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 Admission. For graduate programs, direct inquiries as indicated below.

**UNDERGRADUATE ADMISSION**
*First Year (Domestic & International)*
Clarkson University
PO Box 5605
Potsdam, NY 13699–5605
800–527–6577
315–268–6480
Fax 315–268–7647
E–mail admission@clarkson.edu

*Transfer (Domestic & International)*
Clarkson University
PO Box 5610
Potsdam, NY 13699–5610
800–527–6577
315–268–2125
Fax 315–268–7647
E–mail tradmission@clarkson.edu

**GRADUATE ADMISSION**
*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

*Programs in Physical Therapy/Health Sciences*
315–268–3786
E–mail ptgrad@clarkson.edu

*Graduate School*
315–268–6447
E–mail gradschool@clarkson.edu
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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 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 a mastery of the core knowledge within his or her field, a Clarkson education provides each student with the opportunity to:

- solve real-world, open-ended problems that require creativity and risk taking, including participation 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;
- work productively within and lead disciplinary and multidisciplinary teams composed of members with diverse interests and backgrounds;
- obtain outstanding capabilities in utilizing computing and other 21st century technologies;
- learn through instruction and guidance by nationally recognized faculty who have a commitment to both teaching and research that 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;
- supports the acquisition of knowledge through advanced electronic and information technology and innovative instructional approaches;
provide 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 of the community and to the 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 future challenges.
- **Vision**: Having a vision of what we want the future to be 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 a nationally ranked research university offering comprehensive programs in business, engineering, arts and sciences, and health sciences. As a student-centered institution, Clarkson emphasizes a dynamic collaborative approach to learning through programs that span boundaries across disciplines and outstanding, focused research.

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 seven is a president, CEO, vice president, or owner 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.


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 25 study abroad programs in 13 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 Center for Health Sciences, the Graduate School, the Division of Research, and The Clarkson School, a distinctive program through which accelerated high school students begin college studies.

Clarkson’s campus includes 49 buildings and 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 Center for the Environment is home to the University’s environmental research activities; graduate and undergraduate degree programs with a focus on environmental science, public policy and engineering; campus environmental initiatives; and outreach programs. Related research units include the Center for Air Resources Engineering and Science (CARES) and the Great Rivers Center.

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.

Bertrand H. Snell Hall houses the School of Business, the administrative offices of the School of Arts & Sciences, the humanities and social sciences faculty, and the Division of Research. 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 Leadership and Entrepreneurship, the Center for Global Competitiveness, 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 is a regional center of excellence for education, treatment and research in physical rehabilitation and other health sciences. The center houses both Clarkson’s Ph.D. program in physical therapy and Canton-Potsdam Hospital’s Physical Rehabilitation Services.

Clarkson’s physical facilities are valued at $173 million. They comprise approximately 1,270,392 square feet of assignable space, of which almost 85 percent has been built since 1970. More than 363,529 sq. ft. are dedicated exclusively to academic programs, including 47,879 sq. ft. in traditional classrooms and 177,773 sq. ft. assigned in laboratory areas.

Retention studies of independent institutions in New York State show on average that 66.8 percent of students who enter as freshmen complete their degrees within six years, and 54.3 percent in four years. At these same schools, the sampling of transfer students shows 62.4 percent completing their degrees in four years and 68.6 percent in six years.

At Clarkson the retention rate is well above the norm: averaged among those completing degrees over the past three years, 74.0 percent of freshmen completed their studies for a bachelor’s degree within six years; 71.2 percent in five years; and 55.6 percent in four years or less. Among transfer students, 48.5 percent complete their bachelor’s degrees in two years and 85.3 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 p. 44). 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 66.6 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, woodworking and pattern making, and normal manual training. By 1907 the school was offering additional bachelor’s degrees in mechanical, civil and chemical engineering.

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

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

Hockey began in 1921 on a rink behind Old Main, and soon moved to a bigger rink built by the students in Ives Park. Not until the hockey arena was completed on land across the river in 1938 did the team have a building in which to play. That facility was later named for the founding force behind Clarkson hockey, Murray Walker, owner of Weston’s Bookstore. Walker Arena provided home ice for Clarkson teams, which have frequently achieved national ranking, until 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 shrank to half a million within a year due to the stock market crash, the plans for the move had to be shelved for over 30 years. Since then, the campus has moved almost entirely to the hill, although some administrative offices and the programs in health sciences remain on the original downtown Potsdam campus.

Responding to a plea from New York Governor Thomas Dewey after World War II, Clarkson admitted hundreds of returning veterans. Having no space to house or teach them by 1946, Clarkson rented the New York State School for the Deaf in Malone, N.Y., 40 miles east of Potsdam. For the next five years, freshmen and many sophomores spent their first two years in Malone before moving to the Potsdam campus for the remainder of their Clarkson education. That branch closed in 1951.
With that flood of veterans came the Trustees’ realization that the College would have to expand its facilities, and expand them it did over the next 20 years, adding not only facilities but graduate programs in engineering, science, and management, including Ph.D. programs in most.

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

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

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

In the spring of 1999, Clarkson Hall was renovated and rededicated as the Center for Health Sciences. This downtown facility now houses the University’s programs in physical therapy, research facilities, and Canton-Potsdam Hospital Rehabilitation Services. The following spring, Clarkson opened the Adirondack Lodge as the headquarters for student outdoor recreation activities.

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. In 2007, Clarkson broke ground on the Resource Technology Center (RTC), a 15,000-square-foot addition connecting the Schuler Educational Resources Center and the Cora and Bayard Clarkson Science Center.
DEGREE PROGRAMS

BACHELOR’S DEGREE MAJORS

All bachelor's degree programs at Clarkson require completion of 120 credit hours and the learning expectations of the Clarkson Common Experience (Class of 2010 and later, see page 19) or the Foundation Curriculum (Classes of 2007, 2008 and 2009, see page 19). 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 on the page number listed following the degree. The Higher Education General Information Survey (HEGIS) code designated by the New York State Education Department for classifying these academic programs can be found on page 237. Clarkson offers the Bachelor of Science (B.S.) degree in the following majors:

**ARTS & SCIENCES**
- American Studies ...................................... p. 71
- Applied Mathematics & Statistics ............ p. 73
- Biology...................................................... p. 75
- Biomolecular Science ............................... p. 78
- Chemistry .................................................. p. 79
- Communication......................................... p. 83
- Computer Science ................................. p. 87
- Digital Arts & Sciences............................. p. 89
- Environmental Health Science....... p. 171
- Environmental Science & Policy ................ p. 167
- History ...................................................... p. 91
- Humanities ................................................ p. 93
- Interdisciplinary Liberal Studies ............... p. 93
- Interdisciplinary Social Sciences .............. p. 93
- Liberal Arts and Business Double Major  
  (Areté) ................................................. p. 176
- Mathematics............................................. p. 97
- Physics ...................................................... p. 100
- Political Science................................. p. 102
- Psychology............................................ p. 105

**BUSINESS**
- Aeronautical Engineering .................. p. 135
- Chemical Engineering......................... p. 137
- Civil Engineering ................................. p. 140
- Computer Engineering ......................... p. 143
- Electrical Engineering ......................... p. 146
- Environmental Engineering ................. p. 149
- Mechanical Engineering ...................... p. 151
- Software Engineering ......................... p. 153

**ENGINEERING**
- Financial Information & Analysis .......... p. 121
- Global Supply Chain Management ........ p. 118
- Information Systems & Business Processes . p. 122
- Innovation & Entrepreneurship .......... p. 119
- Interdisciplinary Engineering & Management ........................................ p. 173

**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. (See p. 133.)

**Double Major, Second Degree, and Dual Degree**

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, to two bachelor’s degrees, or to a dual degree. (See p. 23.)

**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.
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. Further information is available on the page indicated.

**ARTS & SCIENCES***

- American Studies .................................. p. 109
- Biology ............................................. p. 107
- Biophysics ........................................ p. 107
- Chemistry ........................................ p. 107
- Cognitive Neuroscience ........................ p. 108
- Computational Science ........................ p. 108
- Computer Science ................................ p. 108
- Digitally Mediated Communication ....... p. 109
- History .......................................... p. 109
- Humanities ...................................... p. 109
- International and Cross-Cultural Perspectives .......................................... p. 109
- Literature and the Arts ......................... p. 109
- Mathematics ..................................... p. 110
- Physics .......................................... p. 110
- Political Science ................................ p. 109
- Professional Communication ............. p. 111
- Psychology ....................................... p. 111
- Science, Technology and Society .......... p. 109
- Social Sciences .................................. p. 109
- Sociology ........................................ p. 109

**BUSINESS**

- Business ......................................... p. 124
- Economics ....................................... p. 124
- Law Studies ..................................... p. 124
- Quality-based Project Management ...... p. 125

**ENGINEERING**

- Electrical Engineering ........................ p. 153
- Engineering Science ........................... p. 154
- Software Engineering ........................ p. 184

**INTERDISCIPLINARY**

- Biomedical Engineering ........................ p. 180
- Biomedical Science and Technology ...... p. 180
- Environmental Health Science ............. p. 181
- Environmental Policy .......................... p. 181
- Environmental Science ........................ p. 183
- Information Technology ........................ p. 110
- Statistics ........................................ p. 111

**Software Engineering** ......................... p. 184

*Humanities and Social Sciences also offers disciplinary minors and student-designed minors not in the above list. See p. 109 or contact the chair of the Department of Humanities and Social Sciences at 315-268-6410.

**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 dean’s office in the School of Arts & Sciences at 315-268-6544.

**Pre-Physical Therapy Undergraduate Concentration Leading to the Graduate Physical Therapy Professional Curriculum**

All students admitted to the undergraduate pre-physical therapy professional concentration have a space reserved for them in the Doctor of Physical Therapy program, providing all prerequisite courses are completed at an appropriate level of performance. Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should call the associate dean for Health Sciences at 315-268-3786. (See p. 163.)
GRADUATE DEGREE PROGRAMS

For information regarding admission requirements, the application process, or financial assistance, including fellowships, research assistantships, and teaching assistantships, see p. 193. For information about specific programs, contact schools through the addresses shown on p. 1 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 on p. 237.

Clarkson University offers the following graduate degrees:

**Business**
- Master of Business Administration

**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

**Science**
- Master of Science
  - Chemistry
  - Mathematics
  - Physics
- Doctor of Philosophy
  - Chemistry
  - Mathematics
  - Physics

**Doctor of Physical Therapy**

**Interdisciplinary**
- Master of Science
  - Computer Science
  - Engineering and Global Operations
  - Management
  - Environmental Science and Engineering
  - Information Technology
- Doctor of Philosophy
  - Environmental 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, mechanical, and software engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET). 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 graduate physical therapy professional curriculum is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE) of the American Physical Therapy Association (APTA). 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.
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.

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, call the program office at 315-268-3948 or visit www.clarkson.edu/exploringoptions.

PRE-MEDICINE, PRE-DENTISTRY, AND PRE-VETERINARY PROGRAMS
Students may prepare for further professional study in medical, 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 315-268-2391 (see p. 11).

PRE-PHYSICAL THERAPY UNDERGRADUATE CONCENTRATION LEADING TO THE GRADUATE PHYSICAL THERAPY PROFESSIONAL CURRICULUM
Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should call the associate dean for Health Sciences at 315-268-3786 (see pp. 11, 163).

PRE-LAW
Katherine Wears, Advisor
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.
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 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 to train 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. To foster a sense of professionalism and a better understanding of careers in law, students interested may participate in the Clarkson Pre-Law Society.

**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.

The executive master’s program in Engineering and Global Operations Management (EGOM) offers an opportunity for practicing engineers and technical managers to keep abreast of leading-edge concepts in both technology and management by completing the degree in three years.

**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 major in Business, Arts & Sciences, or Interdisciplinary Engineering and Management 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
David Craig, 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. Junior and senior seminars and colloquia provide opportunities for all Honors students to present and discuss their research.
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 Thesis Project.

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 David Craig at 315-268-2290 or 2320, or through e-mail at dcraig@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 during the academic year on a space-available basis at one or another of the campuses. 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 p. 41.)

There is a special form for cross-registration available from Student Administrative Services or from the Associated Colleges office (267-3331 or acslv@potsdam.edu). The form requires approving signatures of the student’s advisor 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.
STUDENTS IN THE CLASSES OF 2008 AND 2009

FOUNDATION CURRICULUM AND REQUIREMENTS
The Foundation Curriculum strives to make all Clarkson University students well-rounded individuals. Accordingly, the Foundation Curriculum tries to ensure that all Clarkson University students become aware of their historical and cultural heritage and cultivate an appreciation of literature and the fine arts, as well as an understanding of economic, political, and social systems. Students learn to speak and write clearly, understand how to use computer and library resources, and develop a knowledge of mathematics and science. Also, it provides students with an awareness of self and exposes them to ethical and valuational perspectives in an increasingly technological world. Foundation Curriculum requirements are:

- 1 course in Engineering
- 1 course in Business
- 6 courses in Liberal Arts
- 2 courses in Mathematics
- 2 courses in Science
- LS195 and LS196 (Great Ideas I and II) plus four elective courses fulfill the requirements in Liberal Arts. The four elective courses must include at least two of the three designators: Hum (Humanities), Soc (Social Sciences), and H/S (Interdisciplinary). Liberal Arts courses and the designator attached to each are listed in the Courses publication. Engineering and Interdisciplinary Engineering & Management majors should consult their departmental advisors for additional information on the Liberal Arts requirements. All Foundation Curriculum courses must be selected from approved lists published in Courses.

STUDENTS IN THE CLASS OF 2010 AND BEYOND

CLARKSON COMMON EXPERIENCE CURRICULUM
A Clarkson education prepares each student for today’s world and tomorrow’s challenges. All Clarkson students who enter with the Class of 2010 and later are required to meet the learning expectations of the Clarkson Common Experience, which 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.

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. Coursework 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:
• learning to communicate effectively,
• developing an appreciation for diversity in both working and living environments,
• recognizing the importance of personal, societal, and professional ethics, and
• 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 the Clarkson seminar, then across the curriculum and in the major. Courses designated as communication intensive are assigned points on a scale of one or two (C1 or C2) to indicate the extent of communication experience in that course. Beyond 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 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. The First-Year Seminar helps students respect and learn from Clarkson’s diverse community. In the Clarkson seminar, students will be urged to question their own assumptions and to consider different world-views. 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 prepares 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 the First-Year Seminar. Social and cultural values are discussed as part of the Clarkson Seminar. Several courses in the knowledge areas 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 required technology course reinforces this knowledge by demonstrating how technology may be used to serve humanity. The interrelation of science, technology and society is studied in one of the knowledge areas.
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 creates learning communities which focus on questioning received wisdom. The seminar introduces students to the role of values and ethics in culture and society. The objectives are to develop students’ reasoning abilities through critical analysis of the received beliefs and assumptions of their own societies and cultural traditions, and to develop students’ communication abilities through writing and discussion. [Fall semester]

Knowledge Areas and University Courses
Students must achieve learning outcomes in six broad areas of knowledge listed below. The knowledge area requirement is met by completing five individual courses including at least one University Course that unites two areas of knowledge. Together, these courses must cover all of the following areas of knowledge:

<table>
<thead>
<tr>
<th>Cultures and Societies</th>
<th>Science, Technology, and Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contemporary and Global Issues</td>
<td>Economics and Organizations</td>
</tr>
<tr>
<td>Imaginative Arts</td>
<td>Individual and Group Behavior</td>
</tr>
</tbody>
</table>

All students must take at least one University course after the first year. University Courses will address learning outcomes in two of the six areas of knowledge. University courses are multidisciplinary, 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 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 extracurricular activities that carry a total of at least six communication points. Courses and activities with a communication component will carry either one or two points. At least two points must come from within the student’s major discipline in a 300/400 level course.

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 meet outcomes of the Common Experience as described below.

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

Communications: Students must complete coursework in the major field at the 300 or 400 level that includes discipline-specific communication for a total of at least two communications 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**

Students in the Classes of 2007, 2008 and 2009 (Foundation Curriculum)

1. At least 120 credit hours.
2. At least a 2.000 cumulative average.
3. At least a 2.000 cumulative average in major field of study for the Class of 2004 or later.
4. Satisfy all departmental course requirements.
5. All students entering as first-year students must take First-Year Seminar or equivalent.
6. Develop effective writing skills. To help students develop writing and thinking skills, Clarkson has a Writing Across the Curriculum program in which students write regularly in writing-intensive courses both within the major and their elective courses. Students for whom English is a second language must take an English language placement examination upon entering Clarkson, fulfill all requirements dictated by the examination’s results, and pass any ESL course satisfactorily before taking Great Ideas or other writing-intensive courses.
7. Meet Foundation Curriculum requirements.

Students in the Class of 2010 and Beyond (Clarkson Common Experience)

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.
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 cr. hrs.) including the final undergraduate semester.

Further information regarding graduation requirements may be found in Section III–U of the Clarkson Regulations or by contacting Student Administrative Services.

**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 ESL courses prior to enrolling in the Clarkson Seminar or any course assigned one or two communications points.

**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 student must apply in writing to Student Administrative Services, Clarkson University, PO Box 5575, Potsdam, NY 13699–5575. The letter should state why the University should continue the student, the program(s) of study the student wishes to be continued in, and any other information the student feels pertinent to the situation. All cases of continuance require concurrent approval of the department chair or program director and of 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, SECOND DEGREE, AND DUAL 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 or a dual 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. The two degrees are awarded at the same commencement when the requirements for both degree programs are completed at the same time.

**COURSES**
A wide range of typical courses is listed in all departments, but not all courses are offered each year. Descriptions of courses and semesters in which specific courses are offered are accessible in PeopleSoft and are published annually in Courses, available from the Office of Undergraduate Admission or Student Administrative Services. It is also available electronically at www.clarkson.edu. For more information, call SAS at 315–268–6451.

Course credit is also available for Independent Study and Special Projects.
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 cocurricular educational activities as well as provide global, pre-professional and leadership experiences.
• CORE Values
  Vision — Integrity — Diversity — Pride — Empowerment — Collaboration

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.

**FIRST-YEAR 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. The resident advisors (or RAs) are upperclass students 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.

**First-Year Advising Center**

The First-Year Advising Center 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 advisor, an added service offered by Clarkson is a First-Year Advising Center 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 Center helps students identify campus resources so they can take advantage of the opportunities available at the University. For example, they can help you connect with people to answer your questions about counseling, special learning needs, tutoring, majors and academic options, residence life, and more.

**First-Year Seminar**

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 upperclass 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 tend to be housed with students in their major area of study (i.e., Engineering, Science, Business, or Liberal Arts) and in many instances, with students in the same academic department. This gives students the opportunity to study and learn together. For help adjusting to academics, many alternatives exist. First-year students have available a professional advising center to assist them in understanding and making their choices, and in overcoming academic difficulties of any kind. A faculty academic advisor from the major department is assigned to each entering student the summer before their arrival, and the advisor is a key person to see about academic questions. Academic departments provide information about the role and function of the advisor.

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.

**CLARKSON HOUSING**

Clarkson is a residential university. Single undergraduate students 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. Junior and senior fraternity and sorority members who meet academic requirements may live and dine in University-recognized fraternity and sorority housing. Upperclass 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 the Cubley-Reynolds and Hamlin-Powers complex. Special attention is given to the assigning of roommates to first-year students. Some of our housing units feature suite-type accommodations; these rooms are fully carpeted 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. Substance-free housing is available to our students. 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 emerging 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 compliment 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 Center contains the office of the student newspaper, The Integrator, and the Student Senate office. In addition, the Office of the Dean of Students, Residence Life Office, Office of Student Organizations, and Campus Safety & Security are located in 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 take 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 advisor. This advisor provides a direct student-faculty contact for advising on academic matters and professional planning. There is also an advising center available that provides a professional advisor who can help sort out and resolve particular academic concerns and problems.

The First-Year Advising Center 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 advisor, an added service offered by Clarkson is a First-Year Advising Center 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 Center helps students identify campus resources so they can take advantage of the opportunities available at the University. For example, they can help you connect with people to answer your 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 [www.clarkson.edu/campusafety](http://www.clarkson.edu/campusafety).

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](http://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.

**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 movies, cultural films, special dances, forums, concerts and comedians.

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 Petersen Boardroom, Bertrand H. Snell Hall. 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.

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 Canadiens. 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 (1904)
- Zeta Nu (1956)
- Tau Delta Kappa (1970)

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

- Sigma Delta (1904)
- Alpha Chi Rho (1956)
- Delta Sigma Phi (1967)
Tau Epsilon Phi (1968)
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)

Students are eligible to join fraternities and sororities according to the guidelines established by the Recognition Policy for Fraternities and Sororities. Recruitment takes place during the first two weeks of each semester.

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 Assistant Dean of Students for Student Organizations at 315-268-2345.

HONOR SOCIETIES
Upperclass 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), Omega Chi Epsilon (chemical engineering), Phi Theta Kappa (transfer students), Pi Mu Epsilon (mathematics), Pi Tau Sigma (mechanical engineering), and Tau Beta Pi (engineering). Sigma Tau Iota is a local honor society available to Interdisciplinary Engineering and Management students.

IFC/Panhellenic ACTIVITIES
The councils’ activities include several annual events. The fraternity and sorority community sponsors its own intramural programs, Greek Week, Ice Carnival, as well as numerous broader community-service events. In addition, the councils involve the chapters in many other campus and community activities.

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 Panhellenic 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 at www.clarkson.edu/~iso/.
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 one facility that is located in the basement of the Hamlin-Powers Residence Hall complex. 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.

PANHELLENIC COUNCIL
The Panhellenic 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 conducted during the first two weeks of each semester.

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; Society for Technical Communication; and Society of Women Engineers.

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, Koinonia (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.

SERVICE ORGANIZATIONS
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.

SPECIAL INTEREST CLUBS
Among the campus organizations for students with special interests are: Amateur Radio Club, Archery Club, Bowling, Broomball, Chess, Clarkson Rangers (Army ROTC), Clarkson Theatre, Clarksonian, Common Ground, Cycling/Mt. Biking Club, Environmental Club, Flying Club, Gaming Club, International Students, Jazz Band, Legal Aid Clinic, Men’s Rugby Club, Mini-Baja, Formula SAE, Outing Club, Pep Band, Photo Club, Physics Club, Racquetball Club, Ski Club, SPECTRUM, Sports Car Club, Student Orientation Services, Sunrayce, Ultimate Frisbee, Volleyball Club, WCKN-TV, WTSC radio, and Women’s Rugby Club.

STUDENT DEVELOPMENT 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 (located in the Hamlin-Powers residence hall complex) 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. With the exception of physicals, most visits to the Health Center are free of charge. Lab work, x-rays and prescription meds are billed to the student's insurance carrier. The Health Center is open weekdays from 8 a.m. – 4 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 PROGRAM**
The Career Center is designed to assist 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.

**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 service on the Internet called EmployOn; 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 2006 over 98 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.
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 is on writing resumes, cover letters, practicing job interviews, and teaching students how to conduct a successful job search. A key decision for the student is how to make up coursework missed while in the workplace. Students can choose to attend summer school, use AP credit they have earned, overload coursework during the semester or push back their planned graduation date. Co-op students work closely with their academic advisor, Student Administrative Services representative and the Career Center staff to plan out a successful co-op experience. While away during the semester(s), a co-op student is considered a full-time student.

All University students are encouraged to consider co-op as a way to enrich their Clarkson education. Co-op positions are located across the country, though most are concentrated in the northeast. While on co-op, students are assigned a direct supervisor, paid a professional salary and are evaluated during their job assignment. Students are also encouraged to communicate with the Career Center while on co-op so that staff may monitor their progress. For more information, visit the Clarkson University Cooperative Education Web site at www.clarkson.edu/career/coop_program 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 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 Career Center has articulated exchange agreements with the following universities:

AUSTRALIA
Flinders University, Adelaide
Griffith University, Gold Coast
Monash University, Melbourne
University of Newcastle, Newcastle
University of Technology, Sydney
AUSTRIA
Upper Austria University of Applied Sciences, Steyr
CHINA
City University of Hong Kong, Kowloon
CROATIA
University of Zagreb, Zagreb
ENGLAND
University of Leicester, Leicester
Northumbria University, Newcastle
Queen’s University, International Study Centre (ISC) at Herstmonceux Castle, East Sussex
University of Brighton, Brighton
FRANCE
Bordeaux Management School, Bordeaux
Grenoble School of Management, Grenoble
Université Catholique de Lyon, Lyon
Reims School of Management, Reims
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. Short-term summer programs, 3-4 weeks in duration, are also available for those students who do not wish to be gone for a full semester or year. For more details about the Study Abroad/Exchange Program, visit www.clarkson.edu/career or call the Career Center at 315-268-6477.

*language fluency required
✝research exchange only

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.

Clarkson University’s Office of Accommodative Services, located on the first floor of Price Hall, 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.

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.

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.

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.

Student Support Services (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. To receive assistance, students must be economically challenged, first generation, or disabled. Student services include study skills development, tutoring, career advisement, mentoring and financial assistance.

**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.

**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 Snell Field, adjacent to the residence halls, 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:

<table>
<thead>
<tr>
<th>Basketball (3 on 3 &amp; 5 on 5)</th>
<th>Broomball</th>
<th>Ice Hockey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softball</td>
<td>Indoor Soccer</td>
<td>Soccer</td>
</tr>
<tr>
<td>Volleyball</td>
<td>Touch Football</td>
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</tbody>
</table>

Intramural Athletic weekend tournaments include the following:

- Racquetball
- Basketball
- Volleyball
- Dodgeball

The Recreational Athletics program includes the following:

- Canoeing
- Kayaking
- Down Hill Skiing
- White Water Rafting
- Strength & Toning Exercise

- Hiking
- Mountain Biking
- Rock Climbing
- Aerobic Exercise
- Kick Boxing

- Overnight Camping
- Cross Country Skiing
- Ice Climbing
- Yoga
- Swimming

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

**FACILITIES**

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

Additional facilities include Walker Center, Hantz and Bagdad Fields, and the Cheel Campus Center and Arena. All facilities are within walking distance of the various dormitory buildings.
**VARSIY SPORTS**

The Clarkson Golden Knights compete in 19 intercollegiate varsity sports at the NCAA Division III level and at the NCAA Division I level in men’s and women’s hockey.

Women’s Division III varsity teams include: alpine and nordic skiing, basketball, cross country, lacrosse, 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.

Clarkson is a member of the National Collegiate Athletic Association (NCAA), the Eastern Collegiate Athletic Conference (ECAC), the Liberty League, and the New York State Women’s Collegiate Athletic Association (NYSWCAA).

**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.

**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 at Clarkson. 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.
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 relational database management/design. The following is just a partial list of software titles in use at Clarkson:

- MAPLE
- MATLAB
- ANSYS
- AutoCAD
- 3D Studio
- Adobe Photoshop
- Adobe Premier
- Maple
- MS Office Suite Professional
- STAAD
- SAP
- SPSS
- Visual Studio
- Oracle
- 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 the campus electronic library data. 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**

The University Libraries support 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.

The Harriet Call Burnap Memorial Library is the main library located on the hill campus in the Educational Resources Center (ERC). Its collection comprises more than 500,000 volumes, over 1,600 print and electronic journals, an estimated 9,000 electronic books, thousands of government documents and reports, Clarkson University dissertations, the Ridings Collection, and University Archives. The library also offers access to several electronic databases and online reference works, including but not limited to encyclopedias, dictionaries, directories and newspapers.

The Physical Therapy 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 serves the University’s health programs, as well as the local health industry. Its collection includes 1,730 books and 198 reference books, as well as 83 journal titles.

The Clarkson University library catalog is available on the campus network, as are catalogs from neighboring colleges, a combined catalog for Northern New York libraries, and a “supercatalog” covering millions of books throughout the country and the world. Clarkson students have access to the library resources of the other member institutions of the Associated Colleges of the St. Lawrence Valley. Together, the four local academic libraries provide excellent support for the diverse fields of study offered within the consortium. Materials not found in the local libraries can be ordered through electronic interlibrary loan services.

Increasingly, the library provides information services through the Web, available to students in classrooms and labs, residence halls, and even off-campus. Clarkson licenses online reference works including encyclopedias, dictionaries and directories, full-text books, abstracts and indexes used to identify journal articles in all fields of study, and full-text journals and newspapers. Several databases combine indexes to journal articles with online full text of the articles, considerably expanding what is available through our own journal collection. For many students, our licensed Web resources provide the primary source of academic reference materials needed for their studies.
Candidates for admission to Clarkson as first-year students are graduates, or soon-to-be graduates, of a secondary school or preparatory school. In special instances students are considered after three years of high school. 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. Students who complete an interview with an admission staff member will receive a fee waiver for the application fee. 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 turn to page 45.

