC151</td>
<td>Macroeconomics</td>
<td>3</td>
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<tr>
<td>EC150</td>
<td>Microeconomics</td>
<td>3</td>
<td>SB114</td>
<td>Leadership, Teamwork, and Business Enterprise</td>
<td>3</td>
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<tr>
<td></td>
<td>and Organization</td>
<td>3</td>
<td></td>
<td>Common Experience Science Course</td>
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<td>AR120</td>
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18
### SOPHOMORE YEAR

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<thead>
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<th>Cr. Hrs.</th>
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<tr>
<td>Liberal Arts Major Course</td>
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<td></td>
<td>Liberal Arts Major Course</td>
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<td>IS211</td>
<td>Intro to ERP Tools</td>
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<td>EC311</td>
<td>Economics and Business Statistics</td>
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<td>AC205</td>
<td>Intro Accounting</td>
<td>3</td>
<td>MK320</td>
<td>Principles of Marketing</td>
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<td>STAT282</td>
<td>Statistics</td>
<td>3</td>
<td>OS286</td>
<td>Organizational Behavior</td>
<td>3</td>
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<tr>
<td></td>
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<td>15</td>
<td>OM331</td>
<td>Operations &amp; Supply Chain Mgt.</td>
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<tr>
<td></td>
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<td>AR321</td>
<td>Following the News</td>
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### JUNIOR YEAR

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<th>Course</th>
<th>Title</th>
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<tr>
<td>LW270</td>
<td>Law and Society I</td>
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<td>Liberal Arts Major Course</td>
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<tr>
<td>MK321</td>
<td>Consumer Behavior</td>
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<td>Liberal Arts Major Course</td>
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<tr>
<td>MK332</td>
<td>Market Analysis &amp; Research</td>
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<td>OS352</td>
<td>Human Resource Management</td>
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<tr>
<td>FN361</td>
<td>Corporate Finance</td>
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<td>EC370</td>
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<td>SB322</td>
<td>Leading Innovative Ventures</td>
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<td>AR325</td>
<td>Advertising Theory &amp; Practice</td>
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### SENIOR YEAR

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<td><strong>Title</strong></td>
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<td>MK436</td>
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<td>New Products</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>Liberal Arts Major</td>
<td>Technology Course</td>
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<td>Business Professional</td>
<td>Commercializing</td>
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<td>Elective</td>
<td>Innovation</td>
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<tr>
<td>AR480</td>
<td>OS432</td>
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<td>Major Research Seminar</td>
<td>Entrepreneurship</td>
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<td>Business Professional</td>
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<td>Elective</td>
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</table>
B.S. in Social Documentation Double Major
Frances Weller Bailey, Director

Students whose interests are broad and flexible, with a broad span of interests, should seriously 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

<table>
<thead>
<tr>
<th>FIRST YEAR</th>
<th>First Semester</th>
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<tbody>
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<td>SD200</td>
<td>History of Social Documentation</td>
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<td>MA180</td>
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<tr>
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<td>Intro. to Culture and Society</td>
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<tr>
<td>COMM327</td>
<td>Digital Video Production I</td>
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<tr>
<td>COMM341</td>
<td>Introduction to Web Design</td>
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<td>HIST320</td>
<td>Medicine and Society in America</td>
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<td>PY151</td>
<td>Intro to Psychology</td>
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| 15 | 15 |

### JUNIOR YEAR

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<th>First Semester</th>
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<tbody>
<tr>
<td><strong>Course</strong></td>
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<td>ANTH385</td>
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<td>COMM320</td>
<td>Photography</td>
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<td>COMM345</td>
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<td>POL351</td>
<td>Globalization</td>
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<th>Course</th>
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<td>SD490</td>
<td>Research Project and Internship</td>
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<td>COMM410</td>
<td>Theory and Philosophy of Communication</td>
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<td>Free Electives</td>
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<td>SOC350</td>
<td>International Development and Social Change</td>
<td>3</td>
<td>Free Electives</td>
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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.

Goals 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

- become 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

- 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, 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 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

<table>
<thead>
<tr>
<th>Course</th>
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<td>ES250</td>
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<td>EE361</td>
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<td>EE261</td>
<td>Intro. to Programming and Software Design</td>
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<td>EE221</td>
<td>Linear Circuits or</td>
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<td>ES141</td>
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## JUNIOR YEAR

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<td>CS344</td>
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<td>MA381</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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<td>EE462</td>
<td>Software System Architecture</td>
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<td>EE408</td>
<td>Software Design for Visual Env.</td>
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<td>Database Systems</td>
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**SENIOR YEAR**

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<td>CS444</td>
<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 Program Verification</td>
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<td>CS341</td>
<td>Programming Languages</td>
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* 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/CM314 Bioinformatics (BY160, BY214)
PH/CM426 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/CM460 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 Entrepreneurial Venture Strategy and Assessment
MK435 Advertising and Promotion Strategy
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:

Required Courses
IH309 Introduction to Industrial Hygiene (3 cr.)
IH310 Introduction to Industrial Hygiene Lab (2 cr.)
CM241 Organic Chemistry I (3 cr.)
PHIL370 Environmental Ethics (3 cr.)

or
EV280 Environmental Science (3 cr.)