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>
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<tr>
<th>Engineering, Science, and Interdisciplinary</th>
<th>Business and Liberal Arts</th>
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<td>Engineering and Management Programs</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>English</td>
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<tr>
<td>Mathematics</td>
<td>Mathematics</td>
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<tr>
<td>Science, including:</td>
<td>Science</td>
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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. This fee is nonrefundable and must accompany the application. The application fee is waived for students who complete an interview with an admission staff member or 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.

The Office of Admission is open on weekdays from 9 a.m. until 4 p.m. and on Saturdays by appointment. 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.

The small student body of The Clarkson School lends itself well to individualized attention. An orientation and advising program that extends into the first semester emphasizes the time-management and study skills that are essential for success in college. Each student’s progress is carefully monitored, and individualized help is provided where necessary. Personal development is considered an integral part of the program, and there are numerous structured activities that foster a cooperative living and learning environment. Monthly dinners are held to build a sense of community amongst the Clarkson School students and are tailored to address the needs of first year students. A typical year will feature guest speakers, discussions of future educational opportunities, and meetings with faculty mentors. Field trips are an integral part of the program. The University’s clubs, activities and most sports are open to Clarkson School students.

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

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

The Admission Committee evaluates each applicant’s credentials with great care. We require the following for application to our program: Clarkson School Application Form, $50 Application Fee, essay, Secondary School Report Form with a letter of recommendation from the guidance counselor, official high school transcript, standardized test scores, and at least two letters of recommendation from teachers.

Applying to The Clarkson School

A $50 fee should be submitted with the application, or may be submitted separately if the application is filed electronically. Application fee waivers are also accepted. All potential Clarkson School students are encouraged to visit the campus for an interview and campus tour. Students who interview with an Admission Representative for The Clarkson School will not be required to submit the application fee. Applications are accepted until July 1, but early application is recommended. Admission decisions are made on a continuing basis for students who have completed their Application Portfolio.

In general, applicants accepted to The Clarkson School have:

Demonstrated academic ability and motivation, as reflected by grades, standardized test scores, and class standing. Nearly all of our students rank in the top five to 15 percent of their high school classes.

Sought extracurricular involvement and demonstrated achievement in high school, and are
looking for a greater challenge for the next year.

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 www.clarkson.edu/transfer.

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.

In addition, applicants should be aware that:

- A personal statement (essay) describing a special interest, experience or achievement that is important and meaningful to you.
- 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 opportunites available for entering transfer students. Please check the Scholarships and Financial Assistance section of this catalog on page 55.

**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 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 pp. 4-5). 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 Admission to support international students.

Application Process
Clarkson University is a member of the Common Application. International students, both first-year and undergraduate transfer, need to begin the admission process very early. Completed applications are continuously accepted; however, the preferred deadlines for completed applications are as follows:

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

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

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

International applicants are admitted on a rolling basis (as their files become complete). Priority is given to those who complete their file by the preferred deadlines listed above. International first-year applicants may complete the Common Application online or in paper form. Applicants will also be asked to submit a Supplement Information Form. To request a paper application, please contact the Office of Undergraduate Admission, Clarkson University, P.O. 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/org or e-mail toefl@ets.org. See the information regarding English requirements on page 49.

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 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.

Recommendation(s). 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 on-line.

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 2008 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 (pp. 15, 56).


**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. $7.15 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 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 (if the student has one), 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/isso.

**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 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 take a maximum total of 15 credit hours of coursework.

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 2008–2009 academic year follows:

Tuition
Undergraduate full-time charge (12 to 19 hours) ................................................................. $30,320.00
Credit Hour Rate (11 hours or less) ........................................................................ 1,011.00
Undergraduate students registered for 12 to 19 credit hours (inclusive) are designated as full-time students and are charged at the full term rate. Students exceeding the full-time load of 19 credits will be charged at the credit-hour rate for each credit hour over 19.
Graduate Students: Tuition per credit-hour rate ...................................................... 1,011.00
Room (based on two persons in freshman housing) ......................................................... 5,586.00
Meal Plans ....................................................................................................................... 5,026.00
Fees
Undergraduate Students .................................................................................................. 690.00
Clarkson School Fee ................................................................................................. 550.00
Graduate Students ........................................................................................................ 440.00
Undergraduate Full-Time Cost of Attendance .............................................................. $41,622.00
Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $3,178 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 2008-2009 is $526 for coverage from 8/1/08 – 8/1/09.

**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 60% of the term period is eligible to receive a refund using the Federal Refund Calculation* as follows:

If the student withdraws
- on or before the first day of classes .....................................................100% refund
- 2-8 class days .......................................................................................90% refund
- 9-19 class days .....................................................................................50% refund
- 20-45 class days ...................................................................................25% refund

The percentage of the enrollment period is determined by the number of days enrolled divided by the total number of days in the period (75 during the academic year). *Refunds for “first-time students” will be calculated on a statutory pro rata basis.

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.

This refund policy has been established in conformance with the Higher Education Act of 1992, as amended in April and November 1994 and July 1995 and by GEN-95-22 (Dear Colleague letter) of April 1995.

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. 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>BY100 Biology Elective with Lab or BY140/142 and BY160/162 Biology I and II, depending on an assessment of the AP course. Consult with the chair of the Biology Department (315-268-2342).</td>
</tr>
</tbody>
</table>

Chemistry

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

Computer Science

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

The computer science department schedules an exam in C++ for new students during fall orientation each year. Students earning a satisfactory grade receive credit for CS141 Intro. to Computer Science I. The exam may also be taken in other pre-approved languages as posted on the department Web page at www.clarkson.edu/mcs.

English

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

Mathematics

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

The mathematics department schedules a calculus exam during fall orientation. Students receiving a satisfactory grade receive credit for MA131 Calculus I. To be eligible for AP or transfer credit for MA131, Calculus I, first-year students must also perform at a satisfactory level on the Calculus Readiness Test (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/mcs.
**Physics**

<table>
<thead>
<tr>
<th>AP score</th>
<th>Course credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, or 3</td>
<td>No credit</td>
</tr>
<tr>
<td>4</td>
<td>SC131 Intro to Physics I</td>
</tr>
<tr>
<td>5</td>
<td>SC131 Intro to Physics Elective</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. See the note under Advanced Placement mathematics regarding credit for Calculus I.

**Credit by Examination**

It is possible in some cases for a new student to take a special advanced-standing placement 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 fall orientation need make no special arrangements. Those exams are scheduled into orientation.

Clarkson will consider the following for advanced credit: AP, CLEP, GCE, GCSE, IB, OACs, A-levels, French Baccalaureat, 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.
Scholarships & Financial Assistance

Financial assistance from Clarkson can consist of scholarships, grants, loans, and employment, either singly or in combination. The Financial Assistance Committee distributes aid in such a way as to help the maximum number of qualified students enroll and stay in school until graduation. This means that no student will 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 15 of the final year of secondary school.
- File the Free Application for Federal Student Aid (FAFSA) no later than February 15. This form is available from high school guidance offices, the Office of Undergraduate Admission, Student Administrative Services at Clarkson, or you can apply over the Internet at www.fafsa.ed.gov. 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 all forms of financial aid are clearly enumerated on the yearly summary of financial assistance 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 and maintenance of acceptable progress and standards that are published annually in the Clarkson Regulations issued to each enrolled student. These regulations are available to prospective students upon request from the Admission Office. Please note: Clarkson is required by federal law to verify the information on student applications for financial assistance. Compliance procedures require that Clarkson obtain signed copies of the student’s and parents’ federal income tax returns and W-2 forms.

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 95 percent of all undergraduates receive some form of financial aid, including state awards and loans. Over 90 percent of first-year students receive awards directly from the University.
SOURCES OF FINANCIAL ASSISTANCE

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 Financial Assistance Committee of the University.

Clarkson Merit Award
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. Examples include Clarkson Merit Awards, Presidential Scholarships, Phi Theta Kappa, Alpha Beta Gamma awards, Adirondack Scholarships, and Five-Boroughs Scholarships. Recipients are chosen by the Financial Assistance Committee.

Holcroft Alumni Recognition Scholarship
Based upon very strong potential for success, in combination with the recommendation from a Clarkson alumnus, approximately 50 entering students each year are selected for this prestigious renewable award. Annual grant amounts are $500. These awards are funded by gifts from Clarkson alumnae/i. Recommendations must be submitted by January 15 of the student’s senior year.

Clarkson FIRST Scholarship
This scholarship recognizes high school seniors who have participated on a FIRST Robotics team during their high school years. Awards range in amounts from $1,000 to $6,000 annually. More information about applying for this scholarship can be obtained from the Office of Undergraduate Admission.

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 $11,000-per-year tuition grant for up to four years (total $44,000). These schools may also nominate one student each year for the Achievement Award who, upon acceptance and enrollment at Clarkson, will receive an $9,000-per-year tuition grant for up to four years (total $36,000). 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 p. 15.)

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 to be considered for assistance from New York State. Awards are based on family income. Award certificates are sent to the student’s home.

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 is determined by the federal government, based on information provided on the FAFSA. Amounts range from $400 to $4,731 annually.

Supplemental Educational Opportunity Grant (SEOG)
This is a nonrepayable federal grant, administered by the University, to the most needy students. The student must be in good academic standing, successfully progressing with his or her class. Renewals are contingent upon financial need. The awards range from $500 to $1,200 annually. Availability is dependent upon federal funding.

Federal Work-Study Program
A number of students with greatest need are selected each year to receive Federal Work-Study Awards. These students are given the opportunity to work at various sites on campus. The amount each work-study student may earn is predetermined by the Financial Assistance Committee in accordance with need, and the student works a specific number of hours each week for the semester to earn that amount. Students are added to the University payroll and paid bi-weekly by check. 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
Many merit-based tuition scholarships are available to Air Force ROTC cadets; they vary from $3,000 to full tuition, and all scholarships include a tiered stipend of $250-$400 per academic month. Below is a list of current scholarships.

- **TYPE I** — $31,010 for 2008-09
- **TYPE II** — $15,000 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. TYPE I, II, III, and VIII include $300 per semester for books, a monthly stipend of $250-$400, and are eligible to receive the Clarkson ROTC Incentive Scholarship of $10,612 to be used for housing and meal expenses in Clarkson residence halls.

Army Reserve Officers’ Training Corps (ROTC) Scholarships
Army ROTC Scholarship winners receive a tuition benefit of $31,010 for the 2008-2009 academic year. This amount represents the total tuition and fees for the academic year. Winners will also receive a book allowance of $900 per year and a tax-fee stipend of $250-$400 per month for 10 months. All Army ROTC Scholarship winners are eligible to receive the Clarkson ROTC Incentive
Scholarship of $10,612 to be used for housing and meal expenses in Clarkson residence halls. For more information please contact the Department of Military Science, Clarkson Army ROTC at 315-265-2180 or at armyrotc@clarkson.edu.

**Clarkson ROTC Incentive Scholarship (Army and Air Force)**

Eligible ROTC Scholarship recipients may receive the Clarkson ROTC Incentive Scholarship. This scholarship is valued at $10,612 for the 2008-2009 academic year. Proceeds from the Clarkson ROTC Incentive Scholarship may only be used for housing and meal expenses in Clarkson residence halls.

**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 will help 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.
Clarkson Endowed, Sponsored, and Share Clarkson Scholarships

Various individuals, foundations and corporations have donated 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 upperclass students who maintain outstanding averages and meet other specified criteria. Awards are made by the Financial Assistance Committee, and generally students receiving them are eligible to keep them for the remainder of their undergraduate years at Clarkson to the extent of a four-year period, provided academic 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

The Arthur, Dora and JoAnn L. Armani Endowed Scholarship Fund
Frank and Lee Augsburger 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 Fund
Charles E. Becker Memorial Scholarship Fund
John J. Bero, Sr. Memorial Scholarship Fund
Andrea K. Bridge ’68 and John E. O’Beirne Endowed Presidential Scholarship Fund
Bradford Broughton Technical Communications Endowed Scholarship Fund
A. Douglas Burrow ’31 Endowed Scholarship Fund
Purcell J. and Edith O. Brownell Endowed Scholarship Fund
Calá Family Endowed Scholarship Fund
Janice L. Campbell Endowed Scholarship Fund
Robert W. Carroll Jr. ’63 Endowed Scholarship Fund
James D. Cartin Memorial 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

Sponsored Scholarships

Thomas F. Clough ’62 Endowed Presidential Achievement Scholarship Fund
Doug and Jane Collette 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 Fund
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. Sillcox Endowed Scholarship Fund
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 Fund

Sponsored Scholarships

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The H. Douglas and Sara Barclay Endowed Scholarship Fund
Professor Robert Barr Endowment Scholarship Fund
Charles E. Becker Memorial Scholarship Fund
John J. Bero, Sr. Memorial Scholarship Fund
Andrea K. Bridge ’68 and John E. O’Beirne Endowed Presidential Scholarship Fund
Bradford Broughton Technical Communications Endowed Scholarship Fund
A. Douglas Burrow ’31 Endowed Scholarship Fund
Purcell J. and Edith O. Brownell Endowed Scholarship Fund
Calá Family Endowed Scholarship Fund
Janice L. Campbell Endowed Scholarship Fund
Robert W. Carroll Jr. ’63 Endowed Scholarship Fund
James D. Cartin Memorial 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

Sponsored Scholarships

Thomas F. Clough ’62 Endowed Presidential Achievement Scholarship Fund
Doug and Jane Collette 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 Fund
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. Sillcox Endowed Scholarship Fund
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 Fund
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
Anna and Frank Greenwall Endowed Scholarship Fund
Frank E. Gutmann Memorial Scholarship Fund
Margaret Van Hamlin Haddad Scholarship Fund
Erwin C. ’48 and Jeanne Hamm Scholarship Fund
Terry O. Harden ’76 Memorial Scholarship Fund
Frank M. Hardiman Scholarship Fund
The Lynn P. Harrison, III and Tonya P. Harrison Endowed Scholarship Fund
William P. Harrison Endowed Scholarship Fund
Ralph E. ’55 and Solita Hawes Endowed Scholarship Fund
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
Kristine M. Layn Endowed Scholarship Fund
The Howard E. ’48 and Mary Lou Lechler Endowed Scholarship
Cecile and Herman Lieberman Endowed Scholarship Fund
Barbara Hewett lowers Endowed Scholarship Fund
The Norman ’51 and Pat Maggione Scholarship
Egon Matijevic’ Endowed Chemistry Scholarship Fund
Peter M. Mayo ’71 Endowed Scholarship
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 Fund
Nathan and Janet Owen 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
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
Willard G. Shafer ’53 Endowed Scholarship Fund
Shelly Electric Endowed Scholarship Fund
Ethel B. Simpson Endowed Memorial Scholarship Fund
Sisson Family Endowed Scholarship Fund
Jay P. Sme’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 Fund
George J. Stanley Endowed Scholarship Fund
The Thompson Family Endowed Scholarship Fund
Fay ’62 & Nadine Tolman Endowed Scholarship Fund
Earle E. Towlson ’27 Memorial Endowed Scholarship Fund
Edward F. Tucker Endowed Scholarship Fund
Merton Van Sant/Industrial Development Agency Endowed Scholarship Fund
Melissa A. Walsh ’03, ’05 Memorial Endowed Scholarship Fund
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
Babcock & Wilcox Company Sponsored Scholarship
Bebchtel Diversity Scholarship Fund
Central Hudson Gas & Electric Sponsored Scholarship
Clarkson Club Sponsored Scholarship
Comstock Memorial Trust Sponsored Scholarship
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
Key Bank Scholarship
Kiewit Construction Company Sponsored Scholarship

Lockheed Martin Sponsored Scholarships
Richard H. Miller ’63 Sponsored Scholarship Fund
Michael W. Morrison ’89 Memorial Sponsored Scholarship
National Starch & Chemical Company Sponsored Scholarship
Niagara National Inc. Sponsored Scholarship
North Country Friends Sponsored Scholarship
O’Brien & Gere Sponsored Scholarship
Karen Mazzella Olstead ’84 Memorial Sponsored Scholarship Fund
P&G Sponsored Scholarship
Proctor & Gamble Minority Sponsored Scholarship
Raytech Technical Sponsored Scholarship
The Gerald ’58 and Judith Reinman Sponsored Scholarship
The David Scaringe ’01 Memorial Scholarship
Todd Stanley Searfoss ’79 Memorial Sponsored Scholarship
Stantec Consulting Services Incorporated Sponsored Scholarship
Norman Western 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 Scholarship
Advani ’70 Share Clarkson Scholarship
Dorr B.C. Begnal ’83 Share Clarkson Scholarship
Bouchard/Mountjoy Share Clarkson Scholarship
Bayard Delafield Clarkson Share Clarkson Scholarship
Bayard Clarkson Jr. Share Clarkson Scholarship
Virginia Clark Clarkson Share Clarkson Scholarship
John D. Correnti ’69 Share Clarkson Scholarship
Crane Family Share Clarkson Scholarship
Lauren M. (LaPine) ’88 and Michael J. Coleman II Share Clarkson Scholarship
Jane and Douglas Collette ’71 Share Clarkson Scholarship
The Sylvia Johnson Dillenback Share Clarkson Direct Scholarship
Fanch Share Clarkson Scholarship
Joseph and Ruth Ferrer Share Clarkson Scholarship
Everett and Judith Foster Share Clarkson Scholarship
Elbridge W. Fuller ’33 Share Clarkson Scholarship
Joel ’57 and Lynda Goldschein Share Clarkson Scholarship
The Elinore and Beecher Greenman ‘50
Share Clarkson Direct Scholarship
Rosemary A. Harrington Share Clarkson Scholarship
W. Jon Harrington Share Clarkson Scholarship
Daniel C. Heintzelman ‘79 (1) Share Clarkson Scholarship
Daniel C. Heintzelman ‘79 (2) Share Clarkson Scholarship
Ellen Herman ‘85 Share Clarkson Scholarship
Bryan Hochstein ‘87 Share Clarkson Scholarship
M. Hubbard Construction Inc. Share Clarkson Scholarship
John B. and Susan Johnson Share Clarkson Scholarship
Rodney D. Johnson ‘82 Share Clarkson Scholarship
Alan F. Lafley ’43 Family Share Clarkson Scholarship
Lawler Family Share Clarkson Scholarship
Matthew J. Maslyn ’77 Share Clarkson Scholarship
McDonald Mascott Share Clarkson Scholarship
The Joseph F. McCarthy ‘85 Share Clarkson Direct Scholarship Fund
Lisa A. Napolione ‘87 Share Clarkson Scholarship
The Dr. John Perry Share Clarkson Direct Scholarship Fund
Kathryn A. Premo ‘84 Share Clarkson Scholarship
David D. Reh ’62 Share Clarkson Scholarship
Larry Shakley ’71 Share Clarkson Scholarship
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 Scholarship
William D. ’54 and Shirley Smith Share Clarkson Scholarship
Ron Terry ’72 Memorial Share Clarkson Scholarship
John A. ’56 and Bunny Thompson Share Clarkson Scholarship
Alissa, Donna and Steve Tritman ’68
Share Clarkson Scholarship
Susan J. and Ellsworth F. Vines ’65
Share Clarkson Scholarship
Rita Fadale Wagner Share Clarkson Scholarship
Nelson ’79 and Barbara Wetmore ’79
Share Clarkson Scholarship
Wolffley Family Share Clarkson Scholarship
Ziek Share Clarkson Scholarship

PRIZE FUNDS
Gregory P. Arnold ’73 Memorial Award
Jerome D. Barnum Memorial Prize
Randy Brockway ’91 Memorial Award
Stephen Brunauer Memorial Award
Charles M. Clark Memorial Award
Frederica Clarkson Prize
Levinius Clarkson Prize
Vern Clute Memorial Academic Achievement Award
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
Turpin Technical Communications Junior and Senior Awards
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
Charles Martin Clark Award
Clarkson Alumni Frederica Clarkson Award
Clarkson Alumni Levinus Clarkson Award
Vern Clute Memorial Academic Achievement Award
Major William Coleman 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
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
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
Turpin Technical Communications Junior Award
Turpin Technical Communications Senior Award
Arthur J. Wells Prize
Martin A. Welt ’54 Family Awards

Loans
WILLIAM D. FORD FEDERAL DIRECT LOAN
A Guaranteed Student Loan is a low-interest loan made to the student by the federal government. These loans are insured by the guarantee agency and reinsured by the federal government. Maximum yearly amounts available are as follows: First-year students, $3,500; sophomores, $4,500; juniors and seniors, $5,500. Aggregate Loan totals must not exceed $23,000 for undergraduate study.

PERKINS LOAN
This is a federally funded, University-administered loan program for undergraduate students. The loan bears a five percent interest rate, and payments start 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.
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/Coming 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.
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 Environmental Science & Policy, 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 chemistry, computer science, information technology, mathematics, and physics. Faculty and students also participate in the interdisciplinary Environmental Science and Engineering program. 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.

**Undergraduate Majors**

- American Studies (p. 71)
- Applied Mathematics & Statistics (p. 73)
- Arete (p. 176)
- Biology (p. 75)
- Biomolecular Science (p. 78)
- Chemistry (p. 79)
- Communication (p. 83)
- Computer Science (p. 87)
- Digital Arts & Sciences (p. 89)
- Environmental Health Science (p. 171)

- Environmental Science & Policy (p. 167)
- History (p. 91)
- Humanities (p. 93)
- Interdisciplinary Liberal Studies (p. 93)
- Interdisciplinary Social Sciences (p. 93)
- Mathematics (p. 97)
- Physics (p. 100)
- Political Science (p. 102)
- Psychology (p. 105)
- Software Engineering (p. 153)
Undergraduate Minors

American Studies (p. 109)  Information Technology (p. 110)
Biology (p. 107)  International & Cross-Cultural Perspectives (p. 109)
Biomedical Engineering (p. 180)  Literature & the Arts (p. 109)
Biomedical Science and Technology (p. 180)  Mathematics (p. 110)
Biophysics (p. 107)  Physics (p. 110)
Chemistry (p. 107)  Political Science (p. 109)
Cognitive Neuroscience (p. 108)  Professional Communication (p. 111)
Computational Science (p. 108)  Psychology (p. 111)
Computer Science (p. 108)  Science, Technology & Society (p. 109)
Digitally Mediated Communication (p. 109)  Social Sciences (p. 109)
Environmental Health Science (p. 181)  Sociology (p. 109)
Environmental Policy (p. 181)  Software Engineering (p. 184)
Environmental Science (p. 183)  Statistics (p. 111)
History (p. 109)  
Humanities (p. 109)  

Graduate Programs

Chemistry (p. 112)  Mathematics (p. 113)
Computer Science (pp. 113, 185)  Physical Therapy (p. 163)
Environmental Science and Engineering (p. 188)  Physics (p. 113)
Information Technology (p. 112, 188)  

PRE-PROFESSIONAL PROGRAMS

Physical Therapy and Pre-Physical Therapy
Clarkson offers an undergraduate Pre-PT concentration and a graduate degree program in physical therapy. (See p. 163.) Students interested in preparing for entrance into Clarkson's Doctor of Physical Therapy degree program should call the associate dean for Health Sciences at 315-268-3786.

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 Health Professions Advisory Committee in the dean's office in the School of Arts & Sciences at 315-268-6544.

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. To foster a sense of professionalism and a better understanding of careers in law, interested students may participate in Clarkson's Pre-Law Society.

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. (See p. 15.)
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 pages 34 and 35 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. Please refer to page 34 for more details on this program.

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. (See p. 10.)

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.

Areté: Business and Liberal Arts Double Major
This unique interdisciplinary option allows students to combine the study of liberal arts with business. Areté is designed to couple the broadening perspective of the liberal arts with a solid background 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 in one of the School of Business programs and one of the Humanities or Social Sciences. During their undergraduate career, 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 individual 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 p. 176.)

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. A student taking advantage of this option works 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. For more information, contact the Science Studies advisor at 315-268-6544.
Nonmatriculated Student Classification
See Nondegree Students, p. 50.

GRADUATE PROGRAMS
Clarkson offers master's and doctoral degrees in chemistry, mathematics and physics (pp. 112-113), computer science (p. 185), and information technology (p. 188). A professional program leading to a Doctor of Physical Therapy is also offered. See also Research and Academic Centers (p. 197).

FACULTY

Biology
Professors Edward Moczydlowski – Bayard and Virginia Clarkson Chair in Biology, Craig Woodworth; Associate Professors Tom A. Langen, Michael Twiss; Assistant Professors Michelle Crimi, Alan Rossner, James Schulte, Kenneth Wallace, Carolyn Zanta

Chemistry and Biomolecular Science
Professors Dan Goia, Philip K. Hopke – Bayard D. Clarkson Distinguished Professor, Evgeny Katz – Professor and Milton Kerker Chair of Colloid Chemistry, Yuzhuo Li, Egon Matijevic’ – Distinguished University Professor and Victor K. LaMer Chair, Sergiy Minko – Egon Matijevic’ Chair of Chemistry; Richard E. Partch – Senior University Professor; Associate Professors Phillip A. Christiansen, Larry Eno, Artem McLennan, James C. Peploski – Director of Freshman Chemistry, Devon A. Shipp; Assistant Professors Silvana Andreescu; Petr Zuman – Distinguished Emeritus Professor

Communication & Media
Professors Stephen D. Farina, Johndan Johnson-Eilola; Associate Professors W. Dennis Horn, Bill Karis; Assistant Professors Dave Beck, Xiaohua Sun

Computer Science
Professors Christopher Lynch, James Lynch, Peter Turner; Associate Professors Alexis Maciel, Jeanna Neefe Matthews, Christino Tamon; Instructors Janice Searleman, Joachim Stahl

Humanities and Social Sciences
Professors Daniel Bradburd, David M. Craig, Joseph Duemer, Lewis P. Hinchman, John N. Serio, Sheila F. Weiss; Associate Professors Owen E. Brady, Ellen C. Caldwell, Laura E. Ettinger, Jerry W. Gravander, Annegret Staiger, William Vitke, Rick Welsh; Assistant Professors Lou Ann Lange, Sarah C. Melville, Christopher C. Robinson; Instructor Frances W. Bailey; Visiting Assistant Professor Kimberly DeFazio; Professor Emeritus Jan Wojcik

Mathematics
Professors Erik Bollt, Scott Fulton, Peter Turner; Associate Professors Brian Helenbrook; Assistant Professors Abbas Alhakim, Kathleen Fowler, Aaron Luttmann, Sumona Mondal, Carmeliza Navasca, Takashi Nishikawa, Joseph Skufca; Instructor Michael Felland; Professor Emeritus M. Lawrence Glasser, Abdul Jerri, David Powers; Adjunct Research Assistant Professor Michael Shuckers

Physics
Professors Daniel ben-Avraham, Vladimir Privman – Robert A. Plane Chair, Dipankar Roy, Lawrence Schulman; Assistant Professor Maria Gracheva, David Wick – Director of First-Year Physics Program; Visiting Assistant Professor Michael Ramsdell

Psychology
Professors Robert Dowman, Eugene M. Fodor; Assistant Professors Jeffrey Lozito, Tom A. Langen, Tina Norton; Adjunct Faculty Gary Kelly

Physical Therapy
(See p. 163.)
Undergraduate Majors

B.S. in American Studies

Program Chair: Daniel Bradburd

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. This understanding will rest 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.
• contribute to the preservation and creation of knowledge via the American Studies Online database project.
• 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 including:
• 1 credit Introduction to the Liberal Arts pre-seminar
• the Humanities/Social Sciences Research Seminar
• 30 credit hours in American Studies including:
  o the American Studies Online, a one-credit module
  o 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
  o a concentration of seven courses organized either by discipline or by a theme, an issue, a problem or a period.

Students majoring in American Studies are required to take a concentration of at least five courses in a pre-professional 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.
# American Studies Curriculum

## FIRST YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>UNIV190 The Clarkson Seminar</td>
<td>American Studies Foundation</td>
</tr>
<tr>
<td>Math course</td>
<td>Course</td>
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<td>(MA 180 recommended)</td>
<td>3</td>
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<td>Science course</td>
<td>Statistics</td>
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<tr>
<td>American Studies Foundation Course</td>
<td>Science Course</td>
</tr>
<tr>
<td>Free Elective</td>
<td>KA Course</td>
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<tr>
<td>FY100 First-Year Seminar</td>
<td>Pre-professional Concentration or Free Elective</td>
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<tr>
<td>Hum/SS120 Introducing Liberal Arts</td>
<td>1</td>
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<td></td>
<td><strong>Total</strong> 15</td>
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## SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>American Studies Foundation Course</td>
<td>Major Course</td>
</tr>
<tr>
<td>KA Course</td>
<td>KA Course</td>
</tr>
<tr>
<td>Pre-professional Concentration</td>
<td>Pre-professional Concentration</td>
</tr>
<tr>
<td>Free Electives</td>
<td>Free Elective</td>
</tr>
<tr>
<td></td>
<td>Free Elective or International/ Cross-Cultural Course</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong> 15</td>
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</table>

## JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Major Course or Free Elective</td>
<td>Major Course or Free Elective</td>
</tr>
<tr>
<td>KA/UC</td>
<td>KA/UC</td>
</tr>
<tr>
<td>Pre-professional Concentration</td>
<td>Pre-professional Concentration</td>
</tr>
<tr>
<td>Free Electives or Technology Course</td>
<td>Free Electives or Technology Course</td>
</tr>
<tr>
<td>AS300 American Studies Online</td>
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<td></td>
<td><strong>Total</strong> 16</td>
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## SENIOR YEAR

<table>
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<th>First Semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Hum or SS480 Research</td>
<td>Major Course or Free Elective</td>
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<tr>
<td>Pre-professional Concentration or Free Elective</td>
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<tr>
<td>KA/UC</td>
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<tr>
<td>Major Course or Free Elective</td>
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<tr>
<td>Free Elective or International/ Cross-Cultural Course</td>
<td><strong>Total</strong> 13</td>
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</table>

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Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
Science, technology and modern business methods have called attention to the importance of mathematics in the analysis and solution of problems that can be formulated quantitatively. A strong foundation in mathematics is a necessity for study in science, engineering, and business.

The B.S. in Applied Mathematics & Statistics prepares students to be practitioners of applied mathematics and statistics and offers an exposure to areas of engineering, natural science, social science or business that give rise to significant applications of mathematics.

Applied mathematics is the problem-solving profession. Many students are skilled in mathematics and interested in applied areas, but are not comfortable with proving theorems. This major is intended for them. It features a strong foundation in mathematics and statistics for applications, complemented by a set of courses chosen by the student in engineering, economics, science or management, in which mathematics and statistics play a key role.

Career possibilities for graduates with this degree include actuary, statistician, process engineer, software developer, business consultant, and many others.

Employers and alumni have been enthusiastic about the possibilities of this major. It is ideal also for students who wish to pursue a double major in concert with a science or engineering discipline. (There is, however, no double major including both Applied Mathematics and Statistics and Mathematics.)

Students in the BS program in mathematics should 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 professional requirements course MA499 summarizes requirements in professional development, communication and computers. Applications courses are chosen from an approved list in consultation with the academic advisor.

The curricula are rigorous and demanding, but flexible enough to allow students to sample many disciplines or to focus on a special interest within their major or other areas. Students with suitable grades may receive accelerated admission to the graduate program and complete the M.S. in mathematics in one additional year.

**Requirements**

<table>
<thead>
<tr>
<th></th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Mathematics and Computer Science*</td>
<td>48</td>
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<tr>
<td>Science</td>
<td>11</td>
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<tr>
<td>Clarkson Common Experience</td>
<td>18</td>
</tr>
<tr>
<td>Communication &amp; Media</td>
<td>6</td>
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<tr>
<td>Applications</td>
<td>15</td>
</tr>
<tr>
<td>Free electives**</td>
<td>21</td>
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<tr>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
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<td>Total</td>
<td>120</td>
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</table>

* Some mathematics and computer science courses are specified requirements; others may be chosen from an approved list. Additional non-credit requirements are recorded by MA499 Professional Requirements. Consult the department for details. These electives must be chosen so as to satisfy the communications and professional requirements outlined on p. 21 (or refer to Clarkson Common Experience requirements). If your major courses do not satisfy the requirement for a technology course, then one of the free electives must be used for this purpose.

** Up to 12 credit hours of advanced (300- or 400-level) coursework in aerospace studies or military science may count toward graduation requirements. Freshman Aerospace Studies or Military Science credits at the 100 and 200 levels do not apply toward the required 120 hours.
# Applied Mathematics & Statistics 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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</thead>
<tbody>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
<td>MA132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I</td>
<td>4</td>
<td>PH132</td>
<td>Physics II</td>
<td>4</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
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<td>KA Elective</td>
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<tr>
<td>CS141</td>
<td>Computer Science I</td>
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<td>Free Elective</td>
<td>(CS142 rec.)</td>
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<td>FY100</td>
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<td>MA200</td>
<td>Math Modeling &amp; Software</td>
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**Total:** 15

## Second Semester

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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>MA211</td>
<td>Foundations</td>
<td>3</td>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
<td>MA339</td>
<td>Applied Linear Algebra</td>
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<tr>
<td>University Course</td>
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<td>STAT383</td>
<td>Applied Statistics I</td>
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<tr>
<td>Science Elective</td>
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<td>3</td>
<td>KA Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Application Elective</td>
<td></td>
<td>3</td>
<td>Application Elective</td>
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<td>3</td>
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</table>

**Total:** 15

## Sophomore Year

## Junior Year

## Senior Year

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

See B.S. Degree Program in Mathematics for a listing of courses (p. 97).
B.S. IN BIOLOGY

Program Chair: Edward Moczydlowski

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 that include molecules, cells, organ systems, species, ecosystems and biosphere. The foundation of the Biology Program is a Core Curriculum consisting of interactive classroom and laboratory experiences that provides fundamental knowledge in biodiversity, cellular and molecular biology, genetics, microbiology, comparative anatomy, physiology and ecology. Biology majors typically pursue career paths in biotechnology, ecology and environmental science, or health-related professions.

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

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

Upper-level Biology majors choose from a variety of elective courses that build upon fundamental principles and allow students to explore areas of personal interest. We encourage students to complement a program of bioscience courses drawn from research and teaching strengths of the department with relevant courses in other basic sciences, mathematics, engineering, business, and humanities. Students may also take advantage of courses offered through the Associated Colleges Program 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, chemical 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 directed study in faculty laboratories, the Senior Honors Thesis, summer laboratory research programs, and external internships.
### Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Cr. Hrs.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>37</td>
<td>Knowledge Area/UC Courses</td>
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<td>Professional Experience in Biology</td>
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<td>Technology Course</td>
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<td>Chemistry</td>
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<td>The Clarkson Seminar</td>
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<td>Physics</td>
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<td>First-Year Seminar</td>
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<td>Mathematics and Computer Science</td>
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<td>Free Electives</td>
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<td></td>
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<td><strong>TOTAL</strong> 120</td>
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### Biology Sample Curriculum

#### FIRST YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY140</td>
<td>Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BY142</td>
<td>Biology I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CM103</td>
<td>Structure &amp; Bonding</td>
<td>3</td>
</tr>
<tr>
<td>CM105</td>
<td>Chemistry Laboratory I</td>
<td>2</td>
</tr>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(or MA180 Intro. College Math.)</td>
<td>4</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
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<td></td>
<td>First-Year Seminar</td>
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#### SOPHOMORE YEAR

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<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>BY222</td>
<td>Ecology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(or BY350 Comp. Anatomy)</td>
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</tr>
<tr>
<td>BY224</td>
<td>Ecology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(or BY352 Comp. Anatomy Lab)</td>
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<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(or PH141 Physics for Life Science I)</td>
<td></td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(or MA282 Gen. Statistics)</td>
<td></td>
</tr>
<tr>
<td>MA383</td>
<td>Applied Statistics I</td>
<td>3</td>
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<tr>
<td></td>
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#### JUNIOR YEAR

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<tr>
<th>Course</th>
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<tr>
<td>BY422</td>
<td>Undergrad Bio. Seminar</td>
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<td></td>
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#### SENIOR YEAR

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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>BY490</td>
<td>Prof. Exp. in Biology</td>
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<tr>
<td></td>
<td></td>
<td><strong>TOTAL 15</strong></td>
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</tbody>
</table>
Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

**Core Biology Courses** (25 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.)
- BY490 Professional Experience in Biology (3 cr.)

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

- BY222 General Ecology and BY224 General Ecology Laboratory (4 cr.)
- BY320 Microbiology and BY322 Microbiology Laboratory (4 cr.)
- BY350 Comparative Anatomy and BY352 Comparative Anatomy Laboratory (4 cr.)
- BY360 Physiology and BY362 Physiology Laboratory (4 cr.)

**Professional Specializations**

**BIOLOGY ELECTIVES:** (15 credits) Students must complete 15 credits of biology electives, examples of which are given below.

**HEALTH-RELATED BIOLOGY ELECTIVES:**

- BY310 Developmental Biology (3 cr.)
- BY312 Advanced Cell Biology (3 cr.)
- BY316 Immunobiology (3 cr.)
- BY350 Comparative Anatomy (3 cr.)
- BY352 Comparative Anatomy Lab (1 cr.)
- BY358 Animal Learning & Cognition (3 cr.)
- BY360 Human Physiology
- BY362 Human Physiology Lab (1 cr.)
- BY416(IH416) Principles of Toxicology and Epidemiology (3 cr.)
- BY444(CM444) Medicinal Chemistry (3 cr.)
- BY454(PY454) Physiological Psychology (3 cr.)
- BY455 Cell and Molecular Biology of Cancer (3 cr.)
- BY458 Cognitive Neuroscience (3 cr.)
- BY460 Neurobiology (3 cr.)
- BY476 Current Topics in Biology and Medicine (3 cr.)

**ENVIRONMENTAL-RELATED BIOLOGY ELECTIVES:**

- BY280 Environmental Science (3 cr.)
- BY302 Introductory Botany (4 cr.)
- BY328 Conservation Biology (3 cr.)
- BY340 Behavioral Ecology (3 cr.)
- BY420 Evolution (3 cr.)
- BY425 Biol. Systems & Env. Change (3 cr.)
- BY431 Limnol. (4 cr.)

**MOLECULAR BIOLOGY-RELATED BIOLOGY ELECTIVES:**

- BY312 Advanced Cell Biology (3 cr.)
- BY314 Bioinformatics Lab (4 cr.)
- BY412 Molecular Biology Laboratory (4 cr.)
- BY420 Evolution (3 cr.)

**DIRECTED STUDIES** (variable credit):

- BY400 Directed Study in Behavioral Biology
- BY401 Directed Study in Aquatic Ecology
- BY402 Directed Study in Microbial Ecology
- BY403 Directed Study in Terrestrial Ecology
- BY404 Directed Study in Ecosystem Processes
- BY405 Directed Study in Microbiology
- BY406 Directed Study in Biochemistry
- BY407 Directed Study in Neurobiology
- BY408 Directed Study in Genetics
- BY409 Directed Study in Mathematical Biology
- BY410 Directed Study in Cell Biology
- BY480 Directed Study
- BY484 Directed Study in Science Ethics

**DIRECTED RESEARCH** (variable credit):

- BY494(PY494) Directed Research in Neuropsychology

**DIRECTED RESEARCH** (variable credit):

- BY491 Undergraduate Thesis
- BY492 Undergraduate Thesis
Science has undergone a remarkable transformation over the last few years, and nowhere has the impact been so dramatic as at the interface between biology and chemistry — the bio-molecular sciences. Recent developments in biotechnology, biofuels, pharmaceuticals, genetic engineering and medicine have been truly astounding and will only continue throughout the 21st century. Few sciences will have the impact on our lives as this one, and few offer the opportunities for individuals to make such a vast variety of contributions. Clarkson University's program in Biomolecular Science is designed to:

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

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

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

**Biomolecular Science Professional Electives (12 Credits)**
- CM371/372 Physical Chemistry I and II

**Physics and Math (17 credits)**
- PH131/132 Physics I and II
- MA131/132 Calculus I and II
- MA282/383 or MG284 Statistics

**Clarkson and First-Year Seminars, Knowledge Area, University Course and Technology electives (22 credits)**

**Free electives (12 credits)**

**Total — 120 credits**
## Biomolecular Science Curriculum

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>CM103 Structure and Bonding</td>
<td>3</td>
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<tr>
<td>CM105 Chemistry Lab I</td>
<td>2</td>
</tr>
<tr>
<td>MA131 Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>BY140 Biology I</td>
<td>3</td>
</tr>
<tr>
<td>BY142 Biology I Lab</td>
<td>2</td>
</tr>
<tr>
<td>UNIV190 Clarkson Seminar</td>
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<td>FY100 First-Year Seminar</td>
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<table>
<thead>
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<tbody>
<tr>
<td><strong>Second Semester</strong></td>
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<tr>
<td>CM104 Equilibrium and Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CM106 Chemistry Lab II</td>
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</tr>
<tr>
<td>MA132 Calculus II</td>
<td>3</td>
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<tr>
<td>BY160 Biology II</td>
<td>3</td>
</tr>
<tr>
<td>BY162 Biology II Lab</td>
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<tr>
<td>KA Elective</td>
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<td><strong>Total</strong></td>
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<table>
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<tr>
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<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td><strong>SOPHOMORE YEAR</strong></td>
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<tr>
<td>CM221 Spectroscopy</td>
<td>3</td>
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<tr>
<td>CM223 Spectroscopy Lab</td>
<td>3</td>
</tr>
<tr>
<td>CM241 Organic Chemistry I</td>
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<td>PH131 Physics I</td>
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<td>KA/UC Elective</td>
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<tr>
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<tr>
<td>CM242 Organic Chemistry II</td>
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<td>CM244 Organic Chemistry Lab</td>
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<td>BY214 Genetics</td>
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<tr>
<td>PH132 Physics II</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td><strong>JUNIOR YEAR</strong></td>
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</tr>
<tr>
<td>CM371 Physical Chemistry I</td>
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</tr>
<tr>
<td>BY450 Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>Statistics</td>
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<tr>
<td>Professional Elective</td>
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<table>
<thead>
<tr>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td><strong>Second Semester</strong></td>
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<tr>
<td>CM372 Physical Chemistry II</td>
<td>3</td>
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<tr>
<td>BY451 Biochemistry II</td>
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<td>Professional Elective</td>
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<td>Technology Course</td>
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<td>KA/UC Elective</td>
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<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td><strong>SENIOR YEAR</strong></td>
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<tr>
<td>BY412 Molecular Biology Lab</td>
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Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### 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 concentration and a Doctor of Physical Therapy degree program. Detailed information about this program is available to students through the Associate Dean for Health Sciences at 315–268–3786.

**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
- CM371/371 Physical Chemistry I and II
- CM402 Senior Seminar

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 Area, University Course and Technology
- Electives (22 credits)
- Free Electives (29 credits)

**Chemistry Curriculum**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<td>CM105</td>
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<td>2</td>
<td>Equilibrium and Dynamics&lt;sup&gt;1&lt;/sup&gt;</td>
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<td>MA131</td>
<td>Calculus I</td>
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<td>PH131</td>
<td>Physics I</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
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|            |                              | 16       | 16              |

<sup>1</sup> Indicates lab credit
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<th>JUNIOR YEAR</th>
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<th>SENIOR YEAR</th>
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<td><strong>Second Semester</strong></td>
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<td>CM223 Spectroscopy Lab</td>
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<td>CM244 Organic Chemistry Lab</td>
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<td>CM371 Physical Chemistry I</td>
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<td>CM241 Organic Chemistry</td>
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<td>MA232 Differential Equations</td>
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<th>SENIOR YEAR</th>
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<td><strong>Second Semester</strong></td>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
<td><strong>First Semester</strong></td>
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<tr>
<td>KA/UC Elective</td>
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<td>CM402 Undergraduate Seminar</td>
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<th>(Thesis Option)</th>
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<td><strong>Second Semester</strong></td>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
<td><strong>First Semester</strong></td>
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<td>CM491 Undergraduate Thesis</td>
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<td>CM402 Undergraduate Seminar (c1)</td>
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<td>CM491 Undergraduate Thesis</td>
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<td>KA/UC Elective</td>
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<td>Free Electives²</td>
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<td>15</td>
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</tr>
</tbody>
</table>

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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.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
Specializations

Those courses listed after a slash following an undergraduate course are graduate courses covering the same topics but containing additional material. Not all courses are offered each year or each semester (see annual Courses publication).

CM103  Structure and Bonding
CM104  Chemical Equilibrium and Dynamics
CM105  Chemistry Laboratory I
CM106  Chemistry Laboratory II
CM121  Freshman Seminar
CM131  General Chemistry I
CM132  General Chemistry II
CM300  Instrumental Laboratory
CM345  Advanced Laboratory
CM402  Senior Seminar
CM405  Analytical Chemistry Laboratory
CM406/506  The Treatment of Experimental Data
CM451/551  Mfg. Impl. Advanced Materials
CM509  Receptor Modeling in Environmental Chemistry

ANALYTICAL CHEMISTRY*
CM221  Spectroscopy
CM223  Spectroscopy Laboratory
CM320/520  Separations, Radiochemistry, and Electrochemistry
CM427-429  Directed Study in Analytical Chemistry
CM725-729  Special Topics in Analytical Chemistry

BIOCHEMISTRY
CM453/553  Intro Biomaterials
CM460/560  Biochemistry I
CM461/561  Biochemistry II
CM464/564  Physical Biochemistry
CM467-469  Directed Study in Biochemistry
CM470/570  Biochem/Biotech Lab
CM765-769  Special Topics in Biochemistry (see also CM413[513])

COLLOID AND SURFACE CHEMISTRY**
CM430/530  Colloids and Interfaces
CM432  Particle Size Analysis
CM437-439  Directed Study in Colloid Chemistry
CM735-739  Special Topics in Colloid and Surface Chemistry

INORGANIC CHEMISTRY
CM312  Survey of Inorganic Chemistry
CM417-419  Directed Study in Inorganic Chemistry
CM715-719  Special Topics in Inorganic Chemistry

ORGANIC CHEMISTRY
CM241  Organic Chemistry I
CM242  Organic Chemistry II
CM244  Organic Chemistry Laboratory I
CM440/540  Computational Chemistry
CM441/541  Physical Organic Chemistry
CM442/542  Synthetic Organic Chemistry
CM443/543  Reactive Intermediates in Organic Chemistry
CM444/544  Medicinal Chemistry
CM445/545  Stereochemistry of Organic Compounds
CM447  Molecular Photochemistry
CM448-449  Directed Study in Organic Chemistry
CM745-749  Special Topics in Organic Chemistry

PHYSICAL CHEMISTRY
CM371  Physical Chemistry I
CM372  Physical Chemistry II
CM471/571  Fund-Chemical Kinetics
CM473/573  Advanced Techniques in Nuclear Magnetic Resonance
CM474/574  Fundamentals of Molecular Spectroscopy
CM475/575  Quantum Chemistry
CM476/576  Atmospheric Chemistry
CM477-479  Directed Study in Physical Chemistry
CM562  Physical Chemistry for Life Sciences I
CM775-779  Special Topics in Physical Chemistry

POLYMER CHEMISTRY
CM450/550  Introduction to Polymer Chemistry
CM457-459  Directed Study in Polymer Chemistry
CM483/583  Intro to Polymer Science
CM484/584  Multicomponent Polymer Systems
CM755-759  Special Topics in Polymer Chemistry

RESEARCH, SEMINARS, AND SPECIAL COURSES
CM491-492  Undergraduate Thesis
CM497-499  Directed Study
CM890-899  Directed Study Seminar
CM900  Thesis, Dissertation, or Special Project

* See also CM300/500 and CM405.
** See also the colloid and surface science [SU] courses listed in the Courses publication.
Clarkson’s Communication degree integrates communication, design and technology. Students develop a highly transferable and flexible repertoire of abilities and a solid, conceptual 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, 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, speech, mass media, web design, environmental rhetoric, graphic arts, digital video, usability testing, computer documentation, instructional design, and information architecture. 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 principles, theories and abilities.

In classes and in project work, students learn to analyze communication problems and to generate successful solutions, applying, when appropriate, various communication technologies. Our program enables students to learn and experiment with computer-mediated communication, digital video and audio, animation, and other emerging communication technologies and electronic media. Students also learn and examine the societal implications of such technologies.

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 required to obtain 15 credit hours in an external field (e.g., biology, computer science, digital arts, e-business, history, information technology) 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 or Research Project) serves as a bridge to industry or to advanced study in the field. Students may choose to complete their internship in our Eastman Kodak Center for Excellence in Communication, in the Publications Office, or at a location outside the University. Students also may choose to complete the internship as a research assistant on a C&M faculty project.

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 either Professional Communication or Digitally Mediated Communications.

Along with meeting the requirements of the Clarkson Common Experience (see p. 19), Communication majors must fulfill the following requirements:
Requirements

GENERAL REQUIREMENTS: 39 hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>Clarkson Common Experience Courses</td>
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<tr>
<td>Mathematics Courses</td>
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<tr>
<td>Science Courses (including lab course)</td>
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<td>7</td>
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<tr>
<td>Computer Courses</td>
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<td>Additional Mathematics, Science, or Computer Course</td>
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<tr>
<td>University Seminar</td>
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<td>First-Year Seminar</td>
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COMMUNICATION REQUIREMENTS: 36 hrs.

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<td>COMM210</td>
<td>Theory of Rhetoric for Business, Science, and Engineering*</td>
<td>3</td>
</tr>
<tr>
<td>COMM313</td>
<td>Professional Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM341</td>
<td>Introduction to Web Design</td>
<td>3</td>
</tr>
<tr>
<td>COMM410</td>
<td>Theory and Philosophy of Communication*</td>
<td>3</td>
</tr>
<tr>
<td>COMM490</td>
<td>Communication Internships or Research Projects</td>
<td>3</td>
</tr>
<tr>
<td>Plus 7 additional Communication courses</td>
<td></td>
<td>21</td>
</tr>
</tbody>
</table>

EXTERNAL FIELD: 15 hours

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

- Accounting
- Aeronautical Engineering
- Biology
- Business
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Engineering
- Computer Science
- Digital Arts & Sciences
- e-Business
- Economics
- Finance
- Electrical Engineering
- Environmental Science & Policy
- History
- Information Systems
- Information Technology
- Marketing
- Mathematics
- Mechanical Engineering
- Operations Management
- Organizational Studies
- Physical Therapy
- Physics
- Psychology
- Software Engineering

FREE ELECTIVES: 30 hours

Students choose the remaining hours without restriction 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 their academic advisor 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 the guidance of their academic advisors in planning their academic program.

*Must be taken in addition to courses in Part I, General Requirements.
## Communication Curriculum

### FIRST YEAR

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>COMM210 Theory of Rhetoric</td>
<td>3</td>
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<td>COMM Elective</td>
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<tr>
<td>COMM214 Computer Applications &amp; Concepts</td>
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<td>UNIV190 The Clarkson Seminar</td>
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<td></td>
<td>Science Elective with Lab</td>
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<td>Science Elective</td>
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<td>FY100 First-Year Seminar</td>
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### SOPHOMORE YEAR

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<tr>
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<td>COMM313 Prof. Communication</td>
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<td>COMM Elective</td>
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<td>MA/SC/Computing Elective</td>
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### SENIOR YEAR

<table>
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<tr>
<td>COMM410 Theory and Philosophy</td>
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<td>COMM Elective</td>
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<tr>
<td>COMM490 Internship/Research Project</td>
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<td>External Field Elective</td>
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Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
Topical Listing of Communication Courses

Not all courses are offered each year or each semester (see annual Courses publication).

COMM210  Theory of Rhetoric for Business, Science and Engineering
COMM214  Computer Applications and Concepts
COMM217  Introduction to Public Speaking
COMM220  Writing for New Media
COMM221  2D Digital Design
COMM310  Mass Media and Society
COMM313  Professional Communication
COMM320  Photography
COMM325  Intercultural Communication
COMM327  Digital Video Production I
COMM 330  Science Writing
COMM341  Introduction to Web Design
COMM345  Information Architecture
COMM390-95 Communication: Special Topics
COMM409  Introduction to Instructional Design
COMM410  Theory and Philosophy of Communication
COMM412  Organizational Communication
COMM414  Computer Documentation
COMM417  Business and Professional Speaking
COMM420-25 Communication: Independent Study
COMM426  Gender and Communication
COMM427  Digital Video Production II
COMM428  Public Debate and the Environment
COMM440  PHP/MySQL Interactive Design
COMM442  Advanced World Wide Web Interface Design
COMM444  Unix Web System Administration
COMM480  Undergraduate Teaching Assistant in Communication & Media
COMM490  Communication Internships or Research Projects
COMM512  Organizational Communication
COMM513  Professional Communication
COMM520-525 Communication: Independent Study
COMM542  CGI Programming with Perl
COMM544  Unix Web System Administration
COMM620-625 Communication: Independent Study
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 and networks, database systems and Web technology. Some are researchers who invent new technology or study its theoretical foundations. Others become lawyers, journalists and some go on to manage their own businesses.

The Computer Science major is organized into four options. The General option is the most flexible. It allows students to design an individualized program of study. The other three options prepare students for the specific career paths mentioned above. They are the Software Design and Development, Information Technology, and Research options.

The requirements of the General option are shown below. The other options are described in detail in the CS student handbook, which is available in the department office (Science Center 357) and on the department Web pages (www.clarkson.edu/cs). The first five semesters of the sample schedule shown below are common to all options of the CS major.

Students in the BS program in computer science should learn to
• reason clearly, logically, and analytically;
• demonstrate a solid understanding of the core concepts in computer science and a deeper understanding of some of the advanced topics in computer science;
• work effectively with standard programming languages and software systems;
• apply problem-solving skills to approach large-scale, interdisciplinary, real-world problems;
• read computer science literature;
• communicate effectively, both orally and in writing; and
• work effectively both individually and in teams.

The requirements include a certain number of science, computer science and free electives that must be chosen according to certain restrictions. In addition, some CS and free electives must be chosen to meet certain Common Experience requirements. If your major courses do not satisfy the requirement for a technology course, then one of the free electives must be used for that purpose. See the student handbook for details.

**Requirements**

<table>
<thead>
<tr>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Computer Science .......................................................... 43</td>
</tr>
<tr>
<td>Mathematics .................................................................................. 15</td>
</tr>
<tr>
<td>Science ....................................................................................... 12</td>
</tr>
<tr>
<td>Common Experience ................................................................. 21</td>
</tr>
<tr>
<td>First-Year Seminar ................................................................. 1</td>
</tr>
<tr>
<td>Free Electives ............................................................................. 28</td>
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<td>Total ......................................................................................... 120</td>
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</table>

**Computer Science Curriculum**

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<thead>
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<th>Course</th>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS141</td>
<td>Intro to Computer Science I</td>
<td>4</td>
<td>CS142</td>
<td>Intro to Computer Science II</td>
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<tr>
<td>MA131</td>
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<td>MA132</td>
<td>Calculus II</td>
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<td>FY100</td>
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<tr>
<td>SOPHOMORE YEAR</td>
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<tr>
<td>CS242 Advanced Prog. Concepts</td>
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<td>CS241 Computer Organization</td>
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<td>MA211 Foundations</td>
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<td>CS344 Alg. and Data Structures</td>
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<td>MA339 Applied Linear</td>
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<td>Science Elective</td>
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<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
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<tr>
<td>CS341 Programming Languages</td>
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<td>CS345 Automata Theory</td>
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<tr>
<td>CS350 Software Design and Development</td>
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<td>CS Electives</td>
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<td>Free Electives</td>
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</table>

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

**Computer Science Electives**

- CS443 Parallel Programming
- CS445 Compiler Construction
- CS446 Computer Graphics and Geometry
- CS447 Computer Algorithms
- CS449 Computational Learning
- CS451 Artificial Intelligence
- CS452 Computer Graphics
- CS453 Mainframe Computing
- CS455 Computer Networks
- CS456 Cryptography
- CS457 Computer and Network Security
- CS458 Formal Methods for Program Verification
- CS459 Human-Computer Interaction
- CS460 Database Systems
- CS461 Virtual Environments: Principles and Applications
- CS462 Web Development
- CS463 Wireless Networks
- CS497 Undergraduate Research
- CS624 Computational Complexity
- CS643 Parallel Computation
- CS644 Current Issues in Operating Systems Research
- CS653 Automated Reasoning
- CS654 Current Issues in Computer Networks Research
- CS656 Advanced Topics in Cryptography
- CS657 Advanced Topics in Computer Security
- CS658 Current Issues in Program Analysis and Verification Research
- CS659 Systems Biology
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.