Any two courses from the following:
IH405 Industrial Hygiene Monitoring and Analysis (4 cr.)
IH406 Industrial Hygiene Control Methods (3 cr.)
IH416 Introduction to Toxicology & Epidemiology (3 cr.)
IH330 Environmental Health & Safety (3 cr.)
ES532 Risk Analysis (3 cr.)

One additional course from the following or one additional course from above:
CE480 Environmental Quality Engineering (3 cr.)
CE481 Hazardous Waste Management Engineering (3 cr.)
CE479 Water and Wastewater Treatment Processes (3 cr.)
CE371 Physical Chemistry I (3 cr.)
BY360 Physiology (3 cr.)
CE240 Earth Science
CE340 Introduction to Environmental Engineering
CE477 Atmospheric Chemistry (3 cr.)
CE580 Environmental Chemistry (3 cr.)
BY320 Microbiology (3 cr.)

Total Credit Hours for the Minor: 20-22

In addition to the required courses, it is recommended that MA282 or MA383 or MG284 Statistics be taken as a mathematics elective course. 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 Arts & Sciences approves an exception.

**Minor in Environmental Policy**

A minor is available in Environmental Policy to all students except those majoring in Clarkson's interdisciplinary program in Environmental Science and Policy. To obtain a minor, a student must complete the following courses:

1. Fifteen credits of environmental policy. Courses are selected from Category I.
2. Six credits of environmental science. Courses are selected from Category II.
3. Three credits spread across the following areas:
   a. an independent research project (1 credit)
   b. an ES&P Multidisciplinary Project Course (1 credit)
   c. one of the following 1 credit courses (EV100, 200, or 300). Courses are selected from Category III.

**Category I: Course Offerings in Environmental Policy**

**Humanities & Social Sciences**

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<th>Credits</th>
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<td>LC/EV225</td>
<td>Env., Tech., and Society</td>
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<tr>
<td>PHIL370</td>
<td>Environmental Ethics</td>
<td>1</td>
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<td>PHIL270</td>
<td>American Environmentalism</td>
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<td>POL371</td>
<td>Environmental Law</td>
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<td>COMM/EV428</td>
<td>Public Debate and Env.</td>
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<td>PHIL470</td>
<td>Env. Philosophy Seminar</td>
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<td>POL270</td>
<td>American Politics</td>
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<td>POL225</td>
<td>American West</td>
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<td>Politics in C-N Perspective</td>
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**Business**

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<td>LW466</td>
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<td>OM476</td>
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<td>Quality Management &amp; Lean Enterprise</td>
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<td>OM480</td>
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**Category II: Course Offerings in Environmental Science**

**Science**

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<td>CM103</td>
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**Engineering**

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**Category III: Course offerings in Environmental Science & Policy**

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<th>Code</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV100</td>
<td>Introduction to Environmental Science and</td>
<td>EV200</td>
<td>Creating Environmental Policy</td>
</tr>
<tr>
<td></td>
<td>Policy Issues and Professions</td>
<td>EV300</td>
<td>Environmental Leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MP134-534</td>
<td>Campus Sustainability</td>
</tr>
</tbody>
</table>

**Minor in Environmental Science**

A minor is available in Environmental Science to all students except for those majoring in
Clarkson's interdisciplinary program in Environmental Science and Policy. To obtain a minor, a student must complete the following courses:

1. Fifteen credits of environmental science, nine credits of which must be in 300 level or higher courses. Courses are selected from Category I below.
2. Six credits of environmental policy. Courses are selected from Category II.
3. Three credits of environmental science, nine credits of which must be in 300 level or higher courses. Courses are selected from Category III.

**Category I: Course Offerings in Environmental Science**

<table>
<thead>
<tr>
<th>Science</th>
<th>Category I</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY140 Biology I</td>
<td>CM103 Structure and Bonding</td>
</tr>
<tr>
<td>BY142 Biology I Lab</td>
<td>CM104 Equilibrium and Dynamics</td>
</tr>
<tr>
<td>BY153 Cell and Molec. Biology</td>
<td>CM105 Chem. Lab I</td>
</tr>
<tr>
<td>BY155 Cell Biology Lab</td>
<td>CM106 Chem. Lab II</td>
</tr>
<tr>
<td>BY221 General Ecology</td>
<td>CM131 General Chemistry I</td>
</tr>
<tr>
<td>BY224 General Ecology Lab</td>
<td>CM132 General Chemistry II</td>
</tr>
<tr>
<td>BY314 Genetics</td>
<td>CM221 Spectroscopy</td>
</tr>
<tr>
<td>BY315 Genetics Lab</td>
<td>CM223 Spectroscopy Lab</td>
</tr>
<tr>
<td>BY320 Microbiology</td>
<td>CM241 Organic Chemistry I</td>
</tr>
<tr>
<td>BY322 Microbiology Lab</td>
<td>CM242 Organic Chemistry II</td>
</tr>
<tr>
<td>BY328 Conservation Biology</td>
<td>CM244 Organic Chemistry Lab</td>
</tr>
<tr>
<td>BY340 Animal Behavior</td>
<td>CM371 Physical Chemistry</td>
</tr>
<tr>
<td>BY420 Evolution</td>
<td>CM409 Receptor Modeling</td>
</tr>
<tr>
<td>BY431 Limnology</td>
<td>CM460 Biochemistry</td>
</tr>
<tr>
<td>BY440 Advanced Invertebrate Phys.</td>
<td>CM476 Atmospheric Chemistry</td>
</tr>
<tr>
<td>BY450 Biochemistry I</td>
<td>CH434 Air Pollution Control</td>
</tr>
<tr>
<td>BY451 Biochemistry II</td>
<td>IH405 Methods and Analysis Engineering*</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Engineering**

<table>
<thead>
<tr>
<th>Engineering*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE240 Earth Science</td>
</tr>
<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</td>
</tr>
<tr>
<td>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.