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:

- Internet Teaching Laboratory
- Eastman Kodak Center for Excellence in Communication
- Virtual Reality Discovery Laboratory
- Clarkson Open Source Institute
- Digital Art Software and Programs
- Digital Video and Audio Equipment
- 2D and 3D Printing Technology
- Motion Capture Equipment
- Field Trips to Digital Art Companies and Conferences

**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

<table>
<thead>
<tr>
<th>Areas of Study</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Digital Arts and Communication &amp; Media (DA and COMM)</td>
<td>39</td>
</tr>
<tr>
<td>Mathematics and Computer Science (MA and CS)</td>
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<tr>
<td>Science</td>
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<td>Clarkson Common Experience</td>
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<td>Free Electives</td>
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# Digital Arts & Sciences Curriculum

## First Year

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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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<tbody>
<tr>
<td>DA110</td>
<td>Drawing</td>
<td>3</td>
<td>DA100</td>
<td>Intro to Digital Art</td>
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<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
<td>MA132</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>CS141</td>
<td>Computer Science I</td>
<td>4</td>
<td>CS142</td>
<td>Computer Science II</td>
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<tr>
<td>COMM221</td>
<td>2D Design</td>
<td>3</td>
<td>DA120</td>
<td>Intro to Sculpture</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
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<td>PH131</td>
<td>Physics I (or PH 141)</td>
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## Second Semester

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<tbody>
<tr>
<td>DA100</td>
<td>Intro to Digital Art</td>
<td>3</td>
</tr>
<tr>
<td>MA132</td>
<td>Calculus II</td>
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</tr>
<tr>
<td>CS142</td>
<td>Computer Science II</td>
<td>3</td>
</tr>
<tr>
<td>DA120</td>
<td>Intro to Sculpture</td>
<td>3</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I (or PH 141)</td>
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<tr>
<td>FY100</td>
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## Sophomore Year

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<tbody>
<tr>
<td>DA200</td>
<td>3D Digital Design</td>
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<td>COMM341</td>
<td>Intro to Web Design</td>
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<tr>
<td>DA250</td>
<td>Algorithmic &amp; Inter. Art</td>
<td>3</td>
<td>Knowledge Area Elective</td>
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<tr>
<td>PH132</td>
<td>Physics II (or PH 142)</td>
<td>4</td>
<td>Free Elective</td>
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## Junior Year

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<tbody>
<tr>
<td>MA377</td>
<td>Numerical Methods</td>
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<td>MA339</td>
<td>Applied Linear Algebra</td>
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<td>COMM327</td>
<td>Digital Video I</td>
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<td>CS452</td>
<td>Computer Graphics</td>
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<td>MA/CS</td>
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<td>MA/CS Elective</td>
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<td>DA491</td>
<td>Professional Practice</td>
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<td>University Course</td>
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## Senior Year

<table>
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<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA381</td>
<td>Probability (or MA383)</td>
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<td>DA492</td>
<td>Senior Studies</td>
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<td>Science Elective</td>
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<td>Knowledge Area Elective</td>
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<td>Free Elective</td>
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<td>DA/COMM/MA/CS Elective</td>
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<td>Free Elective</td>
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</tbody>
</table>

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 ENVIRONMENTAL SCIENCE & POLICY

Program Chair: Alan Rosner

Complex environmental challenges require creative interdisciplinary solutions. This degree program develops understanding of both life science concepts and social and political systems. See description under Interdisciplinary Programs (p. 167).

B.S. IN ENVIRONMENTAL HEALTH SCIENCE (INDUSTRIAL HYGIENE-ENVIRONMENTAL TOXICOLOGY)

Program Chair: Alan Rosner

This program prepares students to address a wide range of environmental and public health challenges, including assessments, ranging from air quality assessment to workplace evaluations. See description under Interdisciplinary Programs (p. 171).

B.S. IN HISTORY

Program Chair: Dan Bradburd

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 traditional courses in American History, 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, 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

PROGRAM REQUIREMENTS

120 credit hours, including:

• 1 credit Introduction to the Liberal Arts pre-seminar
• 9 courses in history, including:
  o 6 courses above the 200-level
  o 1 course in pre-modern history
  o 1 course in modern history
• Humanities/Social Sciences Research Seminar
• 5 courses in a pre-professional concentration
• Fulfillment of the requirements of the Clarkson Common Experience
Students majoring in History are required to take a concentration of at least five courses in a
pre-professional 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 do:
• Study Abroad. Students who study abroad are required to take at least one course in the
history of their host country.
• Historical Internships, for example, at local historical museums.

HISTORY COURSES
200-level courses:
HIST210 Survey of Ancient History
HIST220 American History, 1776-1877
HIST221 American History, 1877-present
HIST230 Science and Society
HIST240 War and Society
HIST241 War Literature I
HIST25 Twentieth-Century Germany
HIST291 Survey of the Medieval and Renaissance World
300-level courses:
HIST320 Medicine and Society in America
HIST325 Sexuality and Health in American History
HIST327 History of Women in America
HIST329 History of the American Family
HIST330 Science, Technology, and Society in the Ancient World
HIST331 Ancient Medicine and Magic
HIST333 Science, Technology, and Society in the Renaissance
HIST340 War in Ancient Greece
HIST341 War in Ancient Rome
HIST343 War in the Middle Ages
HIST345 The Civil War
HIST347 World War I in History and Literature
HIST349 Cold War History
HIST350 History of Nazi Germany
HIST351 History of the Holocaust
HIST391 Ancient Egypt
HIST395 Oral History: Theory and Practice
HIST396 Antebellum America, 1790-1850
HIST397 World War II, European Theater, 1939-1945
400-level courses:
Hu/SS480 Major Research Seminar

History Curriculum

FIRST YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year Seminar</td>
<td>HIST MAJOR COURSE</td>
</tr>
<tr>
<td>UNIV190 Clarkson Seminar</td>
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</tr>
<tr>
<td>Hu/SS/120 Introduction to Liberal Arts</td>
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<td>Common Experience Math Requirement (MA180 recommended)</td>
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<td>HIST MAJOR COURSE at 200 Level</td>
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SOPHOMORE YEAR

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<tr>
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<td>HIST MAJOR COURSE</td>
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<td>Common Science Requirement</td>
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</table>
First Semester
HIST MAJOR COURSE 3
HIST MAJOR COURSE Or
Free Elective 3
Common Experience Knowledge
Area or University Course 3
Pre-professional Concentration 3
Free Elective or Common
Experience Technology and
Humanity Course 3

Second Semester
HIST MAJOR COURSE 3
HIST MAJOR COURSE Or
Free Elective 3
Common Experience Knowledge
Area or University Course 3
Pre-professional Concentration 3
Free Elective or Common
Experience Technology and
Humanity Course 3

Junior Year

First Semester
H/SS RESEARCH SEMINAR (C2)
Pre-professional Concentration 3
Free Elective 3
Knowledge Area or
University Course 3
Free Elective 3
Free Elective 3

Second Semester
H/SS RESEARCH SEMINAR (C2)
Free Elective 3
Free Elective 3
Free Elective 3
Free Elective 3
Free Elective 3

Senior Year

Program Chair: Daniel Bradburd
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 the individual 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

B.S. IN INTERDISCIPLINARY HUMANITIES
B.S. IN INTERDISCIPLINARY LIBERAL STUDIES
B.S. IN INTERDISCIPLINARY SOCIAL SCIENCES
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

**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

Students majoring in Interdisciplinary Social Science, Humanities or Liberal Studies at Clarkson are required to take a concentration of at least five courses in a pre-professional 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.

**H&SS Curriculum**

<table>
<thead>
<tr>
<th></th>
<th><strong>FIRST YEAR</strong></th>
<th><strong>SECOND SEMESTER</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>First Semester</strong></td>
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<tr>
<td>UNIV190</td>
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<td>MAJOR COURSE 3</td>
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**SOPHOMORE YEAR**

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<td>Free Electives</td>
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Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

This presumes that the major research experience is the professional experience, though internships, etc. could also count.

Major courses are those designated Anthropology, Film, History, Literature, Philosophy, Political Science, Social Sciences or Science Technology and Society.

**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.

**UNIVERSITY COURSE**
- UNIV190 The Clarkson Seminar

**ANTHROPOLOGY**
- ANTH200 Introduction to Culture and Society
- ANTH230 Introduction to Race and Ethnicity
- ANTH250 Peoples & Cultures Through Film and Fiction
- ANTH270 Environment, Technology and Society
- ANTH320 Racial Inequality in the U.S.
- ANTH330 Men and Masculinities
- ANTH332 Cities and Social Justice
- ANTH355 Understanding the Contemporary Middle East
- ANTH380 Drugs, Guns, Spices
- ANTH381 Consumption and Culture
- ANTH385 Food and Society
- ANTH394 ST: Global Perspectives on Sexuality
- ANTH490-497 Independent Study
- ANTH498 Undergraduate TA
- ANTH499 Minor Portfolio

**FILM STUDIES**
- FILM240 Films from Fiction
- FILM321 Great American Directors
- FILM322 The Hollywood Cinema
- FILM340 World in a Frame
- FILM342 Women & Men in American Film
- FILM344 History & Art of Animation
- FILM490-497 Independent Study
- FILM498 Undergraduate TA
- FILM499 Minor Portfolio

**HISTORY**
- HIST210 Ancient History Survey
- HIST220 America: Revolution to 1877
- HIST221 America: 1877 to the Present
- HIST230 Science and Society
- HIST240 War and Society
- HIST241 War Literature I
- HIST250 History of 20th Century Germany
- HIST320 Medicine & Society in America
- HIST325 Sexuality & Health in American History
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<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>HIST327</td>
<td>History of Women in America</td>
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<tr>
<td>HIST329</td>
<td>History of the American Family</td>
</tr>
<tr>
<td>HIST330</td>
<td>Science, Technology &amp; Society in the Ancient World</td>
</tr>
<tr>
<td>HIST331</td>
<td>Ancient Medicine &amp; Magic</td>
</tr>
<tr>
<td>HIST333</td>
<td>Science, Technology &amp; Society in the Renaissance</td>
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<tr>
<td>HIST340</td>
<td>War in Ancient Greece</td>
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<td>HIST343</td>
<td>War in the Middle Ages</td>
</tr>
<tr>
<td>HIST345</td>
<td>The Civil War</td>
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<tr>
<td>HIST347</td>
<td>World War I in History and Literature</td>
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<tr>
<td>HIST349</td>
<td>Cold War History</td>
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<tr>
<td>HIST350</td>
<td>History of Nazi Germany</td>
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<tr>
<td>HIST351</td>
<td>History of the Holocaust</td>
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<tr>
<td>HIST355</td>
<td>Travel Literature of the Balkans, Middle East &amp; West Central Asia</td>
</tr>
<tr>
<td>HIST380</td>
<td>Middle Ages &amp; Renaissance Survey</td>
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<tr>
<td>HIST391</td>
<td>ST: Ancient Egypt</td>
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<tr>
<td>HIST396</td>
<td>ST: 19th Century American Survey</td>
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<td>HIST490-497</td>
<td>Independent Study</td>
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<td>HIST498</td>
<td>Undergraduate TA</td>
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<td>HIST499</td>
<td>Minor Portfolio</td>
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<tr>
<td>LIT499</td>
<td>Minor Portfolio</td>
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<tr>
<td>PHIL200</td>
<td>Introduction to Philosophy</td>
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<td>PHIL240</td>
<td>Contemporary Moral Issues</td>
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<td>PHIL241</td>
<td>Medical Ethics</td>
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<td>PHIL243</td>
<td>Business Ethics</td>
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<td>PHIL270</td>
<td>American Environmentalism</td>
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<td>PHIL310</td>
<td>Faith and Action</td>
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<tr>
<td>PHIL320</td>
<td>Citizenship &amp; the American Tradition</td>
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<td>PHIL341</td>
<td>Professional Ethics</td>
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<td>PHIL370</td>
<td>Environmental Ethics</td>
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<td>PHIL380</td>
<td>The Law and Bioethics</td>
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<td>PHIL381</td>
<td>Minds and Machines</td>
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<tr>
<td>PHIL420</td>
<td>Philosophy of the American Founding</td>
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<tr>
<td>PHIL470</td>
<td>Environmental Philosophy Seminar</td>
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<td>Independent Study</td>
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<td>POL498</td>
<td>Undergraduate TA</td>
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<td>POL499</td>
<td>Minor Portfolio</td>
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<tr>
<td>POL210</td>
<td>Introduction to Politics &amp; Policy</td>
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<tr>
<td>POL220</td>
<td>American Politics</td>
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<tr>
<td>POL225</td>
<td>The American West</td>
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<tr>
<td>POL250</td>
<td>Politics in Cross-National Perspective</td>
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<td>POL251</td>
<td>Intro to International Politics</td>
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<tr>
<td>POL301</td>
<td>Political Theory</td>
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<td>POL302</td>
<td>Social &amp; Political Thought in the 20th Century</td>
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<tr>
<td>POL320</td>
<td>The American Political Tradition</td>
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<td>POL350</td>
<td>International Development and Social Change</td>
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<td>POL351</td>
<td>Globalization</td>
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<td>POL362</td>
<td>Human Rights, Law and Politics</td>
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<td>POL371</td>
<td>Environmental Law</td>
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<td>POL380</td>
<td>The Law and Bioethics</td>
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<td>POL400</td>
<td>Constitutional Law</td>
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<td>POL470</td>
<td>Environmental Policy</td>
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<td>SS120</td>
<td>Introducing Liberal Arts</td>
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<td>SS480</td>
<td>Majors Research Seminar</td>
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<td>SOC200</td>
<td>Introduction to Culture and Society</td>
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<td>SOC350</td>
<td>International Development and Social Change</td>
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<td>SOC351</td>
<td>Globalization</td>
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<tr>
<td>SOC385</td>
<td>Food and Society</td>
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<td>SOC470/570</td>
<td>Environmental Policy</td>
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<tr>
<td>SOC490-497</td>
<td>Independent Study</td>
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</table>
SOCE498 Undergraduate TA
SOCE499 Minor Portfolio

ARÉTÉ COURSES
AR103 Cultural Events
AR152 Working Lives, Working Selves
AR202 Success in Business
AR250 Management in America: Ideologies at Work
AR305 Thinking Globally, Acting Locally
AR350 Ethics and Management
AR351 Valuing the Earth: Economics, Ecology and Ethics
AR352 Cross-cultural Communication
AR370 Managing Success
AR428 Doing Business in an International Context
AR490 Canadian-U.S. Business Issues

B.S. IN MATHEMATICS

Program Chair: Peter R. Turner

Science, technology, and modern business methods have called attention to the importance of mathematics and computer science in the analysis and solution of problems that can be formulated quantitatively. A strong foundation in mathematics and computer science is a necessity for study in science, engineering, and business. The department serves all majors of the University by providing courses in mathematics, especially calculus, differential equations, and statistics.

The department offers undergraduate and graduate degrees in Mathematics and a minor in Mathematics. The curricula are rigorous and demanding, but flexible enough to allow students to sample many disciplines or to focus on a special interest within the major or in other areas. Many students complete a double major. Graduates are hired by major corporations and government agencies; many continue their education in graduate programs. Students with suitable grades may receive accelerated admission to the graduate program and complete the M.S. in mathematics in one additional year.

Students in the BS program in mathematics should 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 first four semesters are dedicated to science, liberal arts, and in department courses in calculus, differential equations, foundations, linear algebra, statistics, and programming. In the last four semesters, all majors take a semester of analysis and other courses as required by the mathematics or statistics option within the department.

Requirements

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<th>Requirements</th>
<th>Credit Hours</th>
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* Some mathematics and computer science courses are specified requirements; others may be chosen from approved lists for the math and statistics options. Consult the department for details. If your major courses do not satisfy the requirement for a technology course, then one of the free electives must be used for that purpose.

** 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 apply toward the required 120 hours.
### Mathematics Curriculum

#### FIRST YEAR

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<td>CS141</td>
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<td>MA200 Math Modeling &amp; Software</td>
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<td>MA211</td>
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<td>MA231 Calculus III</td>
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<td>MA232</td>
<td>Differential Equations</td>
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<td>MA339 Applied Linear Algebra</td>
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<td>Science Elective</td>
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<td>STAT383 Applied Statistics I</td>
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<td>MA321</td>
<td>Advanced Calculus I</td>
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<td>MA322 Adv. Calculus II or MA314</td>
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<td>MA311 or MA313</td>
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<td>MA/CS Elective</td>
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<td>KA Elective</td>
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<td>KA Elective/UC</td>
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#### SENIOR YEAR

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<th>Cr. Hrs.</th>
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<td>MA451/453</td>
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<td>MA/CS Course</td>
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<td>MA Elective</td>
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Students in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
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<tbody>
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<td>Basic Calculus</td>
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<tr>
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<tr>
<td>MA211</td>
<td>Foundations</td>
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<tr>
<td>MA230</td>
<td>3-D Space and Projective Geometry</td>
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<td>MA239</td>
<td>Elementary Linear Algebra*</td>
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<tr>
<td>MA277</td>
<td>Introduction to Computational Science*</td>
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<td>MA562</td>
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<td>MA570</td>
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<td>MA571</td>
<td>Numerical Solution of Differential Equations</td>
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<td>MA572</td>
<td>Finite Element Methods (ME515, CE538)</td>
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<td>MA573</td>
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<td>MA578</td>
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<td>MA579</td>
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<td>MA580</td>
<td>Intro to Monte Carlo Simulation</td>
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<td>MA581</td>
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<td>MA613–614</td>
<td>Topics in Logic and Set Theory</td>
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<td>MA619–620</td>
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<td>MA711–712</td>
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*MA239, 277, 282 may not be used to count towards a mathematics major.*
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 it 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Cr. Hrs</th>
<th>Description</th>
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<td>First-Year Seminar</td>
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<td>Knowledge Area and University Course</td>
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<td>Clarkson Seminar</td>
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<td>Electives</td>
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<td>Physics (or equivalent)</td>
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<td>Mathematics</td>
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<td>Chemistry</td>
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<td>Biology Elective</td>
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<td>Free Electives (including one C1 course)</td>
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<td>Communications Elective (C2)</td>
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<td><strong>TOTAL</strong></td>
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Physics Curriculum

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<tr>
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<th>Cr. Hrs</th>
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<th>Second Semester</th>
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<tr>
<td>PH131</td>
<td>Physics I</td>
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<td>FY100</td>
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<td>CM131</td>
<td>Chemistry I</td>
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<td>PH121</td>
<td>Phy. Freshman Seminar</td>
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<td>UNIV190</td>
<td>Clarkson Seminar</td>
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16*
### SOPHOMORE YEAR

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<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>PH231 Modern Physics</td>
<td>PH221 Theoretical Mechanics</td>
</tr>
<tr>
<td>PH232 Modern Physics Lab</td>
<td>MA231 Calculus III</td>
</tr>
<tr>
<td>MA232 Differential Equations</td>
<td>Free Elective (C1 or C2)</td>
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<tr>
<td>Biology Elective</td>
<td>KA/UC Elective</td>
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<td>KA/UC Elective</td>
<td>Communication Elective (C2)</td>
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<td>Information Tech. Elective</td>
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### JUNIOR YEAR

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<th>First Semester</th>
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<tr>
<td>PH325 Thermal Physics</td>
<td>PH331 Quantum Physics I</td>
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<tr>
<td>PH380 Electromagnetic Theory I</td>
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<td>MA381 Probability</td>
<td>MA331 Fourier-Series and Boundary Value Problems</td>
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<tr>
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<td>KA/UC Elective</td>
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<td>Free Elective (recommended PH381)</td>
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### SENIOR YEAR

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<td>PH435 Senior Seminar</td>
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<td>KA/UC Elective</td>
<td>Free Electives</td>
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* Some non-credit courses in physical education, aerospace studies and/or military science might be required for graduation.

1 Including the core courses PH131, PH132, PH221, PH231, PH232, PH325, PH327, PH380 and at least one Professional Course selected from PH445, PH446, PH470-471, and PH474-477.

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

3 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.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### Physics Courses

Not all courses are offered each year or each semester (see annual *Courses* publication).

#### UNDERGRADUATE COURSES

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<td>Physics I</td>
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<td>PH132</td>
<td>Physics II</td>
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<td>PH141</td>
<td>Physics for Life Sciences I</td>
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<td>PH142</td>
<td>Physics for Life Sciences II</td>
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<tr>
<td>SC101</td>
<td>Introduction to Astronomy</td>
</tr>
<tr>
<td>SC131</td>
<td>Introduction to Physics I</td>
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<tr>
<td>SC132</td>
<td>Introduction to Physics II</td>
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<tr>
<td>SC133</td>
<td>Collective Behavior in Physical, Biological, and Other Systems</td>
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<tr>
<td>PH221</td>
<td>Theoretical Mechanics I</td>
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<tr>
<td>PH231</td>
<td>Fundamentals of Modern Physics</td>
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<td>Modern Physics Laboratory</td>
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<td>PH255</td>
<td>Introduction to Mathematical Physics</td>
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<td>PH301</td>
<td>Teaching Methodology in Physics I</td>
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<td>Teaching Methodology in Physics II</td>
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<td>PH322</td>
<td>Theoretical Mechanics II</td>
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<td>Optics</td>
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<td>PH325</td>
<td>Thermal Physics</td>
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<td>Experimental Physics I</td>
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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
  o American Politics
  o Political Theory
  o International Politics
  o Law and Public Policy
• The Humanities/Social Sciences Research Seminar
• 5 courses in a pre-professional concentration
• 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 a concentration of at least five courses in a pre-professional 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.

Political Science Courses
POL210  Introduction to Policy & Politics
POL220  American Politics
POL250  Politics in Cross-National Perspective
POL251  Introduction to International Politics
POL301  Political Theory
POL302  Social & Political Thought in the 20th Century
POL320  The American Political Tradition

Cognate Philosophy Courses
PHIL200  Introduction to Philosophy
PHIL240  Contemporary Moral Issues
PHIL241  Medical Ethics
PHIL243  Business Ethics
PHIL270  American Environmentalism

POL305  International Development and Social Change
POL350(SOC350)  International Development and Social Change
POL351(SOC351)  Globalization
POL362  Human Rights, Law and Politics
POL371  Environmental Law
POL380(PHL380)  The Law and Bioethics
POL390-99  Special Topics in Political Science
POL400  Constitutional Law
POL470(SOC470/570)  Environmental Policy
PHIL200  Introduction to Philosophy
PHIL305  Critical Thinking
PHIL341  Professional Ethics
PHIL370  Environmental Ethics
PHIL420  Philosophy of the American Founding
## Political Science Curriculum

### First Year

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<th>Credits</th>
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<td>Introduction to Liberal Arts</td>
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<td><strong>PSCI MAJOR COURSE</strong></td>
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<tbody>
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<td><strong>SECOND SEMESTER</strong></td>
<td><strong>PSCI MAJOR COURSE</strong> or Free Electives</td>
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<td>Common Experience Knowledge Area Course</td>
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<td></td>
<td>Pre-professional Concentration</td>
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<td>Free Elective or Common Experience Technology and Humanity Course</td>
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<td><strong>First Semester</strong></td>
<td><strong>SECOND SEMESTER</strong></td>
<td><strong>H/SS RESEARCH SEMINAR (C2) or MAJOR COURSE</strong></td>
</tr>
<tr>
<td></td>
<td>Pre-professional Concentration or Free Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Knowledge Area or University Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free Electives</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
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. The science of 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 breadth of the discipline gives psychology majors a wide diversity of career options. While traditional professions such as mental health are still popular, graduates in psychology also pursue careers in the health professions, business, and governmental agencies.

The psychology curriculum at Clarkson emphasizes a theoretical and experimental approach to the various disciplines of psychological science. Our goal is to provide each student with a foundation in the fundamental areas of psychology, as well as specifically designed plans of study in the areas of greatest interest. All psychology majors will be given hands-on learning experiences. These experiences include 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/or industrial internships where the student works with psychologists in industrial settings. Talented students may pursue their own research projects through our senior thesis option. The psychology major prepares students for a variety of careers and for graduate study. Students may design their curricula to emphasize their own interests.

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.

### Psychology Curriculum

#### FIRST YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs</th>
<th>Second Semester</th>
<th>Cr. Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY101</td>
<td>First-Year Seminar in Psychology</td>
<td>2</td>
<td>PY Cognitive Elective</td>
<td>3</td>
</tr>
<tr>
<td>PY151</td>
<td>Intro. to Psychology</td>
<td>3</td>
<td>Psychology, Personality &amp; Social</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
<td>Elective</td>
<td>3</td>
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<tr>
<td></td>
<td>Mathematics Course</td>
<td>3</td>
<td>Mathematics Course</td>
<td>3</td>
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<tr>
<td></td>
<td>Science Course</td>
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<td>Science Course</td>
<td>3</td>
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<td>FY100</td>
<td>First-Year Seminar</td>
<td>1</td>
<td>Science Course Lab</td>
<td>2</td>
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<tr>
<td></td>
<td></td>
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</table>

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs</th>
<th>Second Semester</th>
<th>Cr. Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA282</td>
<td>Statistics</td>
<td>3</td>
<td>Psychology Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Psychology Electives</td>
<td>6</td>
<td>Psychology Cognitive Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>KA/UC</td>
<td>3</td>
<td>KA/UC</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free Elective</td>
<td>3</td>
<td>Free Electives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
First Semester | JUNIOR YEAR | Second Semester
--- | --- | ---
PY456 Experimental Psychology | 4 | Psychology Physiological Elective 3
KA/UC | 3 | Technology Elective 3
Free Electives | 9 | KA/UC 3
 | 16 | Free Elective 6
 | 15 |

First Semester | SENIOR YEAR | Second Semester
--- | --- | ---
PY | Directed Research/Internship | 3 | Free Electives | 15
KA/UC | 3 | 15
Free Electives | 9 | 15
 | 15

1The Professional & Professional Experience requirements are met by PY456 and the directed research/internship course. The Information Technology requirement is distributed throughout the Psychology Curriculum.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

**Psychology Courses**

<table>
<thead>
<tr>
<th>CORE COURSES (all required)</th>
<th>PY317 The Psych of Psychoactive Drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY151 Intro. to Psychology</td>
<td>PY321 Consumer Behavior</td>
</tr>
<tr>
<td>PY456 Experimental Psychology</td>
<td>PY325 Group Dynamics</td>
</tr>
<tr>
<td>PY496 Directed Research or</td>
<td>PY340 Behavioral Ecology</td>
</tr>
<tr>
<td>PY401-3 Internship</td>
<td>PY370 Developmental Psychology</td>
</tr>
<tr>
<td>PHYSIOLOGICAL REQUIREMENTS</td>
<td>PY401 Internship – Counseling</td>
</tr>
<tr>
<td>PY454 Physiological Psychology</td>
<td>PY402 Internship – Personnel Relations</td>
</tr>
<tr>
<td>PY458 Cognitive Neuroscience</td>
<td>PY403 Internship – Neurorehabilitation</td>
</tr>
<tr>
<td>PERSONALITY AND SOCIAL</td>
<td>PY411 Counseling Psychology</td>
</tr>
<tr>
<td>PSYCHOLOGY (one required)</td>
<td>PY460 Neurobiology</td>
</tr>
<tr>
<td>PY253 Social Psychology</td>
<td>PY462 Abnormal Psychology</td>
</tr>
<tr>
<td>PY361 Human Motivation</td>
<td>PY463 Health Psychology</td>
</tr>
<tr>
<td>COGNITIVE PSYCHOLOGY (two required)</td>
<td>PY480 D.S. in Psychology</td>
</tr>
<tr>
<td>PY255 Cognitive Psychology</td>
<td>PY481 D.S. in Social Psychology</td>
</tr>
<tr>
<td>PY358 Animal Learning and Cognition</td>
<td>PY482 D.S. in Physiological Psychology</td>
</tr>
<tr>
<td>PY359 Perception</td>
<td>PY483 D.S. in Cognitive Psychology</td>
</tr>
<tr>
<td>PY360 Learning &amp; Memory</td>
<td>PY491 Dir. Res./Health Psychology</td>
</tr>
<tr>
<td>ELECTIVES</td>
<td>PY492 Dir. Res./Psychophysiology</td>
</tr>
<tr>
<td>PY286 Organizational Behavior I</td>
<td>PY493 Dir. Res./Pain Psychology</td>
</tr>
<tr>
<td>PY310 Human Sexuality</td>
<td>PY494 Dir. Res./Neuropsychology</td>
</tr>
<tr>
<td>PY315 Personal Relationships</td>
<td>PY495 Dir. Res./Violence &amp; Conflict</td>
</tr>
<tr>
<td>PY316 The Nature of Human</td>
<td>PY496 Dir. Res./Close Relationships</td>
</tr>
<tr>
<td>Consciousness</td>
<td>PY497 Dir. Res./Psychology</td>
</tr>
<tr>
<td></td>
<td>PY498/499 Senior Thesis</td>
</tr>
</tbody>
</table>

**B.S. IN SOFTWARE ENGINEERING**

In applying the principles of engineering to the construction of computer software, the software engineer is the architect of a complex system. See description under Interdisciplinary Programs (p. 167).
UNDERGRADUATE MINORS

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.)

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 (1 cr.)
- BY142 Biology II Laboratory (2 cr.)
- BY162 Biology II Laboratory (2 cr.)
- BY322 Microbiology Laboratory (1 cr.)
- BY362 Human Physiology Laboratory (1 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 Interdisciplinary Programs (p. 180).

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 Biophysics or an appropriate replacement.
- Chemistry (3 credits) — Organic Chemistry I (prerequisite for Biochemistry I).

Minor in Chemistry
A minor in Chemistry is available to students in any degree program. To obtain a minor, a student must complete the following course requirements.

Category I (9 credits):
- CM241 Organic Chemistry I
- CM242 Organic Chemistry II
- CM244 Organic Laboratory I

Category II (6 credits):
- CM221 Spectroscopy
- CM223 Spectroscopy Laboratory

Category III (3 credits):
- CM371 Physical Chemistry I

Category IV (3 credits):
- CM 312 Survey of Inorganic Chemistry

or
- CM460 Biochemistry I

Students may substitute up to six credit hours of undergraduate research (CM391 and CM392) for an equivalent number of credit hours for the courses in Categories II-IV.
Minor in Cognitive Neuroscience

Required Basic Science Courses (29 credits)

- PY151 Introduction to Psychology (3 cr.)
- BY140 Biology I: Inheritance, evolution and diversity (3 cr.)
- BY142 Biology I Laboratory (2 cr.)
- BY160 Biology II: Cellular and Molecular Biology (3 cr.)
- BY162 Biology II Laboratory (2 cr.)
- CM131 General Chemistry I (4 cr.)
- CM132 General Chemistry II (4 cr.)
- PH141 Physics for Life Sciences I (4 cr.)
- PH142 Physics for Life Sciences II (4 cr.)

Required Cognitive Neuroscience Courses (9 credits)

- PY458 Cognitive Neuroscience (3 cr.)
- BY/PY454 Physiological Psychology (3 cr.)
- BY/PY460 Neurobiology (3 cr.)

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

- PY317 Psychology of Psychoactive Drugs (3 cr.)
- BY/PY340 Animal Learning and Cognition (3 cr.)
- PY359 Perception (3 cr.)
- PY360 Learning and Memory (3 cr.)
- PY462 Abnormal Psychology (3 cr.)
- PY463 Health Psychology (3 cr.)

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

Minor in Computational Science

The minor in Computational Science and Engineering, or 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:

- MA277 Introduction to Computational Science*
- MA377 Numerical Methods

At least two of:

- MA232 Differential Equations
- MA239/339 Elementary/Applied Linear Algebra
- MA282/383 General/Applied Statistics

Application area electives to make a total of 21 credits. (These are computational courses in departments other than Mathematics.)

*MA277 may not be taken after, or concurrent with, MA377. Successful completion of MA377 implies satisfaction of this requirement for the minor in CSE.

Minor in Computer Science

A minor in Computer Science is available to students in almost all degree programs. The requirements for the minor are:

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. Details are available from the Department. Exclusion: The Minor in Computer Science is not open to students majoring in Computer Science or Software Engineering.

Minor in Digitally Mediated Communication
Clarkson University offers a minor in Digitally Mediated Communication that is available to all undergraduate students with the exception of Communication majors. The minor enables non-Communication majors to focus their electives on issues and competencies in the field of digitally mediated communication. Courses used to fulfill the requirements of the minor include theoretical courses, project-based courses, and issue-driven courses.

To achieve a minor in Digitally Mediated Communication, students must achieve a 2.0 grade average in six three-credit courses, distributed in the following fashion:

A. Students must take four of the following courses:
   COMM214  Computer Applications and Concepts
   COMM220  Writing for New Media
   COMM221  2D Digital Design
   COMM327  Digital Video Production I
   COMM341  Introduction to Web Design
   COMM345  Information Architecture
   COMM414  Computer Documentation
   COMM427  Digital Video Production II
   COMM442  Advanced World Wide Web Interface Design

B. Students must take two additional three-credit COMM courses at or above the 300 level.

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.

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.” Forms for declaring one of these minors are available.

Thematic Minors. These interdisciplinary minors consist of five related humanities and social sciences courses that address a common theme. The currently available thematic minors are:
1. International and Cross-Cultural Perspectives
2. Science, Technology and Society
3. American Studies
4. Literature and the Arts

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.

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: IS414*
4. one course in computer networks: CS454 or EE407/CS455
5. two courses concerned with Web technologies and administration: COMM442 and COMM444

* For School of Business Majors for whom IS414 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 MA300 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

One of the following basic courses
(1 credit):

- PH121  Physics Freshman Seminar
- PH232  Modern Physics Laboratory
- PH435  Physics Seminar
- PH470  Directed Study Experimental
- PH474  Directed Study Theoretical
Minor in Professional Communication
Clarkson University offers a minor in Professional Communication that is available to all undergraduate students with the exception of Communication majors. The minor enables non-Communication majors to focus their electives on issues and competencies in the field of professional communication. Courses used to fulfill the requirements of the minor include theoretical courses, project-based courses, and issue-driven courses.

To achieve a minor in Professional Communication, students must achieve a 2.0 grade-point average in six three-credit courses, distributed in the following fashion:
A. Students must take four of the following courses:
   - COMM210  Theory of Rhetoric for Business, Engineering, and Science
   - COMM217  Introduction to Public Speaking
   - COMM313  Professional Communication
   - COMM330  Science Writing
   - COMM410  Theory and Philosophy of Communication
   - COMM412  Organizational Communication
   - COMM417  Business and Professional Speaking
B. Students must take two additional three-credit Communication courses at or above the 300 level.

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 Psychology
A minor in Psychology is available to students in any degree program. 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
See p. 184.

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 (MA282 or MA383 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 and Computer Science. (The current list of approved courses is maintained by the Mathematics and Computer Science Department.)

   Exclusion: Applied Mathematics and Statistics majors, and majors in Mathematics (Statistics option) are excluded from this minor.
GRADUATE PROGRAMS

Through the School of Arts & Sciences, Clarkson offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) in the following areas: chemistry (including biomolecular), mathematics, physics, as well as master's (MS) degrees in computer science and information technology, and a Doctor of Physical Therapy degree. Faculty and students also participate in the interdisciplinary program in Environmental Science and Engineering.

For information regarding the admission process, application procedures, degree requirements and financial assistance, see p. 198. To learn more about faculty members and research areas contact the appropriate department. Additional information is also available at www.clarkson.edu/graduate.

CHEMISTRY

The Department of Chemistry offers American Chemical Society accredited graduate programs leading to both M.S. and Ph.D. degrees.

The research interests of the department include various areas of experimental and theoretical chemistry. The department has an internationally renowned program in colloid and materials chemistry which is actively supported by government agencies and industrial sponsors. Front-edge research involves colloidal particles and their applications in high-technology materials as well as in liquid systems and their pharmaceutical and biological applications. Studies in analytical chemistry involve electrochemistry and bioelectrochemistry, chromatography, spectrophotometry, and separations; radiochemical techniques in atmospheric aerosol science; and the use of computers in the interpretation of analytical data. Advanced topics in the analysis of solids, liquids, and gases (aerosols) are available for students interested in industrial hygiene vocations.

Investigations in organic chemistry are concerned with photochemistry, organic synthesis, synthesis with enzymes, free radicals, pharmaceuticals, mechanisms of organic reactions, and nuclear magnetic resonance studies. Studies in physical chemistry include thermodynamics, kinetics, molecular quantum chemistry, collision dynamics, and spectroscopy. Work in biochemistry involves proteins, protein-DNA interactions, biosensors, bioelectronics, vesicles and membrane models. Polymer studies include microemulsions, liquid crystals, smart materials, biomaterials, plasma deposition, and coating of fine particles for use in electronics, ceramics, and composite materials manufacture.

Excellent laboratory facilities and equipment are available for this work. They include scanning and transmission electron microscopes; scanning probe microscope; atomic force microscopes, a number of atomic absorption, infrared, visible and ultraviolet spectrophotometers including recording, stopped-flow, relaxation spectroscopy, and single photon counting fluorescence instruments; analytical and preparative ultracentrifuges; nuclear magnetic resonance, laser Raman spectrometers, dynamic and static light-scattering photometers; liquid scintillation (beta) and gamma counting, x-ray diffraction and energy dispersive x-ray elemental analysis equipment; gas chromatographs and high-performance liquid chromatography instruments and laboratory computers.

Further information about the Center for Advanced Materials Processing (CAMP) is available on page 205.

INFORMATION TECHNOLOGY

See p. 188.
MATHEMATICS AND COMPUTER SCIENCE
The Department of Mathematics and Computer Science offers graduate programs leading to both Master of Science and Doctor of Philosophy degrees in mathematics and an interdisciplinary Master of Science in Computer Science. All 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: critical phenomena and statistical mechanics; integral and discrete transforms and modified iterative methods for nonlinear problems; sampling expansions, Gibbs phenomenon, operational sum methods for difference equations; multigrid and spectral methods, and applications to atmospheric models; numerical analysis, optimization, computational applied mathematics, applied probability and statistics, theory of linear and nonlinear regression models; chaos, dynamical systems; computer arithmetic, parallel processing, computational science and engineering, nonlinear dynamics; fluid dynamics; artificial intelligence; virtual reality; theoric analysis of finite models, using methods of logic and combinatorics; automated deduction, algorithms, software verification, computational learning theory, complexity theory; Boolean circuits; algebraic theory of automata; proof complexity; operating systems, file systems, distributed systems, bioinformatics systems biology.

Details of the graduate M.S. in Computer Science are on p. 185 (under Interdisciplinary).

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, reaction kinetics, nonlinear phenomena, dynamics of noise-driven systems, quantum computing, nonlinear optics, solid state physics, transport properties, effects of disorder, statistical mechanics, phase transitions, scaling, finite size effects, percolation, self-avoiding walks, surface and interface physics, Monte Carlo techniques for ion-surface scattering, optics, atomic and molecular physics, biophysics, atomic force microscopy, and self assembly of nanomaterials.
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 create and disseminate knowledge and to educate leaders who are energized by the entrepreneurial spirit, nourished through scholarship and beckoned to serve the community.” 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 that is 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 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 AACSBO, 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* Augustine A. Lado; *Associate Professors* Larry Compeau, Sandra Fisher, Mary E. Graham, Rajesh Sethi; *Assistant Professors* Theresa Coates, Fred Miao, Stephen Saver, Michael Wasserman; *Instructors* Marc Compeau, Floyd Ormsbee, Anju Sethi

**Economics and Financial Studies**
*Professors* H. Sonmez Atesoglu, Clifford Brown, John K. Mullen, Timothy F. Sugrue; *Associate Professors* Mark R. Frascatore, Alasdair Turnbull; *Assistant Professors* Luciana Echazu, Martin Heintzelman, Diego Nocetti, Allan Zebedee; *Instructors* Gasper Sekelj, Katherine Wears, Susan Young

**Operations and Information Systems**
*Professors* Farzad Mahmoodi; *Associate Professors* Ralph E. Janaro, Boris Jukic, Somendra Pant; *Assistant Professors* Weiling Ke, Santosh Mahapatra, Chester Xiang, Dennis Yu; *Instructors* Michael Ensby, William MacKinnon, Steve Marsh, Jesse Sherman
**UNDERGRADUATE PROGRAMS**

**Curricula**

The program’s first two years are designed to provide flexibility so students are exposed to a variety of courses. You will have formal and informal opportunities to learn about our majors, minors and career opportunities so that you can make a good decision about choosing an academic path in which you are interested. The courses students take are virtually identical for all School of Business students during those first two years, so you do not need to decide on your major until the end of your sophomore year.

We have four undergraduate integrated majors that result in the Bachelor of Science degree: Global Supply Chain Management, Innovation & Entrepreneurship, Financial Information & Analysis, and Information Systems & Business Processes. We also offer a range of minors including Economics, Law Studies, and Project Management. These are all 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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC150</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>SB113</td>
<td>Entrepreneurship, Management and Organization*</td>
<td>3</td>
</tr>
<tr>
<td>UNIV110</td>
<td>Clarkson Seminar</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Science Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

**First Year — Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC151</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>SB114</td>
<td>Leadership, Teamwork, and Business Enterprise*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective to satisfy Clarkson Common Experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowledge Area requirement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Science Course</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mathematics Course</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
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</table>

**Second Year — First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS211</td>
<td>Introduction to ERP</td>
<td>3</td>
</tr>
<tr>
<td>AC205</td>
<td>Accounting for Decision Analysis</td>
<td>3</td>
</tr>
<tr>
<td>LW270</td>
<td>Law and Society I</td>
<td>3</td>
</tr>
<tr>
<td>PHIL243</td>
<td>Business Ethics (recommended, or other non-business elective)</td>
<td>3</td>
</tr>
<tr>
<td>MA282</td>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
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</tbody>
</table>

**Second Year — Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS286</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MK320</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>OM331</td>
<td>Operations and Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>EC311</td>
<td>Econometrics &amp; Business Statistics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective to satisfy Clarkson Common Experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Knowledge Area requirement</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

*Transfer students are required to take upper-level School of Business electives in place of SB113/SB114.
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
- 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. 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:

- EC451 Industrial & Supply Chain Economics
- IS428 Information Systems for Supply Chain Management
- MK431 Supply Chain Distribution Channels
- OM341 Global Sourcing & Supply Chain Design
- OM351 Quality Management & Lean Enterprise
- SB361 Supply Chain Environmental Management
- SB441 Advanced Topics in Global Supply Chain Management
- OS466 Negotiations & Relationship Management

Students choose one professional elective course from the following list:

- IS314 Database Management
- LW471 Law & Society II
- MK322 Market Analysis & Research
- MK436 Creativity and Developing Innovation & New Products
- OM476 Management of Technology
- SB305 Cost Management
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.

### Third Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>OM341</td>
<td>Global Sourcing &amp; Supply Chain Design</td>
<td>3</td>
</tr>
<tr>
<td>OS351</td>
<td>Quality Management &amp; Lean Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
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<td>TOTAL</td>
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### Third Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS428</td>
<td>Information Systems for Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SB361</td>
<td>Supply Chain Environmental Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Free or Non-Business Elective</td>
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<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
<td>3</td>
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<tr>
<td></td>
<td>TOTAL</td>
<td>15</td>
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</table>

### Fourth Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS466</td>
<td>Negotiations &amp; Relationship Management</td>
<td>3</td>
</tr>
<tr>
<td>EC451</td>
<td>Industrial &amp; Supply Chain Economics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
<td>3</td>
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<td>Free or Non-Business Elective</td>
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<td>Non-Business Elective</td>
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### Fourth Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB441</td>
<td>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>
</tr>
<tr>
<td>OS432</td>
<td>Organizational Policy and Strategy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge Area requirement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>15</td>
</tr>
</tbody>
</table>

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**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.
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:

- EC370 Economics of Innovation
- SB322 Designing and Leading Innovative Ventures
- MK321 Consumer and Buyer Behavior
- MK332 Market Analysis and Research

Students choose three Professional Electives:

- SB305 Cost Management
- LW471 Law and Society II
- OM476 Management of Technology
- OM480 Project Management

Included in these three Professional Electives, students may choose one of the following two experiential courses:

- SB313 Experiential Entrepreneurship
- ES305 Virtual Tools in Engineering Design

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.

### Third Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK321</td>
<td>Consumer and Buyer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MK332</td>
<td>Market Analysis and Research</td>
<td>3</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management</td>
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<tr>
<td></td>
<td>Non-Business Elective</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
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</table>

### Third Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC370</td>
<td>Economics of Innovation</td>
<td>3</td>
</tr>
<tr>
<td>SB322</td>
<td>Designing &amp; Leading Innovative Ventures</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
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</table>

### Fourth Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK436</td>
<td>Creativity and Developing Innovation and New Products</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Common Experience Knowledge Area requirement</td>
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</tr>
<tr>
<td></td>
<td>Free or Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
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</table>

### Fourth Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB437</td>
<td>Commercializing Innovation</td>
<td>3</td>
</tr>
<tr>
<td>SB440</td>
<td>Innovation and Entrepreneurship Strategy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective: Clarkson Common Experience Knowledge</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Common Experience Knowledge Area requirement</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
B.S. IN FINANCIAL INFORMATION AND ANALYSIS

The field of Financial Information and Analysis (Fi&A) provides students with expertise in the wide range of issues common to both finance and accounting. This includes the role of accounting as the basic language of business, the importance of accounting information systems in organizational decision making, and the use of this information by financial decision makers in managing assets and investments. The knowledge and skills developed through our unique curriculum provide graduates with the abilities to succeed in a workplace that is integrating the traditional functions of finance and accounting. The Fi&A curriculum gives each student a fundamental knowledge of managerial and cost accounting, and financial statement analysis. Career opportunities for graduates in Fi&A include fields such as management accounting, accounting information systems design, financial management, investment management, financial services, and corporate financial planning.

Students earning a degree in Financial Information and Analysis must complete the Clarkson Common Experience and complete 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 27 credits of specialized business courses to satisfy the major requirements; and 18 credit hours of electives. 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 Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB305</td>
<td>Cost Accounting</td>
</tr>
<tr>
<td>AC403</td>
<td>Financial Reporting &amp; Analysis I</td>
</tr>
<tr>
<td>AC404</td>
<td>Financial Reporting &amp; Analysis II</td>
</tr>
<tr>
<td>FN464</td>
<td>Financial Management II</td>
</tr>
<tr>
<td>FN470</td>
<td>Strategic Financial Management</td>
</tr>
<tr>
<td>FN462</td>
<td>Investments</td>
</tr>
</tbody>
</table>

Students choose three (3) Professional Electives:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC407</td>
<td>Taxation of Business Entities</td>
</tr>
<tr>
<td>AC421</td>
<td>Accounting Information Systems</td>
</tr>
<tr>
<td>AC431</td>
<td>Advanced Accounting: Investment and Ownership Interests</td>
</tr>
<tr>
<td>EC356</td>
<td>Money and Banking</td>
</tr>
<tr>
<td>FN455</td>
<td>Venture Capital and Private Equity</td>
</tr>
<tr>
<td>FN467</td>
<td>International Finance</td>
</tr>
<tr>
<td>FN475</td>
<td>Portfolio 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.

**Third Year – First Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN361</td>
<td>Financial Management</td>
</tr>
<tr>
<td>AC403</td>
<td>Fin. Reporting &amp; Analy. I</td>
</tr>
<tr>
<td>OM331</td>
<td>Operations &amp; Supply Chain Free Elective</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
</tr>
</tbody>
</table>

**Third Year – Second Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC404</td>
<td>Fin. Reporting &amp; Analysis II</td>
</tr>
<tr>
<td>MK320</td>
<td>Principles of Marketing</td>
</tr>
<tr>
<td>FN464</td>
<td>Financial Management II Non-Business/Global Elective</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</td>
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</tbody>
</table>

**Fourth Year – First Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN462</td>
<td>Investments</td>
</tr>
<tr>
<td>OS352</td>
<td>Human Resource Mgt. Non-Business Elective</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
</tr>
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</table>

**Fourth Year – Second Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS432</td>
<td>Org. Policy &amp; Strategy</td>
</tr>
<tr>
<td>FN470</td>
<td>Strategic Fin. Management Professional Elective</td>
</tr>
<tr>
<td></td>
<td>Non-Business/ Knowledge Area</td>
</tr>
<tr>
<td></td>
<td>Non-Business Elective</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:

- **CS141** Introduction to Computer Science
- **IS400** Business Processes and Applications: Analysis and Design
- **IS314** Database Management
- **IS415** Data Warehousing and Data Mining
- **IS437** Business Application Development
- **OM480** Project Management

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

- **COMM341** Introduction to Web Design
- **COMM345** Information Architecture
- **EE408** Software Design for Visual Environments
- **CS459** Human-Computer Interaction
- **CS460/EE468** Database Systems
- **COMM440** PHP/MySQL Interactive Design

These courses can be combined into several sets, expanding a particular expertise area. Students will be advised to take one of the suggested course combinations:

- **IS426** Enterprise Architecture and Integration
- **EE361** Fundamentals of Software Engineering or
- **COMM345** Information Architecture
- **CS460/EE468** Database Systems
- **COMM341** Introduction to Web Design
- **EE361** Fundamentals of Software Engineering or
- **COMM345** Information Architecture
- **CS460/EE468** Database Systems
- **COMM440** PHP/MySQL Interactive Design

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, CS141 Introduction to Computer Science I should be taken prior to the junior year.

### Third Year — First Semester

<table>
<thead>
<tr>
<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>
</tr>
<tr>
<td>IS314</td>
<td>Database Management</td>
<td>3</td>
</tr>
<tr>
<td>OS352</td>
<td>Strategic Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>FN361</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>Non-Business Elective</td>
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<tr>
<td><strong>TOTAL</strong></td>
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</table>

### Third Year — Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS415</td>
<td>Data Warehousing and Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>IS437</td>
<td>Business Application Development</td>
<td>3</td>
</tr>
<tr>
<td>Professional Elective</td>
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<tr>
<td>Non-Business Elective: Clarkson</td>
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<td>3</td>
</tr>
<tr>
<td>Common Experience Knowledge</td>
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<td>3</td>
</tr>
<tr>
<td>Area requirement</td>
<td></td>
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<tr>
<td>Free or Non-Business Elective</td>
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<tr>
<td>Non-Business Elective</td>
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<td><strong>TOTAL</strong></td>
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### Fourth Year — First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tr>
<td>IS437</td>
<td>Business Application Development</td>
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<td>Professional Elective</td>
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<td>Non-Business Elective: Clarkson</td>
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<tr>
<td>Common Experience Knowledge</td>
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<td>Area requirement</td>
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<tr>
<td>Free or Non-Business Elective</td>
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<td>Non-Business Elective</td>
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### Fourth Year — Second Semester

<table>
<thead>
<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
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<td>Project Management</td>
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<tr>
<td>OS432</td>
<td>Organizational Policy and Strategy</td>
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<td>Non-Business Elective: Clarkson</td>
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</tr>
<tr>
<td>Common Experience Knowledge</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Area requirement</td>
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<td>3</td>
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<tr>
<td>Non-Business Elective</td>
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<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
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
EC151  Principles of Macroeconomics
AC205  Introduction to Accounting for Decision Analysis
LW270  Law and Society I
OS286  Organizational Behavior
FN361  Corporate Finance
OM331  Operations & Supply Chain Management*
MK320  Principles of Marketing*

*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:

Required
Principles of Microeconomics (EC150, EC350, or equivalent)
Principles of Macroeconomics (EC151 or equivalent)
Econometrics and Business Statistics (EC311 or equivalent)

Electives (9 credit hours)
Three (3) 300- or 400-level EC designated courses

Minor in Law Studies

The minor in Law Studies is primarily designed for students who wish to structure their academic program to help prepare for law school. The minor will also serve the needs of students 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 the following requirements:

1. LW270 Law and Society I

2. Two of the following areas of Law courses: LW466 Law and the Workplace, LW471 Law and Society II, POL371 Environmental Law, POL400 Constitutional Law

3. Two of the following social issues courses: LW490 Internship, COMM428 Public Debate and the Environment, PHIL240 Contemporary Moral Issues, PHIL243 Business Ethics, ANTH332 Cities and Social Justice, PHIL341 Professional Ethics, POL/SOC470 Environmental Policy, PHIL380 Law and Bioethics, POL362 Human Rights Law & Politics

4. One of the following Communications courses: COMM210 Theory of Rhetoric for Business, Science and Engineering, COMM217 Introduction to Public Speaking, COMM410 Theory and Philosophy of Communication

5. LW499 Law Studies Minor Portfolio
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:
   OM480  Project Management (Prerequisite: statistics course)
   OM485  Quality Systems Management (Prerequisite: statistics)
   SB305   Cost Management

B. Elective Courses (Choose any pair):
   OS286  Organizational Behavior (Prerequisite: sophomore standing)
   OS352  Strategic Human Resource Management
           (Co/Prerequisite: IS211 or IS200, Prerequisite: OS286)
   OS286  Organizational Behavior (Prerequisite: sophomore standing)
   OS466  Negotiations and Relationship Management (Prerequisite: OS286)
   OM331  Operations Production Management
           (Pre/Corequisite: IS211 or IS200; Prerequisite: statistics)
   OM476  Management of Technology (Co/Prerequisite: OM331)

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 couple the broadening perspective of the liberal arts with a solid background 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 in one of the School of Business programs and one of the Humanities or Social Sciences. During their undergraduate career, 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 individual 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 p. 176.)
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 Health Professions Advisory Committee in the dean’s office in the School of Arts & Sciences at 315-268-6544.

Pre-Physical Therapy Leading into the Professional Physical Therapy Graduate Program
Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should call the associate dean for Health Sciences at 315-268-3786 (see p. 163).

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. To foster a sense of professionalism and a better understanding of careers in law, interested students may participate in Clarkson’s Pre-Law Society.

Study Abroad Program
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. Students choosing the International Business concentration within the Business and Technology major are expected to study abroad for at least one semester. Please refer to page 34 for more details on this program.

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 pages 34 and 35 for more details on these programs.

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.
BUSINESS GRADUATE PROGRAMS

The School of Business offers graduate work leading to the Master of Business Administration (MBA) and an interdisciplinary summer program leading to the Master of Science in Engineering and Global Operations Management (see p. 186). 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 measured by undergraduate grade-point average, score on GMAT, 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. Students are also eligible to apply for a graduate assistant position working for a faculty/staff member.

Students may complete the full-time MBA in one year of study by receiving advanced credit for first-year foundation courses. Foundation requirements include 27-33 credit hours in business, economics, and statistics. MBA candidates must complete foundation courses in nine specified areas as well as 35 credits of advanced coursework. Through careful planning, students with backgrounds in business, engineering, liberal arts, or science may complete the foundation courses as undergraduates or through pursuing the Summer Business Concepts program and fulfill the requirements for the graduate degree in one year. Some students may require overloading and/or summer school to complete the 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. Further information regarding graduate programs can be found on pages 188-195.

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 (MBA)

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 nine specified areas and 35 credit hours of advanced graduate work. The foundation includes courses from the following subjects: financial and managerial accounting, computer fundamentals, corporate finance, micro- and macroeconomics, law and society, organizational behavior, marketing, operations and production management, and quantitative methods/statistics. Students with appropriate undergraduate coursework can be awarded credit for foundation course requirements.

Beyond the foundation, the 35-hour core of the MBA consists of ten two-credit interrelated modules, four 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. A Strategic Planning module (2 credits) and the Information Systems module (2 credits) are also required during the spring semester. The other modules are taught for seven weeks each.

The module titles are:
- AC603 Management Accounting
- EC604 Applied Economics
- FN607 Financial Management
- IS605 Information Systems
- OM602 Decision Analysis and Supply Chain Modeling
- OM606 Supply Chain Management
- OS608 Organizational Behavior & Performance Management
- OS610 Strategic Planning
- MK609 Marketing Management
- SB609 Corporate Ethical Decision Making
In addition to the General MBA track, three tracks are also offered in Global Supply Chain Management, Environmental Management, and Innovation and New Venture Management.

Graduate elective courses are available in several functional areas. Experiential learning is a strong part of Clarkson's culture so each student participating in the One-Year MBA is required to take a three credit hour experiential course. Students can choose from either a number of consulting projects or pursue a summer international abroad program.

With the Clarkson Consulting Group project options, you can find ways to apply your skills and gain new insights into the management issues facing business leaders and organizations. Through international study, Clarkson also helps you explore the global management issues facing business leaders and organizations in all parts of the world.

**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. The objective of a 4+1 program is to allow students to complete their master’s degree requirements in just one additional academic year of study. Students from any undergraduate discipline can participate in these 4+1 programs by carefully selecting appropriate foundation courses as undergraduates.

For further information about specific foundation requirements at our 4+1 partners, please visit our Web site at [www.clarkson.edu/business/graduate](http://www.clarkson.edu/business/graduate).

**Graduate Business Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC603</td>
<td>Management Accounting</td>
<td>(MBA Module)</td>
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<tr>
<td>AC623</td>
<td>Financial Statement Analysis</td>
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<tr>
<td>EC604</td>
<td>Applied Economics (MBA Module)</td>
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<td>EC660</td>
<td>Environmental Economics</td>
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<td>EC675</td>
<td>Personnel Economics</td>
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<tr>
<td>FN607</td>
<td>Financial Management (MBA Module)</td>
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<td>FN655</td>
<td>Venture Capital and Private Equity</td>
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<td>FN667</td>
<td>International Finance</td>
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<tr>
<td>FN668</td>
<td>Financial Markets and the Global Economy</td>
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</tr>
<tr>
<td>FN680</td>
<td>Financial Tools for Business Development and Risk Management</td>
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<tr>
<td>FN687</td>
<td>Special Project in Finance</td>
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<tr>
<td>IS605</td>
<td>Information Systems (MBA Module)</td>
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<tr>
<td>IS614</td>
<td>Database Administration</td>
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<tr>
<td>IS628</td>
<td>Management of e-Business Systems</td>
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<td>OM602</td>
<td>Decision Analysis &amp; Supply Chain Modeling (MBA Module)</td>
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<td>OM606</td>
<td>Supply Chain Management</td>
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<td>OM671</td>
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<td>OS608</td>
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<td>OS610</td>
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<td>OM615</td>
<td>Supply Chain Systems Management</td>
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<td>OM650</td>
<td>Operations Strategy &amp; International Competitiveness</td>
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<td>OM676</td>
<td>Developing and Managing Technology</td>
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<td>OM680</td>
<td>Strategic Project Management</td>
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<td>OM685</td>
<td>Quality Management and Process Control</td>
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<td>OS554</td>
<td>Special Topics in International Business</td>
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<tr>
<td>OS652</td>
<td>Strategic Human Resource Management</td>
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<tr>
<td>OS657</td>
<td>Leading Organizational Change</td>
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<td>OS666</td>
<td>Negotiations and Relationship Management</td>
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<tr>
<td>MK609</td>
<td>Marketing Management (MBA Module)</td>
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<td>MK689</td>
<td>New Product Marketing</td>
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<td>MK694</td>
<td>Supply Chain Distribution Management</td>
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<td>MK696</td>
<td>Marketing Methods</td>
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<td>SB609</td>
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<td>SB611</td>
<td>Clarkson Consulting Group</td>
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<tr>
<td>SB693</td>
<td>Seminar in International Business I</td>
<td></td>
</tr>
<tr>
<td>SB696</td>
<td>Advanced Topics in Supply Chain Management</td>
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</table>
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 complex. Engineers require not only a knowledge of mathematics and the associated sciences for finding solutions to problems, but at the same time 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 enable Clarkson graduates to make significant contributions in their chosen fields while at the same time recognizing their responsibilities to society under the motto of “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). SPEED projects, including FIRST Robotics and Mini-Baja, encompass multidisciplinary approaches to solving real-world problems. Not only do the SPEED projects involve design and fabrication, they also incorporate marketing, public relations, technical 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). 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 to laboratory facilities; and scholarships for both minority students and women from developing countries 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.
The eight-semester undergraduate degree granted in engineering is the Bachelor of Science (B.S.), with specialization in one of the seven EAC/ABET-accredited curricula — aeronautical, chemical, civil, computer, electrical, mechanical, or software and a new program in environmental engineering. See Clarkson's home page at www.clarkson.edu/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 Common Experience requirements stated on page 19.