**Category II: Course Offerings in Environmental Policy**

**Humanities & Social Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC/EV225</td>
<td>Env., Tech., and Society</td>
<td>POL250</td>
<td>Politics in C-N Perspective</td>
</tr>
<tr>
<td>PHIL370</td>
<td>Environmental Ethics</td>
<td>POL225</td>
<td>American West</td>
</tr>
<tr>
<td>PHIL270</td>
<td>American Environmentalism</td>
<td>HIST230</td>
<td>Science and Society</td>
</tr>
<tr>
<td>POL470</td>
<td>Environmental Law</td>
<td>POL380</td>
<td>Bioethics &amp; the Law</td>
</tr>
<tr>
<td>COMM/EV428</td>
<td>Public Debate and Env.</td>
<td>POL400</td>
<td>Constitutional Law</td>
</tr>
<tr>
<td>PHIL470</td>
<td>Env. Philosophy Seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL220</td>
<td>American Politics</td>
<td></td>
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</tr>
</tbody>
</table>

**Business**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC/EV360</td>
<td>Environmental Economics</td>
<td>LW471</td>
<td>Law and Society II</td>
</tr>
<tr>
<td>LW466</td>
<td>The Law of the Workplace</td>
<td>OM331</td>
<td>Operations &amp; Supply Chain Management</td>
</tr>
<tr>
<td>LW270</td>
<td>Law and Society I</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Category III: Course Offerings in Environmental Science & Policy**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV100</td>
<td>Introduction to Environmental Science and Policy Issues and Professions</td>
</tr>
<tr>
<td>EV200</td>
<td>Creating Environmental Policy</td>
</tr>
<tr>
<td>EV300</td>
<td>Environmental Leadership</td>
</tr>
<tr>
<td>MP134-534</td>
<td>Campus Sustainability</td>
</tr>
</tbody>
</table>

**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 seeks 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 (3 cr. total):
   ANTH 381 Consumption and Culture (3 cr.)
   EV 200 Sustainability and the Environment (2 cr.)
   EV 300 Environmental Leadership (2 cr.)
   PHIL 370 Environmental Ethics (3 cr.)
   PHIL 371 Energy and Society (3 cr.)
   PHIL 405 Sustainability Theory and Practice: A Critical Assessment (3 cr.)
   POL 350 International Development and Social Change (3 cr.)

2. Two of the following courses² (6 cr. total)
   ANTH 201 Introduction to Anthropology (3 cr.)
   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 (3 cr.)
   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 (3 cr.)

3. Two of the following courses³ (6 cr. total)
   MK 436 Creativity, Innovation and New Product Development (3 cr.)
   SB 396 Global Business Strategies (3 cr.)
   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.

1The 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 this 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.

2The 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.

3The purpose of this category of course work is for the students to develop an understanding of key principles of innovation and entrepreneurship. 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.

4The 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 within the minor and 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 theme and relates to strategies employable in the developing world, the student can obtain approval from the director of the minor for the course to serve as the minor required course.

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, students are expected to acquire a significant specialized significant 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 adaptive radiations, genetic regulation of enteric development, migration and differentiation of neurons, molecular virology and cervical carcinogenesis, regulation of epithelial 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.
Interdisciplinary Graduate Programs

MS in Computer Science
William Jemison, Chair, Department of Electrical and Computer Engineering; Christopher A. Lynch, Chair of Mathematics and 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 Division of Mathematics and 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).
MS in Engineering and Global Operations Management (EGOM) Graduate Program

The challenges of global competition demand effective management of technical and human resources. To meet these challenges, Clarkson University offers an innovative part-time interdisciplinary graduate program in Engineering & Global Operations Management (EGOM) for professionals working full-time in industry. All entering students must have at least two years of industry experience, be nominated by their company, and be accepted by the program. Applicants should hold a bachelor’s degree in a technical field, but students with a B.S. degree in other areas and relevant experience may also be admitted. Students completing the program receive an M.S. in Engineering and Global Operations Management or a graduate certificate in a specified focus area.

The program offers maximum flexibility by providing a variety of options to complete the degree. For example, the entire 30 credit-hour program can be completed by taking only on-campus courses or by taking a combination of residency and distance learning courses. The residency portion of the program consists of two-week summer sessions and the distance learning courses are offered 12 months a year during the fall, winter, spring and summer semesters. As a result, the program may be completed in as few as 24 months and up to 80% online.