**CURRICULA**
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 (see p. 19).

### The Common First-Year Curriculum in Engineering

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course</strong></td>
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<tr>
<td>CM131</td>
<td>Chemistry I</td>
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<tr>
<td>PH131</td>
<td>Physics I</td>
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<td>Calculus I</td>
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<td>Clarkson Seminar</td>
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<td>FY100</td>
<td>First-Year Seminar</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

*Knowledge Area or University Course Electives*  
There are a total of five courses which must be taken to cover 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 recommended.

# Information Technology component

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### 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 (p. 155) and Minors and Concentrations (pp. 10-11).

### 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 serve 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.

### Combined MBA/B.S. Engineering 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 either engineering or business administration. This may require course overloads in some semesters and/or attendance at summer school. Interested students should consult the School of Business. For information on the joint ME/MBA program, see p. 160.
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 Pre-Medical Sciences Advisory Committee in the Dean’s Office in the School of Arts & Sciences at 315-268-6544.

Pre-Physical Therapy Leading into the Professional Physical Therapy Graduate Program
Students interested in preparing for entrance into Clarkson’s Doctor of Physical Therapy degree program should call the Associate Dean for Health Sciences at 315-268-3786 (see p. 163).

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. A list of pre-law advisors is available through the Director of Undergraduate Programs in the School of Business. The advisors provide counseling and information about law schools and careers in law. To foster a sense of professionalism and a better understanding of careers in law, interested students are encouraged to participate in Clarkson’s Pre-Law Society.

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. (See p. 15.)

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, and the 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 (see p. 14), via the Concrete Canoe; Construction Management; Design, Build, Fly; Engineers Without Borders; Environmental Remediation; FIRST Robotics; Formula SAE; Mini-Baja; Destination Imagination; Steel Bridge; Snowmobile Challenge; Timber Bridge and other design teams, all part of the SPEED program.

Bachelor of Professional Studies Program
An entering first-year or transfer student may create, in consultation with an advisor, an academic program uniquely tailored to meet special occupational or career objectives. The Bachelor of Professional Studies (BPS) degree program provides this opportunity. Further information regarding BPS opportunities in the School of Engineering may be obtained from the office of the Dean at 315-268-6446.

Transfer Programs
Both 2+2 and 3+2 transfer programs are available at Clarkson (see p. 46).

Nonmatriculated Student Classification
See Nondegree Students, p. 50.
FACULTY

Chemical and Biomolecular Engineering
Ruth Baltus — 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, Roshan Jachuck, Richard J. McCluskey, Raghunathan Rengaswamy; Assistant Professor Sitaraman Krishnan

Civil and Environmental Engineering
Hung Tao Shen — Chair; Professors Norbert L. Ackermann, Anthony G. Collins, John P. Dempsey, Thomas M. Holsen, Feng-Bor Lin, Levon Minnetyan, Susan E. Powers, Hayley H. Shen, Hung Tao Shen, Poojitha D. Yapa, Thomas C. Young, Amy K. Zander; Associate Professors Stefan J. Grimberg, Kerop V. Janoyan; Assistant Professors Ayman Ababneh, Andrea R. Ferro, Yongming Liu, Narayanan Neithalath, Sulapha Peethamparan, Tong Qiu, Shane Rogers; Adjunct Associate Professors Spencer F. Thew, Brooks Washburn; Adjunct Instructor Randy Pray

Electrical and Computer Engineering
Thomas H. Ortmeyer — Chair; Professors Paul B. McGrath, Thomas H. Ortmeyer, Pragasen Pillay, Vladimir Privman, Charles Robinson, Robert J. Schilling, Yuzhuo Li; Associate Professors James J. Carroll, Ming-Cheng Cheng, Susan E. Conry, Abul N. Khondker, Jack Koplowitz, Robert A. Meyer, Stephanie Schuckers, James A. Svoboda, Alireza Ziarani; Assistant Professors Daqing Hou, Feng Hua, Edward Sazonov; Associate Professors Cetinkaya Cetin, Jeanne Matthews; Research Professor Liya L. Regel; Instructor Timothy Fanelli

Mechanical and Aeronautical Engineering
Daryush K. Aidun — Chair; Professors Goodarz Ahmadi, Daryush K. Aidun, Sung P. Lin, John C. Moosbrugger, Kenneth Willmert; Associate Professors Frederick M. Carlson, Cetin Cetinkaya, Suresh Dhaniyala, Brian Helenbrook, Kathleen Issen, Ratneshwar Jha, James H. Kane, Ronald S. LaFleur, David J. Morrison, Daniel T. Valentine, Kenneth D. Visser, Steven W. Yurgartis; Assistant Professors Doug Bohl, Weiqiang Ding, Kevin Fite, Piergiovanni Marzocca
UNDERGRADUATE PROGRAMS

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

1 See Mechanical & Aeronautical Engineering Department Student Handbook, section 4.3.1.

- Competence in employing the solution process to solve professional problems.
- Competence in transforming a physical system into a mathematical model, using a combination of scientific knowledge, physical intuition, and mathematical techniques, and in extracting meaning from that model by numeric or analytic solutions, approximation, or estimation to evaluate a proposed solution or make a decision.
- Clear communication in written, oral, and graphical form.
- Competence in collaboration with individuals of differing backgrounds.
- A competent understanding of the interaction of a proposed solution with the social, economic, and natural and man-made environments.
- Instill the habit of continued learning so, as professionals, graduates will prepare themselves to solve new or more difficult problems.

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 the six 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\(^1\). 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.

### Aeronautical Engineering Curriculum

#### FIRST YEAR
(See beginning of School of Engineering section, page 124)

<table>
<thead>
<tr>
<th>MS/AS</th>
<th>Military Science/Aerospace Studies (if elected)</th>
<th>MS/AS</th>
<th>Military Science/Aerospace Studies (if elected)</th>
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<tbody>
<tr>
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<td></td>
</tr>
</tbody>
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#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
<td>ES222</td>
<td>Strength of Materials</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
<td>ES223</td>
<td>Rigid Body Dynamics</td>
</tr>
<tr>
<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
<td>AE/ME212 Intro. to Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Elementary Differential Equations</td>
<td>3</td>
<td>MA231</td>
<td>Calculus III</td>
</tr>
<tr>
<td>AE200</td>
<td>Aeronautical Engineering Seminar</td>
<td>0</td>
<td>AE201</td>
<td>Mechanical Engineering Lab I</td>
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<td>KA/UC Elective</td>
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<td>KA/UC Elective</td>
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</table>

#### JUNIOR YEAR

<table>
<thead>
<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES330</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>AE/ME425 Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
<td>AE429 Aircraft Performance and Flight</td>
<td>3</td>
</tr>
<tr>
<td>AE/ME350</td>
<td>Aircraft Structures</td>
<td>3</td>
<td>AE429 Aircraft Performance and Flight</td>
<td>3</td>
</tr>
<tr>
<td>MA330</td>
<td>Advanced Engineering Math**</td>
<td>3</td>
<td>AE458 Design of Aircraft Structures</td>
<td>3</td>
</tr>
<tr>
<td>AE/ME455</td>
<td>Mechanical Vibrations and Control</td>
<td>3</td>
<td>AE401 Mechanical Engineering Lab III</td>
<td>1</td>
</tr>
<tr>
<td>AE301</td>
<td>Mechanical Engineering Lab II</td>
<td>1</td>
<td>Undesignated Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td>16</td>
</tr>
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</table>

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE450</td>
<td>Aircraft Design I</td>
<td>3</td>
<td>AE451 Aircraft Design II</td>
<td>3</td>
</tr>
<tr>
<td>AE430</td>
<td>Stability Control of Aerospace Vehicles</td>
<td>3</td>
<td>AE427 Design of Propulsion Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE/ME431</td>
<td>Gas Dynamics</td>
<td>3</td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Professional Elective</td>
<td>3</td>
<td>KA/UC Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Economics Elective</td>
<td>3</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

\( \ast \) or MA331 and MA383

\( ^1 \) See Mechanical & Aeronautical Engineering Department Student Handbook, section 4.3.1.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### Professional Concentrations in Engineering
See descriptions pp. 155-159.

### Course Descriptions
Descriptions of all undergraduate and graduate courses will be supplied upon request.
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 elective concentrations are listed on the following pages.

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, materials science, and other technical areas. By appropriate selection of electives, the student can also use the chemical engineering program as a 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 beginning of School of Engineering section, p. 131)

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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH250</td>
<td>Chemical Process Calculations</td>
<td>3</td>
<td>CH272 Phase &amp; Chem. Equilibria</td>
</tr>
<tr>
<td>CH271</td>
<td>ChE Thermodynamics</td>
<td>3</td>
<td>or BY160 Biology II</td>
</tr>
<tr>
<td>CM371</td>
<td>Physical Chemistry I</td>
<td>3</td>
<td>CM372 Physical Chemistry II</td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
<td>or BY160 Cellular and Molecular Biology</td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td></td>
<td>3</td>
<td>MA232 Differential Equations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>KA/UC Elective</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Elective (ES)&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>CH301</td>
<td>Fluid Mechanics</td>
<td>3</td>
<td>CH302 Heat Transfer</td>
</tr>
<tr>
<td>CH351</td>
<td>Mass Transfer</td>
<td>3</td>
<td>CH310 ChE Laboratory I</td>
</tr>
<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
<td>3</td>
<td>CH485 Process Dynamics and Control</td>
</tr>
<tr>
<td>CM244</td>
<td>Organic Chemistry Lab</td>
<td>3</td>
<td>CM242 Organic Chemistry II</td>
</tr>
<tr>
<td>EC350</td>
<td>Micro and Engr. Economics</td>
<td>3</td>
<td>Math Elective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>Undesignated Elective&lt;sup&gt;1,2&lt;/sup&gt;</td>
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<td></td>
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<td>3</td>
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<td></td>
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<td>16</td>
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</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH345</td>
<td>Reactor Analysis I</td>
<td>3</td>
<td>CH481 Design II</td>
</tr>
<tr>
<td>CH410</td>
<td>ChE Laboratory II</td>
<td>2</td>
<td>Technical Electives&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>CH480</td>
<td>Design I</td>
<td>3</td>
<td>Undesignated Electives&lt;sup&gt;1,2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Elective (ES)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>KA/UC Elective</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

<sup>1</sup> 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.

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

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### Professional Specializations

It is recommended that each student 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 (see p. 155), Chemistry (see p. 107), Environmental Health Science (see p. 181), Professional Communication (see p. 107), Digitally Mediated Communication (see p. 109), Environmental Engineering (see p. 157), Manufacturing Engineering (see p. 157), Materials Engineering (see p. 158), or Business (see p. 124). Not all courses listed are offered every year. See Professional Concentrations in Engineering pp. 155-159.
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
   - MA383 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.
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 technical 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**

(See beginning of Engineering Section, page 132)

<table>
<thead>
<tr>
<th>Course</th>
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<th>Second Semester</th>
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<tr>
<td>ES220</td>
<td>Statics</td>
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<td>ES Elective¹</td>
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<tr>
<td>CE212</td>
<td>Intro. to Engineering Design</td>
<td>3</td>
<td>MA232 Elem. Differential Equations</td>
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<tr>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
<td>ES330 Fluid Mechanics</td>
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<td></td>
<td>ES Elective¹</td>
<td>3</td>
<td>KA/UC Elective</td>
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**SOPHOMORE YEAR**

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<tbody>
<tr>
<td>Course</td>
<td>Title</td>
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<tr>
<td>ES220</td>
<td>Strength of Materials</td>
</tr>
<tr>
<td>CE301</td>
<td>Geospatial Science w/lab</td>
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<tr>
<td>CE310</td>
<td>Geotechnical Eng w/lab w/lab</td>
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<tr>
<td>CE340</td>
<td>Environmental Eng. w/lab</td>
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<td>CE341</td>
<td>Structural Design</td>
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**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>Title</td>
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<tr>
<td>EC350</td>
<td>Engineering Economics</td>
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<tr>
<td>Professional Electives</td>
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</tbody>
</table>

¹Eligible ES electives are: ES223 Rigid Body Dynamics, ES250 Electrical Science, ES260 Material Science, ES340 Thermodynamics I

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

**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 pp. 155-159.
ARCHITECTURAL
CE447 Reinforced Masonry and Timber Design
CE448 Introduction to Architectural Engineering
CE455 Structural Damage, Rehabilitation and Repair
CE457 Environmental Degradation of Concrete Structures
CE492 Senior Design (Building, Architectural)

CONSTRUCTION
CE405 Construction Planning Management
CE406 Construction Engineering
CE407 Construction Estimating and Scheduling
CE411 Construction Materials Engineering

ENVIRONMENTAL
CE433 Human Exposure Analysis
CE477 Atmospheric Chemistry
CE478 Solid Waste Management and Landfill Design
CE479 Water and Wastewater Treatment Processes
CE480 Environmental Quality Engineering
CE481 Hazardous Waste Management Engineering
CE577 Atmospheric Chemistry
CE580 Environmental Chemistry
CE582 Environmental Systems Analysis and Design
CE583 Modeling Natural Aquatic Systems
CE584 Chemodynamics
CE586 Industrial Ecology
CE587 Contaminant Transport in Groundwater
CE589 Limnology

TRANSPORTATION
CE461 Transportation Systems Design
CE468 Traffic Engineering

STRUCTURAL
CE420 Computational Methods of Structural Analysis
CE452 Advanced Mechanics of Materials
CE453 Properties & Performance of Concrete Materials
CE457 Environmental Degradation of Concrete Structures
CE512 Introduction to Structural and Soil Dynamics
CE521 Analysis of Advanced Composite Structures
CE532 Engineering Elasticity
CE538 Finite Element Methods
CE541 Bridge Engineering
CE542 Advanced Steel Design
CE544 Advanced Design of Structural Concrete
CE546 Prestressed Concrete Design
CE547 Reinforced Concrete Design
CE554 Continuum Masonry and Timber Design
CE555 Optimum Structural Design

GEOTECHNICAL
CE415 Foundations, Stability, and Retaining Structures
CE512 Introduction to Structural and Soil Dynamics
CE514 Groundwater Flow
CE516 Advanced Soil Mechanics I
CE517 Laboratory and In-Situ Shear Strength Testing of Soil
CE519 Advanced Foundation Design

WATER RESOURCES
CE430 Water Resources Engineering II
CE514 Groundwater Flow
CE570 Advanced Hydrology
CE572 Shallow Water Hydrodynamics
CE573 Sediment Transport
CE574 Hydrodynamic Dispersion
CE576 Hydraulic Engineering in Cold Regions

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 that within a few years after completing the program:

◆ graduates will have become contributing professionals in society,
◆ graduates will have exhibited continued intellectual growth,
◆ graduates should be satisfied with their Clarkson undergraduate education,
◆ some graduates should have risen to positions of leadership in the profession, and
◆ those graduates who are especially talented and motivated to seek the Ph.D. 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 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. 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 and/or university courses 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 outcomes:

• In the required courses, students are expected to master fundamentals of hardware and software design. Sound software engineering principles are introduced and reinforced with required courses that treat object-oriented design, data structures, standardized components, and system software. Hardware design principles are introduced in a course that treats hardware concepts and analysis that is followed by work in logic design and laboratory experiences in which students must design and build small systems using standard logic circuits and programmable logic devices. Elements common to hardware and software are stressed and hardware/software tradeoffs are addressed in this segment of the curriculum.
• Students gain experience working in modern software development environments and using modern design tools. In the required course sequence, students learn C/C++ and the Standard Template Library, 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 solar car team or the US First Robotics competition.

**Computer Engineering Curriculum**

**FIRST YEAR**

(See beginning of School of Engineering section, page 124)

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<tr>
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<th>Title</th>
<th>Cr. Hrs.</th>
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<tbody>
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<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
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<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
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<td>ES260</td>
<td>Materials Science</td>
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</tr>
<tr>
<td>EE261</td>
<td>Intro. to Programming and Software Design</td>
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</tr>
<tr>
<td>KA/UC Elective’</td>
<td>3</td>
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<td><strong>Total</strong></td>
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**SOPHOMORE YEAR**

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<td>MA231</td>
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<td>EE211</td>
<td>ECE Lab I</td>
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<td>EE221</td>
<td>Linear Circuits</td>
<td>3</td>
</tr>
<tr>
<td>EE264</td>
<td>Intro. to Digital Design</td>
<td>3</td>
</tr>
<tr>
<td>EE361</td>
<td>Fundamentals of Software</td>
<td>3</td>
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<tr>
<td>Engineering</td>
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<td><strong>Total</strong></td>
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**JUNIOR YEAR**

<table>
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<th>Course</th>
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<tr>
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<td>EE321</td>
<td>Systems and Signal Processing</td>
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<tr>
<td>EE341</td>
<td>Microelectronics</td>
<td>3</td>
</tr>
<tr>
<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
<td>3</td>
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<tr>
<td>EE365</td>
<td>Advanced Digital Circuit Design</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>15</strong></td>
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<table>
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<td>MA346</td>
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<td>EE316</td>
<td>Computer Engineering Junior Lab</td>
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<tr>
<td>EE360</td>
<td>Microprocessors</td>
<td>3</td>
</tr>
<tr>
<td>EE462</td>
<td>Software Systems Architecture</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC Elective’</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
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 disciplines, such as EE427, which is a signal processing course and also has a strong software component. A complete description of all courses, including graduate-level courses, can be found in the annual publication *Courses*. Qualified undergraduate students are encouraged to take graduate level courses within their area of interest. Undergraduate students enrolled in 500-level courses must have a cumulative grade-point average of at least 3.0, and permission of their advisor and their department chair. To enroll in a 600-numbered course, undergraduates must have a cumulative grade-point average of at least 3.0, and must have permission of their advisor, department chair, and the dean of Engineering. See Professional Concentrations in Engineering pp. 155-159.

### COMMUNICATIONS SYSTEMS AND SIGNAL PROCESSING
- **EE321** Systems and Signal Processing
- **EE370** Coding and Information Transmission
- **EE401** Digital Signal Processing
- **EE427** Introduction to Digital Image Processing
- **EE471** Principles of Digital and Data Communications

### COMPUTER ENGINEERING
- **EE261** Introduction to Programming and Software Design
- **EE264** Introduction to Digital Design
- **EE360** Microprocessors
- **EE361** Fundamentals of Software Engineering
- **EE363** Software Components and Generic Programming
- **EE365** Advanced Digital Circuit Design
- **EE368** Software Engineering
- **EE407** Computer Networks
- **EE408** Software Design for Visual Environments
- **EE462** Software Systems Architecture
- **EE465** Computer Graphics
- **EE466** Computer Architecture
- **EE468** Database Systems

### CONTROL SYSTEMS
- **EE324** Dynamical Systems
- **EE321** Systems and Signal Processing
- **EE450** Control Systems
- **EE451** Digital Control

### ELECTRONICS AND CIRCUITS
- **ES250** Electrical Science
- **EE221** Linear Circuits
- **EE341** Microelectronics
- **EE345** Microelectronic Circuit Fabrication
- **EE441** Electronic Devices for IC Simulation
- **EE446** Instrumentation
- **EE447** VLSI Design

### POWER ENGINEERING
- **EE331** Energy Conversion
- **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

### Professional Concentrations in Engineering

See descriptions pp. 155-159.
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:

◆ graduates will have become contributing professionals in society
◆ graduates will have exhibited continued intellectual growth
◆ graduates should be satisfied with their Clarkson undergraduate education
◆ some graduates should have risen to positions of leadership in the profession
◆ those graduates who are especially talented and motivated to seek the Ph.D. 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;
• 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 and/or university courses 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 outcomes.

• 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 signals and systems, 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 undergraduate research, suitable on-campus work experience, and technical extracurricular activities such as the solar car team or the US First Robotics competition.

Electrical Engineering Curriculum

FIRST YEAR
(See beginning of School of Engineering section, page 131)

<table>
<thead>
<tr>
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<td>MA232</td>
<td>Differential Equations</td>
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<tr>
<td>ES250</td>
<td>Electrical Science</td>
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<td>Materials Science</td>
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<td>EE261</td>
<td>Intro. to Programming and</td>
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<tr>
<td></td>
<td>Software Design</td>
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Second Semester

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<tbody>
<tr>
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<td>EE221</td>
<td>Linear Circuits</td>
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<td>EE264</td>
<td>Intro. to Digital Design</td>
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</tr>
<tr>
<td>EE324</td>
<td>Dynamical Systems</td>
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SOPHOMORE YEAR

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<td>EE311</td>
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<tr>
<td>EE321</td>
<td>Systems and Signal Processing</td>
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<td>EE331</td>
<td>Energy Conversion</td>
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<tr>
<td>EE341</td>
<td>Microelectronics</td>
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Second Semester

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<td>KA/UC Elective*</td>
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JUNIOR YEAR

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<td>ES Elective</td>
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<td>Area Electives</td>
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<tr>
<td>KA/UC Elective*</td>
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Second Semester

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<tr>
<td>Area Elective</td>
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<td>EE412 Senior Design</td>
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SENIOR YEAR

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<tr>
<td>EE412</td>
<td>EE Senior Design or Professional Elective</td>
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<tr>
<td>ES Elective</td>
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<tr>
<td>Area Electives</td>
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<tr>
<td>KA/UC Elective*</td>
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Second Semester

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<tr>
<th>Course</th>
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<tr>
<td>Area Elective</td>
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<tr>
<td>Professional Elective</td>
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<td>3</td>
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<tr>
<td>EE412 Senior Design</td>
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<td>3</td>
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<td>KA/UC Elective*</td>
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<tr>
<td>Undesignated Electives</td>
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15
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 in the annual publication Courses. 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 pp. 155-159.

BIOMEDICAL ENGINEERING
BR400 Introduction to Biomedical Rehabilitation Engineering and Science
EE485 Neural Engineering

COMMUNICATIONS SYSTEMS AND SIGNAL PROCESSING
EE321 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
EE261 Introduction to Programming and Software Design
EE264 Introduction to Digital Design
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
EE462 Software Systems Architecture
EE465 Computer Graphics
EE466 Computer Architecture
EE468 Database Systems

CONTROL SYSTEMS
EE321 Systems and Signal Processing
EE324 Dynamical Systems
EE450 Control Systems
EE451 Digital Control

ELECTRONICS AND CIRCUITS
ES250 Electrical Science
EE221 Linear Circuits
EE341 Microelectronics
EE345 Microelectronic Circuit Fabrication
EE441 Electronic Devices for IC Simulation
EE442 CMOS IC Design
EE446 Instrumentation
EE447 VLSI Design

POWER ENGINEERING
EE331 Energy Conversion
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

Professional Concentrations in Engineering

See descriptions pp. 155-159.
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 life-long 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 on page 157. 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 beginning of School of Engineering section, page 132)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>CE212</td>
<td>Intro. Eng Design</td>
<td>3</td>
</tr>
<tr>
<td>CM371</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>CE240</td>
<td>Earth Science</td>
<td>3</td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES340</td>
<td>Environmental Eng. w/lab</td>
<td>3</td>
</tr>
<tr>
<td>BY320 OR BY323 Microbiology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ES330</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Elem. Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

15

Second Semester

JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MA383</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Core Professional Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES330</td>
<td>Water Resources w/lab</td>
<td>3</td>
</tr>
<tr>
<td>CE479 Water &amp; Wastewater Treatment OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE480</td>
<td>Environmental Quality</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

15

Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC350</td>
<td>Engineering Economics</td>
<td>3</td>
</tr>
<tr>
<td>CE491</td>
<td>Senior Design</td>
<td>3</td>
</tr>
<tr>
<td>Professional Electives</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
| 15

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

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

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 Interdisciplinary Engineering & Management

See description under Interdisciplinary Programs (p. 173).

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.

• Competence in employing the solution process to solve professional problems.
• Competence in transforming a physical system into a mathematical model, using a combination of scientific knowledge, physical intuition, and mathematical techniques, and in extracting meaning from that model by numeric or analytic solutions, approximation, or estimation to evaluate a proposed solution or make a decision.
• Clear communication in written, oral, and graphical form.
• Competence in collaboration with individuals of differing backgrounds.
• A competent understanding of the interaction of a proposed solution with the social, economic, and natural and man-made environments.
• Instill the habit of continued learning so, as professionals, graduates will prepare themselves to solve new or more difficult problems.

See Mechanical & Aeronautical Engineering Department Student Handbook, section 4.3.1.

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 six 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 and 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 beginning of School of Engineering section, page 132)

<table>
<thead>
<tr>
<th>MS/AS Military Science/Aerospace Studies</th>
<th>MS/AS Military Science/Aerospace Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>(if elected)</td>
<td>(if elected)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES220</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
</tr>
<tr>
<td>ES260</td>
<td>Materials Science</td>
<td>3</td>
</tr>
<tr>
<td>MA232</td>
<td>Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>KA/UC Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES222</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td>ES223</td>
<td>Rigid Body Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>AE/ME212 Intro. to Engineering Design</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MA231</td>
<td>Calculus III</td>
<td>3</td>
</tr>
<tr>
<td>ME201</td>
<td>Mechanical Engineering Lab I</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>KA/UC Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES330</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ES340</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>ME324</td>
<td>Dynamical Systems</td>
<td>3</td>
</tr>
<tr>
<td>MA330</td>
<td>Advanced Engineering Math.**</td>
<td>3</td>
</tr>
<tr>
<td>ME301</td>
<td>Mechanical Engineering Lab II</td>
<td>1</td>
</tr>
<tr>
<td>ME310</td>
<td>Thermodynamic System</td>
<td>3</td>
</tr>
<tr>
<td>ME455</td>
<td>Mechanical Vibrations &amp; Control</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>KA/UC Elective</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>**or MA331 and MA383</td>
<td></td>
</tr>
</tbody>
</table>

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME442</td>
<td>Engineering Analysis by FEM</td>
<td>3</td>
</tr>
<tr>
<td>ME445</td>
<td>Integrated Design I</td>
<td>3</td>
</tr>
<tr>
<td>AE, ES, or ME Professional Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Economics Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Undesignated Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Professional Elective</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>Business Elective</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>Un Designated Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**or MA331 and MA383

---

2See *Mechanical & Aeronautical Engineering Department Student Handbook*, section 4.3.1.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
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
  - FLUID AND THERMAL SCIENCES
    - AE/ME425  Aerodynamics
    - AE/ME427  Design of Propulsion Systems
    - AE/ME431  Gas Dynamics
  - ME437  Particle Transport, Deposition, and Removal

- 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

Honors Program
A student admitted to the University Honors Program who is pursuing a mechanical engineering degree should consult the Mechanical and Aeronautical Engineering Department Student Handbook for additional information.

B.S. in Software Engineering
In applying the principles of engineering to the construction of computer software, the software engineer is the architect of a complex system. See description under Interdisciplinary Programs (p. 178).

MINORS

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 Interdisciplinary Programs (p. 180).