This program was developed in the 1960s in partnership with industry and has evolved constantly over time to meet the changes in technological and business conditions. Companies currently sponsoring program participants include: Alcoa, American Packaging, AT&T, Avery Point Group, Carrier Corp., Corning Inc., Eastman Kodak, General Dynamics, General Electric, Green Mountain Coffee Roasters, Hanson, Hatch Mott MacDonald, IBM, Magna Powertrain, MTI Management, New York Air Brake, New York Power Authority, Prudential Real Estate, RR Donnelley, Severstal NA, Sorunke Dental, Sustainable Performance Consulting, Welch Allyn, Wyeth Pharmaceuticals, Young and Franklin, and Xerox.

Coursework

This 30 credit-hour program is composed of core courses and electives. In addition, seminars and workshops offered by industry executives during the residency sessions provide practical insights and exposure to a variety of operational issues. The core courses provide a foundation in engineering and management. Elective courses are selected to permit a continuation of the broad perspective of the core courses or to build a concentration in a particular area.

**CORE COURSES**

(at least seven out of nine are required)

- ES505 Design of Experiments
- ES510 Strategic Project Management
- ES530 Environmental Sustainability and Risk Analysis
- ES540 Engineering Economics
- ES555 Global Supply Chain Systems Mgt.

**TYPICAL ELECTIVES**

- FN608 Financial Management
- MF687 Capstone Project
- OM676 Developing & Managing Technology
- OS652 Strategic Human Resource Management
- OS666 Negotiations and Relationship Management
- SB641 Advanced Topics in Supply Chain Mgmt
ES572  Quality Management and Process Control
ME504  Design Methodology
OS657  Leading Organizational Change
SB696  Global Business Strategies

A description of the courses and requirements can be obtained at www.clarkson.edu/business/egom - phone: 315-268-5982).
MS in Environmental Politics and Governance
Philip K. Hopke, Director, Institute for a Sustainable Environment

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 environmentally 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>
<th>Credit Hours</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>POL/SOC 570 Environmental Policy</td>
<td>3</td>
<td>Core</td>
</tr>
<tr>
<td>ES 532 Risk Analysis</td>
<td>3</td>
<td>Core</td>
</tr>
<tr>
<td>POL 592 Environmental Political Theory</td>
<td>3</td>
<td>Philosophy</td>
</tr>
<tr>
<td>SOC 572 Biofuel and Farm Policy</td>
<td>3</td>
<td>Policy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>Credit Hours</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 580 Directed Study in Research Methods</td>
<td>3</td>
<td>Open</td>
</tr>
<tr>
<td>EC 660 Environmental Economics</td>
<td>3</td>
<td>Core</td>
</tr>
<tr>
<td>CES 586 Introduction to Industrial Ecology</td>
<td>3</td>
<td>Policy</td>
</tr>
<tr>
<td>ANTH 570 Environment, Technol. and Soc.</td>
<td>3</td>
<td>Env &amp; Society</td>
</tr>
<tr>
<td>Summer Semester</td>
<td>Credit Hours</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>--------------</td>
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</tr>
<tr>
<td>EV 612 Thesis Research</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>SS XXX&lt;sup&gt;a&lt;/sup&gt; Student Discussion Seminar</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Planned course
**MS and PhD in Environmental Science and Engineering**

*Philip K. Hopke, 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.
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
- ES 564 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:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY 512</td>
<td>Advanced Cell Biology</td>
</tr>
<tr>
<td>BY 612</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>CH 515</td>
<td>Polymer Materials</td>
</tr>
<tr>
<td>CM 566</td>
<td>Bioelectronics and Bionanotechnology</td>
</tr>
<tr>
<td>CM 553</td>
<td>Medical and Pharmaceutical Biomaterials</td>
</tr>
<tr>
<td>CM 583</td>
<td>Introduction to Polymer Science</td>
</tr>
<tr>
<td>CM 584</td>
<td>Multicomponent Polymer Systems</td>
</tr>
<tr>
<td>EE 539</td>
<td>Dielectrics</td>
</tr>
<tr>
<td>EE 541</td>
<td>Electronic Devices for IC Simulation</td>
</tr>
<tr>
<td>ES 552</td>
<td>Biomaterials and Biomedical Engineering Applications</td>
</tr>
<tr>
<td>ES 557</td>
<td>Microelectronic Circuit Fabrication</td>
</tr>
<tr>
<td>ES 564</td>
<td>Corrosion Engineering</td>
</tr>
<tr>
<td>ME 557/CE 521</td>
<td>Advanced Mechanics of Composite Materials</td>
</tr>
<tr>
<td>ME 591</td>
<td>Micro/Nano Systems Engineering</td>
</tr>
<tr>
<td>ME 595</td>
<td>Principles of Physical Metallurgy</td>
</tr>
<tr>
<td>ME 637</td>
<td>Particle Transport, Deposition and Removal</td>
</tr>
<tr>
<td>PH 589/EE 543</td>
<td>Physics of Semiconductor Devices</td>
</tr>
<tr>
<td>PH 636</td>
<td>Scanning Probe Techniques in Soft Condensed Matter Physics</td>
</tr>
</tbody>
</table>

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 $350-4500 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 Abraham 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 free “room and board.” 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!

Military Science Curriculum*

<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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<tr>
<td>MS111</td>
<td>Leadership &amp; Personal Development</td>
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<td>MS112</td>
<td>Introduction to Tactical Leadership</td>
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SOPHOMORE YEAR

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<th>Course</th>
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<th>Cr. Hrs.</th>
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<tr>
<td>MS221</td>
<td>Innovative Team Leadership</td>
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<td>MS222</td>
<td>Foundations of Tactical Leadership</td>
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<td>Cr. Hrs.</td>
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<tr>
<td>MS331</td>
<td>Adaptive Tactical Leadership</td>
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<td>MS332</td>
<td>Leadership in Changing Env.</td>
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**SENIOR YEAR**

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<tr>
<th>Course</th>
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<th>Course</th>
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<th>Cr. Hrs.</th>
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<td>MS441</td>
<td>Developing Adaptive Leaders</td>
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<td>MS442</td>
<td>Leadership in a Complex World</td>
<td>3</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 Robert Baskette — 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 = $250, SOPH = $300, JUN = $350, SEN = $400
- $450 per semester for books

For more details, contact the Aerospace Studies Department at 315-268-7989.

Aerospace Studies Curriculum*

<table>
<thead>
<tr>
<th>Course</th>
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<td>First Semester</td>
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<td>Second Semester</td>
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<td>AS101</td>
<td>The Air Force Today</td>
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<td>AS102</td>
<td>The Air Force Today II</td>
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<td>AS103</td>
<td>Leadership Laboratory</td>
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<td>AS104</td>
<td>Leadership Laboratory</td>
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<td>SOPHOMORE YEAR</td>
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<tr>
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<td>Second Semester</td>
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<td>AS201</td>
<td>Evolution of Air Power I</td>
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<td>AS202</td>
<td>Evolution of Air Power II</td>
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<tr>
<td>AS203</td>
<td>Leadership Laboratory</td>
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<td>AS204</td>
<td>Leadership Laboratory</td>
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## JUNIOR YEAR

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<td>Air Force Leadership</td>
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<td>AS302</td>
<td>Air Force Leadership</td>
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<td></td>
<td>&amp; Management I</td>
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<td></td>
<td>&amp; Management II</td>
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<tr>
<td>AS303</td>
<td>Leadership Laboratory</td>
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<td>AS304</td>
<td>Leadership Laboratory</td>
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## SENIOR YEAR

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<th>Course</th>
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<td>AS401</td>
<td>National Security Forces</td>
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<td>National Security Forces</td>
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<td></td>
<td>in Contemporary</td>
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<tr>
<td></td>
<td>American Society I</td>
<td>3</td>
<td>AS402</td>
<td>American Society II</td>
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<tr>
<td>AS403</td>
<td>Leadership Laboratory</td>
<td>0</td>
<td>AS404</td>
<td>Leadership Laboratory</td>
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</tbody>
</table>

* Course may be applicable as free electives in some majors where noted. Consult individual departments for details.

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**Physical Education**

Steve Yianoukos — Chair; Director Bill Bergan; Instructors Johan Dulfer, Jim Kane, Laurel Kane, KJ Krasco, Michael Maguire, Kelly Norman, Michael Pitts, Caitlin Powderly

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/ 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, Doctor of Philosophy, Master’s of Physician Assistant Studies and Doctor of Physical Therapy degrees. The M.S. is offered in the following fields: basic science, chemical engineering, chemistry, civil engineering, computer science, electrical engineering, information technology, engineering and global operations management, mathematics, environmental politics and governance, environmental science and engineering, mechanical engineering, physics, and engineering science. Programs leading to the Ph.D. are offered in chemical, civil and environmental, electrical and computer, and mechanical engineering; engineering science, materials science and engineering; environmental science and engineering; bioscience and biotechnology, chemistry, computer science, mathematics, and physics. For details on these graduate programs, see 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 degrees in Engineering and Global Operations Management (EGPM), Information Technology, and Computer Science are offered. The M.S. in Computer Science offers an academic year program that provides both computer science and computer engineering perspectives (see the interdisciplinary graduate programs page). Information Technology courses range from disciplines in math and computer science, electrical and computer science, communications, and management information technology (see the interdisciplinary graduate programs page). Clarkson also offers both M.S. and Ph.D. degrees in Environmental Science and Engineering (see the interdisciplinary graduate programs page).

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.

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)
In the School of Business, the minimum required TOEFL score is 100 on the internet-based test (IBT). The minimum IELTS score is an overall band score of 7.0. If the applicant completes the IELTS, then the student must also complete a TSE (test of spoken English) by calling the Office of Graduate Business Programs for a brief telephone interview. If the applicant submits an iBT TOEFL score of over 100, the TSE requirement may be waived.

In the Coulter School of Engineering, the minimum TOEFL score is 550 80 on the internet based test (IBT) or minimum IELTS band score of 6.5.

The School of Arts and Science 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. Other 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.

Other Application Requirements for all graduate programs in science, engineering and interdisciplinary programs are required to take the Graduate Record Examinations; 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.

Superior Clarkson undergraduate students, 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.

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/.

**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.

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 the departments of Biology, Chemistry, Chemical and Biomolecular Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, Environmental Science and Engineering, Mathematics, Mechanical and Aeronautical Engineering, Physical Therapy, and Physics; and in interdisciplinary Engineering Science, Computer Science and Information Technology. 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).
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.

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, the 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.