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 ES300)

*not open to School of Engineering majors or Interdisciplinary Engineering & Management majors
**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.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE448</td>
<td>Introduction to Architectural Engineering</td>
<td>3 cr.</td>
<td>ES220, CE212</td>
</tr>
<tr>
<td>CE447</td>
<td>Reinforced Masonry and Timber Design</td>
<td>3 cr.</td>
<td>CE441</td>
</tr>
<tr>
<td>CE415/515</td>
<td>Foundations Design</td>
<td>3 cr.</td>
<td>CE310</td>
</tr>
<tr>
<td>CE441</td>
<td>Concrete Design</td>
<td>3 cr.</td>
<td>CE320</td>
</tr>
<tr>
<td>CE442</td>
<td>Steel Design</td>
<td>3 cr.</td>
<td>CE320</td>
</tr>
<tr>
<td>CE492</td>
<td>Senior (Building, Architectural) Design</td>
<td>3 cr.</td>
<td>CE448, CE441, CE442, CE415, CE447 (Corequisite)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE405</td>
<td>Construction Management</td>
<td>3 cr.</td>
<td>CE320 &amp; CE441 (cor.)</td>
</tr>
<tr>
<td>CE411</td>
<td>Construction Materials</td>
<td>3 cr.</td>
<td>CE320 &amp; CE441 (cor.)</td>
</tr>
<tr>
<td>CE420/520</td>
<td>Advanced Structural Analysis</td>
<td>3 cr.</td>
<td>CE320</td>
</tr>
<tr>
<td>CE421/521</td>
<td>Composite Mechanics and Design</td>
<td>3 cr.</td>
<td>ES222 &amp; ES260</td>
</tr>
<tr>
<td>CE542</td>
<td>Advanced Steel Design</td>
<td>3 cr.</td>
<td>CE442, CE420/520 (cor.)</td>
</tr>
<tr>
<td>CE544</td>
<td>Advanced Concrete Design</td>
<td>3 cr.</td>
<td>CE441 &amp; 420/520</td>
</tr>
<tr>
<td>CE455/553</td>
<td>Properties and Performance of Concrete Mat’ls</td>
<td>3 cr.</td>
<td>ES260</td>
</tr>
<tr>
<td>CE455/555</td>
<td>Structural Damage, Rehabilitation, and Repair</td>
<td>3 cr.</td>
<td>CE222</td>
</tr>
<tr>
<td>CE457/557</td>
<td>Environmental Degradation of Concrete Structures</td>
<td>3 cr.</td>
<td>CE411/CE441/CE453</td>
</tr>
<tr>
<td>ME310</td>
<td>Thermodynamic System Engineering</td>
<td>3 cr.</td>
<td>ES340</td>
</tr>
<tr>
<td>ME411</td>
<td>Introduction to Heat Transfer</td>
<td>3 cr.</td>
<td>ES330, ES340, MA232</td>
</tr>
<tr>
<td>ME444</td>
<td>Computer Aided Engineering</td>
<td>3 cr.</td>
<td>ES100, MA231</td>
</tr>
<tr>
<td>CE438 or CE538</td>
<td>Finite Element Methods</td>
<td>3 cr.</td>
<td>ES222, ES330, MA232</td>
</tr>
<tr>
<td>CE401/501</td>
<td>Fracture Mech. of Concrete Structures</td>
<td>3 cr.</td>
<td>ES222 (corequisite)</td>
</tr>
<tr>
<td>CE486/586</td>
<td>Intro to Industrial Ecology</td>
<td>3 cr.</td>
<td>CE340 or CH250</td>
</tr>
</tbody>
</table>

Or other course as designated by CEE Department Chair

In addition to the required number of credits, it is recommended that students in the architectural engineering concentration take relevant liberal arts courses such as Painting and Drawing, 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.

**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 to that shown on p. 129 for obtaining a B.S. degree in Chemical Engineering. In the second semester of the sophomore year, the requirement of CM372 Physical Chemistry II is replaced with BY153 Cellular & Molecular Biology (3 Cr. Hrs.) and BY155 Cell. & Molec. Biology Lab (2 Cr. Hrs.). In the junior year, the required mathematics elective must be a suitable statistics course (MA383 Applied Statistics), and an undesignated elective is replaced with a course selected from the following list of courses relevant to biomolecular engineering: BY214 Genetics, BY312 Advanced Cell Biology, BY316 Immunobiology, BY320/322 Microbiology with Lab, BY360/362 Physiology with Lab, BY412 Molecular Biology Laboratory, CM413 Bioinorganic Chemistry, CM426 Intro to Biophysics, CM453 Intro to Biomaterials, CM464 Physical Biochemistry, or ES365 Polymer Materials. In the senior year, science and engineering electives are replaced with the required courses CM460 Biochemistry I and CH465 Biochemical Engineering. 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
  - CE407 Introduction to Construction Estimating and Scheduling
  - CE411 Construction Materials Engineering
- And any two of the following:
  - IH309 Introduction to Occupational Health or IH416 Principles of Occupational Health
  - OS466 Negotiations and Relationship Management
  - OM480 Project Management
  - OM485 Quality Systems Management
  - LW466 Law of the Workplace
  - PHIL341 Professional Ethics
    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.
Environmental Engineering
A professional concentration in Environmental Engineering is available to students interested in the important field of environmental restoration, preservation and sustainability. This involves the design of water, wastewater and air treatment processes, solid and hazardous waste management, fate and transport of contaminants in the ecosphere, and incorporation of environmental sustainability principles into engineering practice.

Any student can qualify for a Dean’s Certificate for a Professional Concentration in Environmental Engineering.

To achieve this, the student must take six courses:

- CE340 Introduction to Environmental Engineering or CH250 Chemical Process Calculations
- One course in Cell Biology or Microbiology
- One course in Organic or Physical Chemistry
- One course in Environmental Engineering design
- Two courses distributed between two of the following five subdisciplines:
  - Air Pollution Engineering
  - Water and Wastewater Engineering
  - Environmental Quality Engineering
  - Environmental Health Science Engineering
  - Solid and Hazardous Waste Engineering

A list of courses acceptable for this Environmental Engineering Concentration can be obtained from any engineering department office. The Chair of the Department of Civil and Environmental Engineering oversees the concentration requirements, and may be consulted for additional details.

In addition to the required courses indicated above, 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 Environmental Engineering” and a notation to that effect on their transcript.

Manufacturing Engineering
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.

**Required Courses**
- ES260 Materials Science
- MA383 Applied Statistics I or MA330 Advanced Engineering Mathematics
- OM331 Operations/Production Management
- ME390 Manufacturing Processes
- OM485 Quality Management

**Elective Courses (three required)**
- ME399 Computer-aided Manufacturing
- ME444 Computer-aided Engineering
- ME448 Fundamentals of Robotics
- ME393 Analyses of Materials Processing
- AE/ME457 Composite Mechanics and Design
- ME492 Welding Metallurgy
- ES360 Materials Science II
- ES405 Design of Experiments & Analysis of Data
- ES351 Materials Characterization Laboratory
- ES/ME490 Mechanical Behavior of Materials
- ES357 Microelectronic Fabrication
- ES365 Polymer Materials
- ES405 Design of Experiments and Analysis of Data
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 nano-structured composite materials through nano-technology.

To help students improve employment opportunities in materials-related areas, Clarkson University is offering a certificate program in Materials Engineering Concentrations.

To attain this, the student must complete five (5) courses, which include two (2) required courses and three (3) electives from the list given. The required courses are:

ES260  Materials Science and Engineering I (Fall or Spring)
ES360  Materials Science and Engineering II (Spring only)

The three elective courses must be chosen from the following list of materials engineering and science courses:

CE411  Construction Materials Engineering
CM430  Colloids and Interfaces
CM450  Introduction to Polymer Chemistry
EE439  Dielectrics
ES357  Microelectronic Circuit Fabrication
ES361  Fine Particle Technology
ES365  Polymer Materials
ES464  Corrosion Engineering
ME390  Manufacturing Processes (Fall)

Application forms may be obtained from the Department of Mechanical & Aeronautical Engineering (MAE) at 253 CAMP or from any other engineering department office.

Structural Engineering

One of the most important activities of civil and environmental engineers is 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:

CE420/520  Advanced Structural Analysis
CE415/515  Foundations, Stability, and Retaining Structures
CE441  Reinforced Concrete Design
CE442  Steel Design
CE490  Senior Design

And any two of the following:

CE401/501  Fracture Mechanics of Concrete Structures
CE411  Construction Materials Engineering
CE421/521  Composite Mechanics and Design
CE438/538  Finite Element Methods
CE544  Advanced Reinforced Concrete
ME444  Computer-aided Engineering

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.

**ENGINEERING GRADUATE PROGRAMS**

The 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 program is 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.

**M.S. AND PH.D. PROGRAMS**

Through the School of Engineering, Clarkson offers the following Master of Science (M.S.) degrees: chemical, civil, electrical, and mechanical engineering, and engineering science. At the Doctor of Science and Ph.D. levels, students may pursue chemical, civil and environmental, electrical and computer, and mechanical engineering, and engineering science.

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.

For information regarding the admission process, application procedure, degree requirements, and financial assistance, see pp. 198-204. 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 www.clarkson.edu/graduate.

**RESEARCH OPPORTUNITIES**

The University offers a wide range of opportunities to pursue research interests. See Research and Academic Centers, p. 204.

**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 and Science. This includes a stipend and full-tuition waiver. Partial tuition scholarships are also available in all areas (see p. 203).
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 coursework and is structured to be completed within one calendar year. The coursework must include a minimum of 21 credits earned from the School of Engineering or School of Science. Project work may count toward the 30 credit-hour minimum requirement. Students pursuing a dual ME/MBA degree program may count nine graduate course credits from the School of Business (CUSB) toward the 30 credit-hour ME credit requirement; independent study credits from CUSB may not be included in this nine credit-hour limit.

Partial tuition scholarships are available for students in the Master of Engineering program. Transfer to the M.S. program is permitted up to the end of the first semester of study. For further information, see the Graduate School section of this catalog on p. 197.

JOINT ME/MBA PROGRAM
The joint Master of Engineering/Master of Business Administration degree program enables a student to earn two degrees in two years. Participants develop both their engineering and management skills in a project-based learning environment. Students first complete a program leading to the 30 credit-hour, non-thesis Master of Engineering degree. This program focuses on applying engineering skills in projects, working in a multidisciplinary team environment.

As part of the ME program, in the area of their engineering interest, students take business foundation courses to prepare for entry into the one-year MBA program. Thirty-two credit hours are required to obtain an MBA. Any other foundation requirements will be provided to participants during the summer either before the ME degree begins or between the ME and MBA years at no tuition cost. During the MBA year, students serve on the management team for a project that may include ME students who serve as consulting engineers. In this way, students get the opportunity to experience both the management and engineering side of project development and implementation teams.
Pre-Physical Therapy (Pre-PT) Undergraduate Concentration

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.

To prepare candidates for entry into the graduate physical therapy professional curriculum, the University offers an undergraduate Pre-Physical Therapy Concentration. Every undergraduate accepted into the Pre-PT Undergraduate Concentration has space reserved in the Doctor of Physical Therapy (DPT) curriculum provided all prerequisite courses are completed at the appropriate level of performance. While completing prerequisite requirements for the graduate physical therapy professional curriculum, which are described in the Concentration, students earn a bachelor’s degree in any Clarkson major. Students enter the graduate professional curriculum in the fall semester once the baccalaureate degree has been awarded. Students accepted into the Pre-PT Concentration are assigned a Pre-PT advisor in addition to their major advisor.

Both the Pre-PT Concentration and the graduate professional curriculum emphasize problem-based learning, technology in education, a strong basic science partnership, and a strong commitment to cultural diversity. The community offers students and faculty close access to, and interaction with, four colleges, four hospitals, a rehabilitation center and community-based health service. Facilities located nationwide are also accessible.

In addition to science prerequisites, students complete six credits of health-care seminars that introduce them to health-care systems, and issues related to being a health-care professional. Seminars also foster development of strong partnerships between undergraduate students, graduate students, and faculty in physical therapy. Seminars provide:

- an active, “hands-on” approach to learning;
- an understanding of what it means to be a health-care professional;
- an understanding of what it means to be a physical therapist;
- an exposure to the health care delivery systems;
- information to support informed career choice;
- exposure to professional literature and an understanding of the importance of research in clinical practice;
- cultural competency to serve the health and educational needs of diverse clients and underserved communities;
- an opportunity to build a portfolio demonstrating student work and experiences in health care — a portfolio that students will use to enter the graduate professional curriculum, and for future employment.

Students will have opportunities for access to the professional community for observation, volunteering, and project experiences.

Applicants must complete all the required material for general Clarkson undergraduate admission. In addition to the Clarkson’s application process, the Department of Physical Therapy requires:

- Two letters of recommendation (at least one academic, and preferably one in the health-care field);
- An essay of 250-500 words demonstrating awareness of social or health-related issues and experiences appropriate for an individual interested in entering a health profession.
**Length of Program**

An undergraduate degree normally takes four academic years. There are plans of study in some undergraduate majors that can be completed in three years. The Pre-Physical Therapy Undergraduate Concentration can be part of the undergraduate degree requirements.

The DPT professional curriculum starts in the fall semester. The professional curriculum takes three years to complete, finishing in May of the third year. Each year is divided into three semesters (trimesters), includes Clinical Education, and is a full-time program.

**General Requirements for Progression into the Doctor of Physical Therapy Curriculum**

- Completion of baccalaureate degree (B.S., B.A., etc.) prior to matriculation into the professional curriculum.
- A “B” average during undergraduate study.
- Completion of all prerequisite courses, with an average of “B” for all prerequisites, and no prerequisite course grade lower than a “C-”.
- A minimum of 30 hours of observation or volunteer experience in physical therapy (minimum 20 hours) and/or health-related settings.

Detailed requirements are available in the [Department of Physical Therapy Student Handbook](#).

**Prerequisite Courses**

- Biological science — 2 semesters with lab (minimum 4 credits each – total of 8 credits)
- Chemistry — 2 semesters with lab (minimum 4 credits each – total of 8 credits)
- Physics — 2 semesters with lab (minimum 4 credits each – total of 8 credits; to include mechanics, electricity & magnetism)
- Statistics — 1 semester (3 credits)
- Psychology — 3 semesters (9 credits: Introduction to Psychology, Abnormal Psychology or Health Psychology, and a Lifespan Developmental Psychology)
- Pre-PT Health Care — 6 credits (Introduction to Health Care, Health-Care Systems, Scientific Basis of Health Care)

**Doctor of Physical Therapy (DPT) Graduate Program**

**FACILITIES**

The Doctor of Physical Therapy (DPT) curriculum is housed in the Center for Health Sciences at Clarkson Hall. The Center for Health Sciences is a regional center for excellence in health sciences education, treatment and research in physical rehabilitation. The Center houses Clarkson’s Academic Physical Therapy programs, Canton-Potsdam Hospital’s Physical Therapy Rehabilitation Services, and the Clarkson site of the Syracuse VAMC R&D Service.

The state-of-the-art patient evaluation center combines the resources of both the University and Hospital and sophisticated technology, such as teleconferencing and a human performance laboratory for teaching, research and clinical practice.

**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 and self-directed. This active learning process, based on patient case studies, more closely resembles actual clinical experience. It improves preparation of students for clinical practice, and the lifelong learning process as health-care professionals. Throughout the curriculum, students develop a professional portfolio demonstrating their academic and clinical work.

One of the goals at Clarkson is to develop physical therapists possessing more than just technical knowledge required for practice. The professional curriculum develops knowledge and skill in human relations, communications, ethics and effective resource management. Students experience a wide range of environments in which physical therapists can have an impact on health care.
Graduates are able to adapt to future changes in physical therapy and health care using critical and analytical thinking skills learned in the curriculum.

**CLINICAL SITES**
Clinical internships are integrated into the curriculum throughout the educational process, and are not isolated just into clinical internships at the end of the academic phase of study. To prepare students optimally for work in a variety of clinical settings, Clarkson continuously develops new clinical internship sites. Contractual relationships have been developed with clinical sites throughout the United States and some international sites as well. There are many sites in the North Country of New York State for students choosing to remain in this region.

**DOCTOR OF PHYSICAL THERAPY CURRICULUM**

<table>
<thead>
<tr>
<th>Fall — Semester 1</th>
<th>Cr. Hrs.</th>
<th>Spring — Semester 5</th>
<th>Cr. Hrs.</th>
</tr>
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<tbody>
<tr>
<td>PT505  Foundational Sciences for Physical Therapy</td>
<td>9</td>
<td>PT606  Neuromuscular Physical Therapy II</td>
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<tr>
<td>PT506  Professional Foundation for Physical Therapy</td>
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<td>PT615  Physical Therapy for Multiple Systems Disorders I</td>
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<tr>
<td>PT508  Principles of Measurement</td>
<td>1</td>
<td>PT617  Professional Practice V</td>
<td>2</td>
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<tr>
<td><strong>Spring — Semester 2</strong></td>
<td></td>
<td><strong>Summer — Semester 6</strong></td>
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<tr>
<td>PT515  Cardiopulmonary/Exercise Science</td>
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<td>PT616  Physical Therapy for Multiple System Disorders II</td>
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<td>PT517  Professional Practice I</td>
<td>2</td>
<td>PT627  Professional Practice VI</td>
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<tr>
<td>PT518  Evidence-Based Practice</td>
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<td><strong>Fall — Semester 7</strong></td>
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<td><strong>Summer — Semester 3</strong></td>
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<td>PT525  Musculoskeletal Physical Therapy</td>
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<td>PT645  Practice Management in the Autonomous Environment</td>
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<td>PT527  Professional Practice II</td>
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<td>PT648  Writing &amp; Presenting Research</td>
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<tr>
<td>PT528  Physical Therapy Research Design</td>
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<td>PT656  Advanced Clinical Skills</td>
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<td><strong>Fall — Semester 4</strong></td>
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<td><strong>Spring — Semester 8</strong></td>
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<tr>
<td>PT537  Professional Practice III</td>
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<td>PT665  Social Responsibility &amp; Advocacy</td>
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<td>PT605  Neuromuscular Physical Therapy I</td>
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<td><strong>Fall — Semester 7</strong></td>
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<td>PT607  Professional Practice IV</td>
<td>2</td>
<td>PT667  Professional Practice VII</td>
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<tr>
<td>PT608  Physical Therapy Data Analysis</td>
<td>1</td>
<td>PT677  Professional Practice VIII</td>
<td>7</td>
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</table>

**ACCREDITATION STATUS**
The Commission on Accreditation in Physical Therapy Education 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.
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 PROGRAMS

INTERDISCIPLINARY 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 programs: Environmental Science & Policy or Environmental Health Science. If you are uncertain about which program to choose, you can wait until the end of your sophomore year to decide. All students in Environmental Science share a common three-semester experience.

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.
ENVIRONMENTAL SCIENCE & POLICY (ES&P) MAJOR
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.

<table>
<thead>
<tr>
<th>Environmental Science &amp; Policy Sample Curriculum¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRST YEAR</strong></td>
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<tr>
<td><strong>Course</strong></td>
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<tr>
<td>BY140</td>
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<td>BY142</td>
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<td>CM105</td>
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<td>EV100</td>
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<td>UNIV190</td>
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<p>| <strong>SOPHOMORE YEAR</strong>                               |</p>
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<thead>
<tr>
<th><strong>Course</strong></th>
<th><strong>Title</strong></th>
<th><strong>Cr. Hrs.</strong></th>
<th><strong>Course</strong></th>
<th><strong>Title</strong></th>
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<tbody>
<tr>
<td>BY222</td>
<td>Ecology</td>
<td>3</td>
<td>EV200</td>
<td>Creating Environmental Policy</td>
<td>2</td>
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<tr>
<td>BY224</td>
<td>General Ecology Lab</td>
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<td>IH309</td>
<td>Introduction to Industrial Hygiene</td>
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<tr>
<td>EV280</td>
<td>Environmental Science</td>
<td>3</td>
<td>IH310</td>
<td>Introduction to Industrial</td>
<td>2</td>
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<tr>
<td>PH131/141</td>
<td>Physics I</td>
<td>4</td>
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<tr>
<td>CM241</td>
<td>Organic Chemistry I</td>
<td>3</td>
<td>KA/UC (Environmental Policy)</td>
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<tr>
<td>EC151</td>
<td>Microeconomics</td>
<td>3</td>
<td>CE240</td>
<td>Earth Science²</td>
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<p>| <strong>JUNIOR YEAR</strong>                                  |</p>
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<th><strong>Cr. Hrs.</strong></th>
<th><strong>Course</strong></th>
<th><strong>Title</strong></th>
<th><strong>Cr. Hrs.</strong></th>
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<tr>
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<td>EV300</td>
<td>Environmental Leadership</td>
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<td>IH Elective</td>
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<td>EV360</td>
<td>Environmental Economics</td>
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<td>PH371</td>
<td>Environmental Ethics</td>
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<td>Prof./Sci. Elective</td>
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<td>Prof. Sci/Eng/Math Elective</td>
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<td>LW270</td>
<td>Law &amp; Society I</td>
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<td>KA/UC</td>
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<td>EV399</td>
<td>Capstone Proposal</td>
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### SENIOR YEAR

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<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>EHS Elective</td>
<td>KA/UC (Risk Analysis)</td>
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<tr>
<td>Professional Elective</td>
<td>Free Electives</td>
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<tr>
<td>EV400 Capstone</td>
<td>Prof. Elective (ES432 recommended)</td>
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<tr>
<td>Prof. Sci/Eng/Math Elective</td>
<td>EV401 Capstone</td>
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<td>Policy Elective</td>
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<td>3</td>
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<td></td>
<td><strong>Total</strong></td>
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<td><strong>14</strong></td>
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</tbody>
</table>

1. Various environmental courses will meet knowledge area requirements. A technology course will be required if one of the major courses does not fulfill this requirement.

2. Or suitable 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 in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
ENVIRONMENTAL SCIENCE & POLICY

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 in the ES&P Program. Additional courses may be taken pending permission from the student’s advisor. Some professional electives require additional prerequisites.

### SCIENCE

BY300 Readings in Org. Biology  
BY302 Introduction to Botany  
BY312 Advanced Cell Biology  
BY316 Immunobiology  
BY322 Microbiology Lab  
BY326 Invertebrate Biology  
BY340 Behavioral Ecology  
BY358 Animal Learning  
BY412 Molecular Biology  
BY426 Intro. to Biophysics  
BY435 Freshwater Invertebrate Bio.  
BY451 Biochemistry II  
CM242 Organic Chemistry II  
CM244 Organic Chemistry Lab  
CM304 Environmental Science II  
IH320 Principles of Ergonomics  
IH406 IH Control Methods  
MA231 Calculus III  
MA383 Applied Statistics  
PH142 Physics for Life Sciences II

### BIOLOGY

BY214 Genetics  
BY301 Readings in Cellular and Molecular Biology  
BY310 Developmental Biology  
BY314 Bioinformatics  
BY320 Microbiology  
BY323 Microbiology for Engr.  
BY328 Conservation Biology  
BY342 Vertebrate Biology  
BY420 Evolution  
BY431 Limnology  
BY438 Biostatistical Analysis  
BY450 Biochemistry I  
CM221 Spectroscopy  
CM223 Spectroscopy Lab  
CM460 Biochemistry  
IH405 Methods and Analysis  
IH416 Principles of Toxicology & Epidemiology  
MA232 Elementary Diff. Equations  
PH132 Physics II  
PH426 Introduction to Biophysics

### ENGINEERING

CE301 Eng. Measurements  
CE413 Geology for Engineers  
CE470 Hydraulic Engineering  
CE474 Engineering Hydrology  
CE480 Environmental Quality  
CE490 Senior Design  
ES330 Fluid Mechanics  
ES532 Risk Analysis  
CE340 Intro. to Env. Engineering  
CE478 Solid Waste Management and Landfill Design  
CE477 Atmospheric Chemistry  
CE479 Water and Wastewater Treatment Proc.  
CE481 Haz. Waste Management  
CE586 Industrial Ecology  
ES220 Statics

### BUSINESS

IS300 Information Systems  
LW471 Law and Society II  
EC388 Game Theory and Economic Strat.  
LW466 The Law of the Workplace  
EC364 Structure of American Industry  
OS386 Organizational Behavior

### LIBERAL ARTS

ANTH270/VE225 Env., Tech., and Society  
POL220 American Politics  
SOC/POC351 Globalization  
HIST220 Science and Society  
POL400 Constitutional Law  
COMM310 Mass Media and Society  
COMM325 Intercultural Communication  
COMM412 Org. Communication  
POL380 Law & Bioethics  
POL302 Soc. and Political Thought in 20th Century  
SOC/POL470 Environmental Policy  
SOC/ANTH397 Cities and Social Justice  
POL250 Politics in C-N Perspective  
PHIL341 Professional Ethics  
PHL243 American Environmentalism  
COMM313 Professional Communication  
COMM341 World Wide Web  
COMM/EV428 Public Debate and Env.  
POL392 Environmental Political Theory
B.S. IN ENVIRONMENTAL HEALTH SCIENCE
(Industrial Hygiene-Environmental Toxicology)

Alan Rossner, Director

Environmental Health Science is the study of health hazards in the work and community environments. In this continually evolving field, current challenges include indoor air-quality assessment in factories and offices, outdoor air quality assessment in communities downwind of factories or busy highways, hazardous waste site assessment, and ergonomic evaluations. Industrial hygienists work closely with occupational health physicians, nurses, safety specialists, and physical therapists to identify the chemical and physical agents responsible for disease in the work or community environment.

Industrial hygienists or environmental health specialists are expected to work on a wide variety of problems. These range from performing health hazard assessments and training workers to collaborating with engineers in the creation of control systems that reduce exposure to various types of workplace stressors. It takes a special academic program to prepare students to succeed in this multifaceted field. The EHS curriculum is rigorous and effectively prepares students to work in the important area of industrial and 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.

Required Courses

table

Chemistry  25  Clarkson Common Experience  21
Biology  16  Free Engineering Electives  6
Mathematics  9  Professional Electives  3
Physics  8  Free Electives  14
Industrial Hygiene  18  TOTAL  120

Environmental Health Science Curriculum

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>First Semester</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>BY140 Biology I</td>
<td>3</td>
<td>BY160 Biology II</td>
<td>3</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 and Bonding</td>
<td>3</td>
<td>CM104 Chemistry Equilib. and Dynamics</td>
<td>3</td>
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<tr>
<td>CM105 Chemistry Lab I</td>
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<td>CM106 Chemistry Lab II</td>
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<tr>
<td>UNIV190 Clarkson Seminar</td>
<td>3</td>
<td>Statistics</td>
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<tr>
<td>EV100 Intro to Env. Science &amp; Policy</td>
<td>1</td>
<td>Math Course</td>
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<tr>
<td>FY100 First-Year Seminar</td>
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</table>

TOTAL 120
### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>CM241 Organic Chemistry I</td>
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<tr>
<td>BY222 Ecology</td>
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<tr>
<td>EV280 Environmental Science</td>
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<td>PH131/PH141 Physics I</td>
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<tr>
<td>Math Course</td>
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</table>

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM221 Spectroscopy</td>
<td>3</td>
</tr>
<tr>
<td>CM223 Spectroscopy Lab</td>
<td>3</td>
</tr>
<tr>
<td>IH405 Methods and Analysis</td>
<td>4</td>
</tr>
<tr>
<td>IH406 IH Controls</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
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</table>

### SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>IH330 EHS Management</td>
<td>3</td>
</tr>
<tr>
<td>EV400 Capstone</td>
<td>3</td>
</tr>
<tr>
<td>IH416 Prin. of Toxicology &amp; Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>CE340 Intro. to Environ. Eng.</td>
<td>3</td>
</tr>
<tr>
<td>KA/UC</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

1. A technology course will be required if one of the major courses does not fulfill this requirement.
2. Or other suitable engineering courses.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.

### ENVIRONMENTAL HEALTH SCIENCE (EHS) COURSES

- **EV100**: Introduction to Environmental Science & Policy
- **EV280**: Intro for Environmental Science
- **IH309**: Introduction to Occupational Hygiene
- **IH310**: Introduction to Occupational Hygiene Laboratory
- **IH405**: Monitoring and Analysis
- **IH406**: Industrial Hygiene Control Methods
- **IH416**: Principles of Toxicology & Epidemiology
- **IH481**: Advanced Topics in EOH
- **IH491**: Research in EOH
- **IH492**: Directed Study in EOH
Clarkson’s Interdisciplinary Engineering & Management (iE&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 iE&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, with the exception of the yearlong project-based learning experience for first-year students, which is taught within the iE&M program.

The Program Educational Objectives of the iE&M program are to prepare students who upon graduation:

- solve complex technical problems helping organizations become more innovative and effective;
- lead successful multidisciplinary teams, applying knowledge of people, processes and the enterprise;
- effectively communicate information for decision making both orally and in writing to both technical and nontechnical audiences;
- provide economic and social value to an organization through effective management of human, financial, information and physical resources;
- use creative and critical thinking skills, building on and integrating engineering and business core knowledge; and
- make timely, ethical and useful decisions in response to organizational challenges.

Typically, iE&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 iE&M curriculum. By design, the environment is one of collaborative teamwork and is known for strong mutual support among students. iE&M graduates are recognized as leaders and facilitators who possess the ability to initiate new ideas and change.

The iE&M program maintains two professional organizations and an iE&M Student Advisory Council. Sigma Tau Iota, the iE&M honorary society, consists of students enrolled in the program who display consistent academic excellence. This group is active in program outreach to industry and student development through its numerous activities and projects. The Clarkson University Student Chapter of the American Society for Engineering Management regularly hosts business leaders and representatives who engage students in discussions that range from career opportunities to current industry trends and issues. The Advisory Council serves as a curricular advisory group and aids in assessment of the program outcomes.