To be eligible to receive a degree during Commencement exercises at the end of the spring semester, a student who has submitted a thesis acceptable to the advisor and committee must file the completed final copies with the appropriate School office no later than 10 working days before commencement to award degrees.

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. 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.
   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.
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 to 9 credit hours of the required coursework can be taken from Clarkson via 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. There is a maximum of 9 credits of coursework offered through distance learning. The remaining credits, up to 30 hours, can be transferred in accordance with the normal procedures or taken on campus. 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.

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.
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 for more information on Federal Loan Programs and application procedures.
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 DEFINITIONS
Graduate grades at Clarkson are defined as follows:

A  passed with 4.0 quality points per credit hour
B+ passed with 3.5 quality points per credit hour
B  passed with 3.0 quality points per credit hour
C+ passed with 2.5 quality points per credit hour
C  passed with 2.0 quality points per credit hour
F  failure
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 2013–2014 graduate programs is at the rate of $1,324 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. Graduate students (other than MBA candidates) may not register for more than 15 credit hours per semester. Full-time 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 are 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
A wide range of financial assistance is available to full-time graduate students. 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 2013-2014 these assistantships carry stipends of $23,329 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 2013-2014 are $23,329 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 2013-2014 range from $20,670 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.

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 
   federal aid.
2. PACE - A minimum percentage of attempted credits hours 
   must be earned every semester. PACE is determined by:

   Cumulative # of Earned Hours
Cumulative # of Attempted Hours

Students must maintain a minimum PACE of 67%

3. The maximum time frame for meeting degree requirements. 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.

Students who have been notified that she/he is on Financial Aid Warning for Spring 2012, must have a 3.0 by the conclusion of the Spring 2012 term to be eligible for federal aid for subsequent 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.
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.
DIVISION OF RESEARCH

Gregory C. Slack, Director of Research and Technology Transfer; Anna Marie Dawley Grant and Contract Administrator/CAMP Financial Manager; Kimberly Klatt, Research Compliance Officer; Todd C. Travis, Award Administrator and Exchange Visitor Program Alternate Responsible Officer

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.
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 and sensor 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.
CENTER FOR REHABILITATION ENGINEERING, SCIENCE, AND TECHNOLOGY (CREST)
Charles Robinson, Director

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 teams 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

Gabor Forgacs, Executive and Scientific Director, Matthew Draper, Deputy 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 Gabor Forgacs, Executive and Scientific Director and Matthew Draper, Deputy 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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B.E., M.S., Ph.D., Tsinghua University, Beijing, China
Assistant Professor of Civil and Environmental Engineering

WHITE, Dawn
B.A., Nazareth College
M.S., University of Nebraska
Clinical Assistant Professor of Physician Assistant Studies

WILKE, Andreas
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Assistant Professor of Psychology

WRIEDT, Mario
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Ph.D. Christian Albrechts University, Kiel, Germany
Assistant Professor of Chemistry and Biomolecular Science

WEARS, Katherine
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J.D., Albany Law School
Ph.D. Carlton University
Assistant Professor/Associate Dean of Undergraduate Business Programs
WRIGHT, Susan
Ph.D., Carleton University
CMA (Certified Managerial Accountant)
Instructor of Economics and Financial Studies

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Ph.D., Illinois Institute of Technology, Chicago
Assistant Professor of Electrical and Computer Engineering

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M.S., Ph.D., Carnegie Mellon University
Assistant Professor of Operations and Information Systems

XYDIAS, Christina
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M.A., Ph.D., Ohio State University
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YAO, Guangming
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Assistant Professor of Mathematics

YOUNG, Keith
B.S., SUNY Empire State College
M.S., University of Nebraska Medical Center
Clinical Assistant Professor of Physician Assistant Studies / Director of Didactic Education

YOUNG, Keith
A.B., M.S., University of Missouri
Ph.D., Michigan State University
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YOUNG, Keith
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YU, Zhenxin
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M.S., Ph.D. Washington University in St. Louis
Assistant Professor of Operations and Information Systems

YUYA, Philip
B.S., M.S., Ph.D. University of Nairobi, Kenya
Assistant Professor of Mechanical and Aeronautical Engineering
INSTRUCTORS

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M.S., University of Bucharest, Romania
Ph.D., University of Bucharest, Romania
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BAILEY, Frances
A.B., College of Mount St. Joseph
M.A., University of Colorado
Instructor of Humanities / Director of Arete and Social Documentation

BUCKLE, Karen
Instructor of School of Engineering

COMPEAU, Marc
B.S., SUNY Potsdam
M.S., Clarkson University
Instructor of Consumer and Organizational Studies

DULLEA, Daniel
B.S., M.S., SUNY - Syracuse
Instructor of Communication and Media / Director of Media Creation and Production

FELLAND, Michael
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S.M., University of Chicago
M.S., University of Chicago
Senior Military Science Instructor

FOSTER, Clifford
MSG., U.S. Army
Instructor of Military Science

ISSEN, Marshall
B.S., University of Illinois, Urbana
M.S., Roosevelt University
P.E., Illinois
Instructor of Engineering and Management

MACKINNON, William
B.P.S., M.S., Clarkson University
Instructor of Operations and Information Systems

MARTIN, Christopher
B.S., Clarkson University
M.S., SUNY Potsdam
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MORRISON, Sara
B.S., St. Lawrence University
M.S., University of Vermont
Instructor of Mathematics

SEARLEMAN, Janice
B.S., University of Massachusetts/Amherst
M.S., State University of New York at Stony Brook
Instructor of Computer Science

SEKELJ, Gasper
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Instructor of Economics and Financial Studies

SHERMAN, Jesse
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Instructor of Operations and Information Systems

TOWLER, Christopher
B.S., Clarkson University
DPT. Clarkson University
Clinical Instructor of Physical Therapy
# ACADEMIC CALENDAR

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>New student arrival and check-in</td>
<td>August 23</td>
<td>August 22</td>
</tr>
<tr>
<td>Returning student check-in</td>
<td>August 25</td>
<td>August 24</td>
</tr>
<tr>
<td>Classes begin</td>
<td>August 26</td>
<td>August 25</td>
</tr>
<tr>
<td>Fall recess begins*</td>
<td>September 27</td>
<td>September 26</td>
</tr>
<tr>
<td>Classes resume</td>
<td>October 2</td>
<td>October 2</td>
</tr>
<tr>
<td>Thanksgiving recess begins*</td>
<td>November 26</td>
<td>November 26</td>
</tr>
<tr>
<td>Classes resume</td>
<td>December 2</td>
<td>December 1</td>
</tr>
<tr>
<td>Examinations begin</td>
<td>December 9</td>
<td>December 8</td>
</tr>
<tr>
<td>Examinations end</td>
<td>December 13</td>
<td>December 12</td>
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<table>
<thead>
<tr>
<th>Spring Semester</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>New student check-in</td>
<td>January 7</td>
<td>January 6</td>
</tr>
<tr>
<td>Returning student check-in</td>
<td>January 8</td>
<td>January 7</td>
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<tr>
<td>Classes begin</td>
<td>January 9</td>
<td>January 9</td>
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<tr>
<td>February break begins*</td>
<td>February 12</td>
<td>February 11</td>
</tr>
<tr>
<td>Classes resume</td>
<td>February 17</td>
<td>February 16</td>
</tr>
<tr>
<td>Spring recess begins*</td>
<td>March 14</td>
<td>March 13</td>
</tr>
<tr>
<td>Classes resume</td>
<td>March 24</td>
<td>March 23</td>
</tr>
<tr>
<td>Examinations begin</td>
<td>April 28</td>
<td>April 27</td>
</tr>
<tr>
<td>Examinations end</td>
<td>May 2</td>
<td>May 1</td>
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**Commencement**

**Summer School**

<table>
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<tr>
<th>2013</th>
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<tr>
<td>Session I begins</td>
<td>May 19</td>
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<tr>
<td>Session I ends</td>
<td>June 21</td>
</tr>
<tr>
<td>Session II begins</td>
<td>June 30</td>
</tr>
<tr>
<td>Session II ends</td>
<td>August 2</td>
</tr>
</tbody>
</table>

*Recesses begin at the end of the last scheduled class on the day listed.*
Policies

Equal Opportunity Policy
Clarkson University does not discriminate on the basis of race, gender, color, creed, religion, national origin, age, disability, sexual orientation, veteran or marital status in provision of educational or employment opportunities. Clarkson University does not discriminate on the basis of sex or disability in its educational programs and activities, pursuant to the requirements of Title IX of the Educational Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973, and the American Disabilities Act of 1990 respectively. This policy extends to both employment by and admission to the University. Inquiries concerning Section 504, and the Americans with Disabilities Act of 1990, should be directed to Jennifer de Coste, Section 504/ADA Coordinator, Center for Advanced Materials Processing, Room 101, Clarkson University, P.O. Box 5512, Potsdam, NY 13699-5512; or telephone 315-268-3785. Information on the processing of grievances and charges relating to the above policies can be obtained from the Affirmative Action Officer, Clarkson University, P.O. Box 5512, Potsdam, NY 13699-5512, or telephone 315-268-3785. Inquiries concerning Title IX, the Age Discrimination Act, or other discrimination concerns should be directed to Suzanne E. Davis, Title IX Coordinator, Clarkson University, P.O. Box 5615, Potsdam, NY 13699-5615; or telephone 315-268-6493. 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.

Campus Crime Statistics
The Advisory Committee on Campus Safety will provide upon request all campus crime statistics as reported to the United States Department of Education. Contact the Director of Campus Safety & Security, 315-268-6666, or visit www.clarkson.edu/campussafety.

Protection of Privacy
Clarkson University abides by the provisions of the Family Educational Rights and Privacy Act of 1974 (Buckley Amendment). The University will release or withhold information under these provisions, which are published annually in the Clarkson Regulations.

Nonimmigrant Alien Students
Clarkson is authorized under federal law to enroll nonimmigrant alien students.

Changes in Curricula
Information contained in this catalog is current at the time the catalog is posted on our Web site, but as courses and curricula undergo changes by official action of the University, occasionally such changes may supersede information found herein. The accuracy of any particular information can be checked through the Office of Undergraduate Admission, Student Administrative Services, the Dean of the appropriate School, or academic departments.

All students are encouraged to read the catalog thoroughly. Failure to be familiar with the contents does not excuse a student from the requirements and regulations described herein.
LIST OF DEGREE PROGRAMS & HEGIS CODES

The number following the degree program is the Higher Education General Information Survey (HEGIS) code for classifying academic areas designated by the New York State Education Department. Enrollment in other than registered or otherwise approved programs may jeopardize a student’s eligibility for certain student aid awards.

**Undergraduate Degree Programs**

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<thead>
<tr>
<th>BUSINESS</th>
<th>Graduate Degree Programs</th>
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<tbody>
<tr>
<td><strong>Bachelor of Science</strong></td>
<td><strong>Master of Science</strong></td>
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<tr>
<td>Global Supply Chain Management 0509</td>
<td>Engineering and Global Operations Mgmt 0913</td>
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<tr>
<td>Innovation and Entrepreneurship 0506</td>
<td>Professional Management 0506</td>
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<tr>
<td>Financial Information and Analysis 0504</td>
<td><strong>Master of Business Administration</strong></td>
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<tr>
<td>Information Systems and Business Processes 0599</td>
<td>(MBA) Management 0506</td>
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<tr>
<td>Engineering and Management 4904</td>
<td><strong>ENGINEERING</strong></td>
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<tr>
<td><strong>Bachelor of Science</strong></td>
<td><strong>Master of Engineering</strong></td>
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<tr>
<td>Aeronautical Engineering 0902</td>
<td>Chemical Engineering 0906</td>
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<tr>
<td>Chemical Engineering 0906</td>
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<td>Electrical Engineering 0909</td>
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<tr>
<td>Computer Engineering 0999</td>
<td>Mechanical Engineering 0910</td>
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<tr>
<td>Electrical Engineering 0909</td>
<td><strong>Master of Science</strong></td>
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<tr>
<td>Environmental Engineering 0922</td>
<td>Chemical Engineering 0906</td>
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<tr>
<td>Mechanical Engineering 0910</td>
<td>Civil Engineering 0908</td>
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<td>Electrical Engineering 0909</td>
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<td>Engineering Science 0901</td>
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<td>Mechanical Engineering 0910</td>
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<tr>
<td><strong>ARTS AND SCIENCES</strong></td>
<td><strong>Doctor of Philosophy</strong></td>
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<tr>
<td><strong>Bachelor of Science</strong></td>
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<td>American Studies 0313</td>
<td>Civil and Environmental</td>
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<td>Applied Mathematics and Statistics 1703</td>
<td>Engineering 0908</td>
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<tr>
<td>Biology 0401</td>
<td>Electrical and Computer Engineering 0909</td>
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<tr>
<td>Bioscience &amp; Biotechnology 0499</td>
<td>Engineering Science 0901</td>
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<td>Chemistry 1905</td>
<td>Materials Science and Engineering 0915</td>
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<td>Communication 0601</td>
<td>Mechanical Engineering 0910</td>
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<tr>
<td>Computer Science 0701</td>
<td><strong>SCIENCE</strong></td>
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<tr>
<td>Digital Arts and Sciences 0605</td>
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<tr>
<td>History 2205</td>
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<tr>
<td>Humanities 1501</td>
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Interdisciplinary Liberal Studies 4901
Interdisciplinary Social Sciences 2201
Mathematics 1701
Physics 1902
Political Science 2207
Psychology 2001
Social Documentation Double Major
Mathematics 1701

INTERDISCIPLINARY
Bachelor of Science
Areté (Business & Liberal Arts Double Major)
Environmental Science and Policy 0420
Environmental Health Science 0426
Engineering and Management 4904
Software Engineering 0999
Bachelor of Professional Studies
Individually Designed Program 4999

Master of Science
Basic Science 4902
Chemistry 1905
Mathematics 1701
Physician Assistant Studies Physics 1902

Doctor of Philosophy
Chemistry 1905
Computer Science 0701
Mathematics 1701
Physics 1902

Doctor of Physical Therapy
Physical Therapy 1212

INTERDISCIPLINARY
Master of Science
Computer Science 0701
Engineering and Global Operations Management 0913
Environmental Politics & Governance 0420
Environmental Science and Engineering 0922
Information Technology 0702

Doctor of Philosophy
Environmental Science and Engineering 0922
All courses are 3 credits unless otherwise noted.

A total of 16.5 design credits is required. Approved for 2013-2014

If CE435/535 is selected the curriculum must include either CE477 Atmospheric Chemistry or CE480 Chemical Fate and Transport in the Environment

SUGGESTED SOC/HUM ELECTIVES

EC 360 Env. Economics
EV 430 Environmental Law
LC 225 Environment, Technology and Society

SUGGESTED PROFESSIONAL ELECTIVES

BY 222/224 Ecology + Lab
BY 328 Conservation Biology
BY 431 Limnology
*CE 310 Geotechnical Engineering
CE 430 Water Resources Engineering II
CE433/ES533 Human Exposure Analysis
CE 477 Atmospheric Chemistry
CE 478 Solid Waste Management and Landfill Design
CE 488/588 Analysis of Human Exposure to Pollutants
CH 434 Air Pollution Control
CH 460 Environmental Applications of Mass Transfer
CH 465 Biochemical Eng
CM 406 Treatment of Exp Data

* Recommended Electives