Curriculum

The Interdisciplinary 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 iE&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 iE&M curriculum may be summarized as follows:

- Thirty-one credit hours of math and basic and laboratory sciences including calculus through differential equations, applied statistics, chemistry and physics;
Twenty-one credit hours of engineering coursework including the core subjects of statics, electrical science, materials science, fluid mechanics, thermodynamics, digital design and a capstone interdisciplinary process design course;

Twenty-three credit hours of engineering- and business-management coursework including microeconomics, accounting, enterprise resource planning, organizational behavior, operations and supply chain management, organizational strategy and policy, and a unique pair of first-year courses in which iE&M students create, develop and prepare to commercialize new and innovative products;

Twelve credit hours of business courses including macroeconomics, marketing, corporate finance and a business elective;

Eighteen credit hours of Clarkson Common Experience courses including microeconomics (also counted above), psychology, two Knowledge Area electives, a University Course and the Clarkson Seminar course.

Rounding out the experience with courses in public speaking and law, and four elective courses which can be used to pursue a special interest.

The Interdisciplinary Engineering & Management student is encouraged to use program 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 construction management or supply chain management, or courses in technical marketing or sales.

**Employment**

Due to the program’s unique nature, and the quality and versatility of students attracted to it, iE&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, iE&M seniors are typically invited to interview with nearly half of all companies recruiting at the on-campus Career Fair.

The career paths of iE&M alumni reflect the breadth of the program’s curriculum and include:

- Supply Chain Management
- Quality Systems Management
- Consulting
- Entrepreneurship
- Manufacturing and Production
- Applications Engineering
- Project Management
- Field Service Engineering
- Marketing and Technical Sales
- Construction Management

### Interdisciplinary Engineering & Management Curriculum

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Cr. Hrs.</th>
<th>Course Title</th>
<th>Cr. Hrs.</th>
</tr>
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<tbody>
<tr>
<td>EM150 Principles of Microeconomics</td>
<td>3</td>
<td>EC151 Principles of Macroeconomics (KA)</td>
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</tr>
<tr>
<td>EM120 Team-based Design &amp; Innovation(^{1,3})</td>
<td>3</td>
<td>EM121 Technological Entrepreneurship(^{1,3})</td>
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<tr>
<td>UNIV190 Clarkson Seminar</td>
<td>3</td>
<td>KA Course</td>
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<tr>
<td>MA131 Calculus I</td>
<td>3</td>
<td>MA132 Calculus II</td>
<td>3</td>
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<tr>
<td>PH131 Physics I or</td>
<td></td>
<td>PH132 Physics II or</td>
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<tr>
<td>CM131 Chemistry I</td>
<td>4</td>
<td>CM132 Chemistry II</td>
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<tr>
<td>UNIV100 First-Year Seminar</td>
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**FIRST YEAR**

<table>
<thead>
<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>EM150 Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>EM120 Team-based Design &amp; Innovation(^{1,3})</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190 Clarkson Seminar</td>
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</tr>
<tr>
<td>MA131 Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>PH131 Physics I or</td>
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<tr>
<td>CM131 Chemistry I</td>
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<td>UNIV100 First-Year Seminar</td>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>EC151 Principles of Macroeconomics (KA)</td>
<td>3</td>
</tr>
<tr>
<td>EM121 Technological Entrepreneurship(^{1,3})</td>
<td>2</td>
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<tr>
<td>KA Course</td>
<td>3</td>
</tr>
<tr>
<td>MA132 Calculus II</td>
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<tr>
<td>PH132 Physics II or</td>
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<td>CM132 Chemistry II</td>
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| **Total** | 17 |

15
## SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
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<tbody>
<tr>
<td>EM205 Accounting for Decision Analysis</td>
<td>3 LW270 Law &amp; Society</td>
</tr>
<tr>
<td>ES220 Statics</td>
<td>3 PY151 Psychology (KA)</td>
</tr>
<tr>
<td>MA232 Differential Equations</td>
<td>3 COMM217 Public Speaking&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>EM211 Information Systems&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3 MA383 Applied Statistics I</td>
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<tr>
<td>CM131 Chemistry I or</td>
<td>CM132 Chemistry II or</td>
</tr>
<tr>
<td>PH131 Physics I</td>
<td>PH132 Physics II</td>
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## JUNIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>ES250 Electrical Science</td>
<td>3 FN361 Financial Management</td>
</tr>
<tr>
<td>ES260 Materials Science</td>
<td>3 EE264 Introduction to Digital Design</td>
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<tr>
<td>MK320 Principles of Marketing</td>
<td>3 ES330 Fluid Mechanics</td>
</tr>
<tr>
<td>MA231 Calculus III</td>
<td>3 KA</td>
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<tr>
<td>EM286 Organizational Behavior</td>
<td>3 EM331 Ops/Production Mgt</td>
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## SENIOR YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ES340 Thermodynamics</td>
<td>3 EM432 Organizational Policy &amp; Strategy&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>CUSB Elective</td>
<td>3 Business Elective</td>
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<tr>
<td>KA/UC Elective</td>
<td>3 Free Elective</td>
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<tr>
<td>Free Electives</td>
<td>6 ES456 Integrated Process Design&lt;sup&gt;1,3&lt;/sup&gt;</td>
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</tr>
<tr>
<td></td>
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</tbody>
</table>

<sup>1</sup> Communications intensive (CI) – students must earn a minimum of six (6) CI points outside of UNIV190 to meet graduation requirements

<sup>2</sup> Information technology-based course

<sup>3</sup> Technology course that meets CCE requirement

KA/UC students are required to take five courses which cover each of the six specified CCE knowledge areas; one university course (UC) must span two Knowledge Areas.

Professional Requirement is met when student completes both OS432 and ES456.

Professional Experience is met when student completes an approved internship and/or co-op at an external professional organization.

Meeting the Professional Requirement can at times be used to meet the Professional Experience.

Students in the Class of 2010 and later — see p. 19 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 in the Class of 2009 — see p. 19 for details of the Foundation Curriculum.
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.

Areté encourages students to manage their own future, to take control of their own education. That’s why students play a major role in running the program — designing courses, developing activities, running seminars and participating in development of the guidelines and policies of the program. 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. The modules and seminars created by students and faculty help students integrate the skills and insights provided by both majors. These courses promote critical inquiry, communication, a sense of history, the ability to analyze values in society, and an international perspective.

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, as detailed on p. 19 of the catalog. Additionally, they complete all the specific requirements for the degree in each of the majors they have selected. In addition, Areté students take a series of three 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.

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**Areté Sample Curriculum**

**FIRST YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIV190 Clarkson Seminar</td>
<td>Liberal Arts Major Course</td>
</tr>
<tr>
<td>MA180 Intro College Mathematics</td>
<td>MA181 Basic Calculus</td>
</tr>
<tr>
<td>Liberal Arts Major Course</td>
<td>EC151 Macroeconomics</td>
</tr>
<tr>
<td>EC150 Microeconomics</td>
<td>SB114 Entrepreneurship, Management and Organization</td>
</tr>
<tr>
<td>SB113 Entrepreneurship, Management and Organization</td>
<td>Common Experience Science</td>
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<tr>
<td>AR120 Introducing Liberal Arts</td>
<td>Course</td>
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<tr>
<td>FY100 First-Year Seminar</td>
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**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberal Arts Major Course</td>
<td>Liberal Arts Major Course</td>
</tr>
<tr>
<td>IS211 Intro to ERP Tools</td>
<td>EC311 Economics and Business Statistics</td>
</tr>
<tr>
<td>Common Experience Science Course</td>
<td>MK320 Principles of Marketing</td>
</tr>
<tr>
<td>AC205 Intro Accounting</td>
<td>OS286 Organizational Behavior</td>
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<tr>
<td>MA282 Statistics</td>
<td>AR321 Following the News</td>
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**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>LW270 Law and Society I</td>
<td>Liberal Arts Major Course</td>
</tr>
<tr>
<td>MK331 Consumer Behavior</td>
<td>Liberal Arts Major Course</td>
</tr>
<tr>
<td>MK332 Market Analysis &amp; Research</td>
<td>OS352 Human Resource Management</td>
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<tr>
<td>FN361 Corporate Finance</td>
<td>EC370 Economics of Innovation</td>
</tr>
<tr>
<td></td>
<td>SB322 Leading Innovative Ventures</td>
</tr>
<tr>
<td></td>
<td>AR325 Advertising Theory &amp; Practice</td>
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**SENIOR YEAR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>MK436 Creativity/Innovation/New Products</td>
<td>Liberal Arts Major Course</td>
</tr>
<tr>
<td>Liberal Arts Major Course</td>
<td>SB437 Commercializing Innovation</td>
</tr>
<tr>
<td>Business Professional Elective</td>
<td>SB440 Innovation &amp; Entrepreneurship</td>
</tr>
<tr>
<td>AR480 Major Research Seminar</td>
<td>OS432 Organization Policy</td>
</tr>
<tr>
<td>Business Professional Elective</td>
<td>AR425 Informal Business Practices</td>
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</tbody>
</table>
B.S. IN SOFTWARE ENGINEERING

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

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

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:

- graduates will have become contributing professionals in society
- graduates will have exhibited professional development and continued intellectual growth
- graduates should be satisfied with their Clarkson undergraduate education
- some graduates should have risen to positions of leadership in the Software Engineering profession
- 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, the following outcomes have been attained:

- Students will have a fundamental understanding of computer systems.
- Students will be able to apply engineering principles to software design and construction.

They will be able to:

a) develop software requirements and functional specifications,
b) use proven techniques to design software structure before it is implemented,
c) apply established verification and validation techniques,
d) understand the importance of constructing large software systems using standardized components and reusing existing code (modules) where possible,
e) use software tools as effective aids in all phases of software development,
f) design, develop, and deliver software in a cost effective manner.

- Students will have experience with issues encountered at every stage in the software life-cycle.
- Students can work in an interdisciplinary team on software components of a system.
- Students should have good interpersonal and communication skills.
- Students can readily assimilate new technologies.
- Students can 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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM131</td>
<td>Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>PH131</td>
<td>Physics I</td>
<td>4</td>
</tr>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MA131</td>
<td>Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>UNIV190</td>
<td>Clarkson Seminar</td>
<td>3</td>
</tr>
<tr>
<td>FY100</td>
<td>First-Year Seminar</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Intro. to Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of the Computer</td>
<td>2</td>
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<tr>
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</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MA232</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MA211</td>
<td>Foundations</td>
<td>3</td>
</tr>
<tr>
<td>ES250</td>
<td>Electrical Science</td>
<td>3</td>
</tr>
<tr>
<td>EE261</td>
<td>Introduction to Programming and Software</td>
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</tr>
<tr>
<td>or</td>
<td></td>
<td></td>
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<tr>
<td>CS141</td>
<td>Computer Science I</td>
<td>3</td>
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<tr>
<td>KA/UC</td>
<td>Elective</td>
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<tr>
<td></td>
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</table>

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<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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</thead>
<tbody>
<tr>
<td>MA383</td>
<td>Applied Statistics or Probability</td>
<td>3</td>
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<tr>
<td>MA381</td>
<td>Probability</td>
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</tr>
<tr>
<td>EE407</td>
<td>Computer Networks</td>
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<tr>
<td>EE363</td>
<td>Generic Programming &amp; Software Components</td>
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<tr>
<td>EE408</td>
<td>Software Design for Visual Env.</td>
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</tr>
<tr>
<td>KA/UC</td>
<td>Elective*</td>
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<tr>
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<th>Cr. Hrs.</th>
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<tbody>
<tr>
<td>EE418</td>
<td>Senior Design</td>
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<tr>
<td>EE466</td>
<td>Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CS341</td>
<td>Programming Languages</td>
<td>3</td>
</tr>
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<td></td>
<td>Professional Elective</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
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<td>15</td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Cr. Hrs.</th>
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<tr>
<td>CS341</td>
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<td>Professional Elective</td>
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<tr>
<td></td>
<td></td>
<td>3</td>
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<td></td>
<td>6</td>
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<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

* One of the KA/UC electives must be in economics.

Students in the Class of 2010 and later — see p. 19 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 in the Classes of 2009 — see p. 19 for details of the Foundation Curriculum.
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:
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 approved list of courses is available at the Center for Rehabilitation Engineering, Science and Technology (CREST) office.

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.

REQUIREMENTS
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

Breadth Elective:
Choose 1 (3 credits) from approved list of upper division courses

Specialty Tracks:
Choose one (2 course-6 credits) track.
Track I Genetic Engineering
BY214 Genetics
And choose one of
BY412 Molecular Biology Laboratory
BY/CM 314 Bioinformatics
Track II Kinesiology
PT360: Kinesiology I - Concepts of Human Movement
PT460: Kinesiology II - Functional Anatomy
Track III Neuroscience
BY/CM460 Neurobiology
PY458 Cognitive Neuroscience

The approved list of courses is available at the Center for Rehabilitation Engineering, Science and Technology (CREST) office.

**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.)
- PHIL320 Environmental Ethics (3 cr.)

**or**
- PHIL270 American Environmentalism (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 on p. 182.**
2. Six credits of environmental science. **Courses are selected from Category II on p. 182.**
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 on p. 183.**

**CATEGORY I: COURSE OFFERINGS IN ENVIRONMENTAL POLICY**

<table>
<thead>
<tr>
<th>Humanities &amp; Social Sciences</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC/EV225 Env., Tech., and Society</td>
<td>PHIL470 Env. Philosophy Seminar</td>
</tr>
<tr>
<td>PHIL342 Environmental Ethics</td>
<td>POL270 American Politics</td>
</tr>
<tr>
<td>PHIL270 American Environmentalism</td>
<td>POL250 Politics in C-N Perspective</td>
</tr>
<tr>
<td>LP430/POL371 Env. Law</td>
<td>POL225 American West</td>
</tr>
<tr>
<td>COMM325 Intercultural Communication</td>
<td>HIST230 Science and Society</td>
</tr>
<tr>
<td>Globalization</td>
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</tr>
<tr>
<td>COMM/EV428 Public Debate and Env.</td>
<td>POL395 International Development</td>
</tr>
<tr>
<td>COMM429 Issue Analysis and Advocacy</td>
<td>POL400 Constitutional Law</td>
</tr>
<tr>
<td></td>
<td>POL380 Bioethics &amp; The Law</td>
</tr>
<tr>
<td>EC/EV360 Environmental Economics</td>
<td>LW471 Law and Society II</td>
</tr>
<tr>
<td>LW466 The Law of the Workplace</td>
<td>MG455 Managing Org. Change</td>
</tr>
<tr>
<td>MG476 Management of Technology</td>
<td>MG480 Project Management</td>
</tr>
<tr>
<td>MG485 Quality Management</td>
<td>MG670 Industrial Ecology</td>
</tr>
<tr>
<td>LW270 Law and Society I</td>
<td></td>
</tr>
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</table>

**CATEGORY II: COURSE OFFERINGS IN ENVIRONMENTAL SCIENCE**

<table>
<thead>
<tr>
<th>Science</th>
<th>Engineering</th>
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<tbody>
<tr>
<td>SC111 General Biology I</td>
<td>CE240 Earth Science</td>
</tr>
<tr>
<td>SC112 General Biology II</td>
<td>CE301 Eng. Measurements</td>
</tr>
<tr>
<td>BY140 Biology I</td>
<td>CE474 Engineering Hydrology</td>
</tr>
<tr>
<td>BY142 Biology I Lab</td>
<td>CE480 Environmental Quality</td>
</tr>
<tr>
<td>BY153 Cell and Molec. Biology</td>
<td>CE580 Environmental Chemistry</td>
</tr>
<tr>
<td>BY155 Cell Biology Lab</td>
<td>CE584 Chemodynamics</td>
</tr>
<tr>
<td>BY220 General Ecology</td>
<td>CE586 Industrial Ecology</td>
</tr>
<tr>
<td>BY222 General Ecology Lab</td>
<td>CE470 Hydraulic Engineering</td>
</tr>
<tr>
<td>BY314 Genetics</td>
<td>CE479 Water and Wastewater Treatment Proc.</td>
</tr>
<tr>
<td>BY320 Microbiology</td>
<td>CE481 Haz. Waste Management</td>
</tr>
<tr>
<td>BY322 Microbiology Lab</td>
<td>CE491 Senior Design Project</td>
</tr>
<tr>
<td>BY328 Conservation Biology</td>
<td>CE582 Environmental Systems</td>
</tr>
<tr>
<td>BY340 Animal Behavior</td>
<td>CH434 Air Pollution Control</td>
</tr>
<tr>
<td>BY420 Evolution</td>
<td>ES532 Risk Analysis</td>
</tr>
<tr>
<td>BY431 Limnology</td>
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</tr>
<tr>
<td>BY440 Advanced Invertebrate Phys.</td>
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</tr>
<tr>
<td>BY450 Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>BY451 Biochemistry II</td>
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</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 on p. 184.
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 one-credit courses (EV100, 200, or 300). Courses are selected from Category III on p. 184.

CATEGORY I: COURSE OFFERINGS IN ENVIRONMENTAL SCIENCE

Science

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

<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>CE240</td>
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<tr>
<td>CE301</td>
<td>Eng. Measurements</td>
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<tr>
<td>CE470</td>
<td>Hydraulic Engineering</td>
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<td>CE474</td>
<td>Engineering Hydrology</td>
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<tr>
<td>CE479</td>
<td>Water and Wastewater Treatment Proc.</td>
</tr>
<tr>
<td>CE480</td>
<td>Environmental Quality</td>
</tr>
<tr>
<td>CE481</td>
<td>Haz. Waste Management</td>
</tr>
<tr>
<td>CE491</td>
<td>Senior Design Project</td>
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<tr>
<td>CE580</td>
<td>Environmental Chemistry</td>
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<tr>
<td>CE582</td>
<td>Environmental Systems</td>
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<td>CE584</td>
<td>Chemodynamics</td>
</tr>
<tr>
<td>CE586</td>
<td>Industrial Ecology</td>
</tr>
<tr>
<td>ES532</td>
<td>Risk Analysis</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**

**Liberal Arts**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>LC/EV225</td>
<td>Env., Tech., and Society</td>
<td>PHIL470</td>
<td>Env. Philosophy Seminar</td>
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<tr>
<td>PHIL342</td>
<td>Environmental Ethics</td>
<td>POL220</td>
<td>American Politics</td>
</tr>
<tr>
<td>PHIL270</td>
<td>American Environmentalism</td>
<td>POL250</td>
<td>Politics in C-N Perspective</td>
</tr>
<tr>
<td>POL321</td>
<td>Environmental Law</td>
<td>POL225</td>
<td>American West</td>
</tr>
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<td>COMM325</td>
<td>Intercultural Communication</td>
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<td>Science and Society</td>
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<td>Public Debate and Env.</td>
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<td>COMM429</td>
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**Business**

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<th>Course Code</th>
<th>Course Title</th>
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</thead>
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<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>MG670</td>
<td>Industrial Ecology</td>
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<tr>
<td>LW270</td>
<td>Law and Society I</td>
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**CATEGORY III: COURSE OFFERINGS IN ENVIRONMENTAL SCIENCE & POLICY**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</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. 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 — must have at least junior status when taking this course

d) One restricted elective chosen from a list of courses maintained by the Software Engineering Program Committee.

e) One business course selected from a list of Business School courses maintained by the Software Engineering Program Committee.
GRADUATE PROGRAMS

COMPUTER SCIENCE

Thomas Ortmeyer, Chair of Electrical and Computer Engineering; Peter Turner, 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. 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 www.clarkson.edu/mcs/cs_deg_req.html or contact the School of Arts & Sciences (caslerfc@clarkson.edu).

ENGINEERING AND GLOBAL OPERATIONS MANAGEMENT (EGOM) GRADUATE PROGRAM

Michael Ensby, Director

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, 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, Bank of America, Corning Inc., Eastman Kodak, General Electric, IBM, Magna Powertrain, New York Air Brake, New York Power Authority, 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 Management
ES572 Quality Management and Process Control
ME504 Design Methodology
OS657 Leading Organizational Change
SB696 Global Business Strategies

TYPICAL ELECTIVES
ES509 Management of Technology
FN608 Financial Management
LP580 Professional Ethics Within and Across Cultures
OM650 Operations Strategy and International Competitiveness
OS652 Strategic Human Resource Management
OS666 Negotiations and Relationship Management
MK694 Global Supply Chain Distribution Management
SB641 Advanced Topics in Supply Chain Management

A description of the courses and requirements can be obtained at www.clarkson.edu/egom or by contacting Michael Ensby (e-mail: mhensby@clarkson.edu, phone: 315-268-5982).

ENVIRONMENTAL MANUFACTURING MANAGEMENT (EVMM)
Thomas M. Holsen, Director

In recent years, society’s motivation for environmental protection has progressed to a concept of waste and resource management for sustainability. From this point of view, expenditures that make a positive impact on environmental quality are seen as investments with the potential to generate tangible returns. Such a perspective is increasingly evident in the marketplace because many corporations have found that not only are costs high for “end-of-pipe” waste controls, but also that more environmentally sophisticated consumers are demanding products created through cleaner manufacturing methods. Therefore, these producers have begun to see investments in waste management as an integral part of overall operations instead of exterior costs resulting in “negative profits.”

Such trends underlie the philosophy of Clarkson’s doctoral program that emphasize Environmental Manufacturing Management (EvMM), which was established through the Integrative Graduate Education and Research Training (IGERT) program of the National Science Foundation (NSF). This program is based on the idea that changes currently underway in the marketplace have created fertile areas for in-depth research, and that this research will lead to the implementation of new concepts consistent with the goals of sustainability.

The EvMM program possesses several distinguishing features: it is highly interdisciplinary, involving faculty from all University Schools (Arts & Sciences, Business, Engineering), and students from diverse backgrounds; it contains a course core complemented by coursework that reflects students’ unique backgrounds and strengths; it utilizes a systems engineering approach in which individual components are analyzed and modeled and then assembled into a system whose boundaries include the potential for environmental impacts; it includes an internship with a participating industry organization as part of the learning experience and as a means of focusing research areas; and it involves the formation of research cohorts — groups of students and faculty who define and carry out specific research topics in concert.

The EvMM program is focused primarily on doctoral studies. Doctoral students may matriculate in any of Clarkson’s Ph.D. programs (Chemical, Civil and Environmental, Electrical and Computer, and Mechanical and Aeronautical Engineering; Chemistry, Mathematics and Computer Science, Physics, or interdisciplinary Engineering Science or Environmental Science and Engineering). All students are required to take the EvMM core, given below, plus additional coursework reflective of the specific program in which each is enrolled.
EvMM Core Courses
CE586 Introduction to Industrial Ecology
CE582 Environmental Systems Analysis and Design
EC660 Environmental Economics
ES532 Risk Analysis and Communication

Further information on this program can be obtained at www.clarkson.edu/cce.

ENVIRONMENTAL SCIENCE AND ENGINEERING
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 the Clarkson Center for the Environment, whose mission is to develop, foster and enhance innovative, cross-disciplinary research and educational activities at the forefront of environmental investigation. 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.

INFORMATION TECHNOLOGY
Wm. Dennis Horn, Director

The Master of Science in Information Technology offers an interdisciplinary, broad-based curriculum for this professional degree. Students take courses from a range of disciplines that include math and computer science, electrical and computer engineering, technical 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 real-world 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.
RESERVE OFFICERS’ TRAINING CORPS

ROTC at Clarkson University is an elective course of study that provides college-trained officers to the United States Army and Air Force. Upon graduation and successful completion of either the Army program in Military Science or the Air Force program in Aerospace Studies, students receive appointments as commissioned officers at the rank of second lieutenant. Each program provides a Basic Course in the first and sophomore years, and an Advanced Course in the junior and senior years. Sophomores who did not participate during their first two years may qualify for admission into the Army Advanced Course by attending a special, expenses-paid, four-week Leader’s Training Course in the summer prior to their junior year. There are other entry options available for veterans and graduate students. Students may enroll in the ROTC Basic Course without incurring any military service obligation.

Admission to Junior and Senior (300- and 400-) level classes is contingent upon successful completion of first-year and sophomore curriculum (or its equivalent) and qualifications in leadership, academic proficiency, and physical fitness. In special situations, students may qualify for admission into 300- and 400-level curriculum by meeting other criteria. Academic credit toward graduation requirements for Military Science and Aerospace Studies courses is determined by the individual schools at Clarkson. Interested individuals should contact the Professor of Military Science or the Professor of Aerospace Studies.

Uniforms and books required for ROTC courses are furnished free of charge to students in the Basic and Advanced Courses. Advanced-course students are currently paid a $450-$500 per month (tax-free) stipend on a 10-month-per-year basis to offset living costs. Additionally, qualified students are eligible to compete for Army and Air Force scholarships.

MILITARY SCIENCE

LTC John C. Hinrichs — Chair & Professor of Military Science; Major 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 75 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, 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***

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**SOPHOMORE YEAR**

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<td>Innovative Team Leadership</td>
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<td>MS222</td>
<td>Foundations of Tactical Leadership</td>
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**JUNIOR YEAR**

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**SENIOR YEAR**

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<td>Second Semester</td>
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<tr>
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<td>Developing Adaptive Leaders</td>
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<tr>
<td>MS442</td>
<td>Leadership in a Complex World</td>
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*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 Thomas E. Wilson — Chair and Professor of Aerospace Studies;
Captain Roy La Barbera and 1Lt Jeremiah Cross, Assistant Professors

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 office 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 freshman and sophomores, and the Professional Officer Course (POC) for juniors and seniors. All students also complete Leadership Laboratory (LLAB) each semester. Based on the needs of the Air Force, students are often allowed to enroll as late as the fall of their junior year. The GMC curriculum is covered during an extended Field Training in the summer after their junior year.

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, 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.
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 — $15,000 towards tuition and fees
- TYPE III — $9,000 towards tuition and fees
- TYPE VI — $3,000 towards tuition and fees
- TYPE VIII — A competitive-based academic upgrade of a TYPE II, pays up to 80% of tuition

Other Benefits — All scholarships include the following:

- Free room and board (Clarkson incentive)
- Monthly Stipend during the academic year — FR = $300, SOPH = $350, JUN = $450, SEN = $500
- $450 per semester for books

Other Activities

Air Force ROTC presents many unique opportunities for its cadets. On weekends in the fall and spring, cadets can receive up to eight hours of no-cost flight instruction through the Civil Air Patrol. In addition, every winter break the cadet corps has the opportunity to visit an Air Force Base and see first hand how the Air Force works. These trips often include incentive flights on a variety of military aircraft. Cadets can also compete for summertime opportunities to earn parachute wings (free-fall and airborne) and travel to overseas bases at no cost. For more details, contact the Aerospace Studies Department at 315-268-7989.

Aerospace Studies Curriculum*

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<th>Course</th>
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<td>The Air Force Today II</td>
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<td>AS201</td>
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*Course may be applicable as free electives in some majors where noted. Consult individual departments for details.


**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, Willi Steinrotter, Adam Stockwell

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**

<table>
<thead>
<tr>
<th>Weight Training Techniques</th>
<th>EMT/CPR Lifesaving</th>
<th>Golf</th>
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<tbody>
<tr>
<td>Racquetball</td>
<td>Aerobic Fitness</td>
<td>Badminton</td>
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</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 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 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, and Doctor of Physical Therapy degrees. The M.S. is offered in the following fields: chemical engineering, chemistry, civil engineering, computer science, electrical engineering, information technology, engineering and global operations management, mathematics, 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; environmental science and engineering; chemistry; mathematics; and physics.

Graduate work during the entire year leading to the Master of Business Administration is available on a part-time basis for personnel employed in the nearby area.

Interdisciplinary programs leading to master of science degrees in Engineering and Global Operations Management (EGOM), Information Technology, and in Computer Science are offered. The MS in EGOM can be obtained through a hybrid format of accelerated residency sessions and interactive distance learning (see p. 186). The M.S. in Computer Science offers an academic year program that provides both computer science and computer engineering perspectives (see p. 185). Information Technology courses range from disciplines in math and computer science, electrical and computer science, technical communications, and management information technology (see p. 188). Clarkson also offers both M.S. and Ph.D. degrees in Environmental Science and Engineering (see p. 188).

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. Nonengineering 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.

All international applicants for whom English is not a first language must submit a TOEFL score. In the School of Business, a minimum TOEFL score of 600 (CBT score of 250; IBT score of 100) is required. The Coulter School of Engineering requires a minimum TOEFL of 550 (CBT score of 213; IBT score of 80). Applicants to the School of Business must also submit a TSE (Test of Spoken English) score of 250+ or call the Office of Graduate Business Programs for a brief telephone interview and an official GMAT score. Applicants for all graduate programs in science, engineering, and interdisciplinary programs are required to take the Graduate Record Examinations, and all accepted international students for whom English is a second language are required to take an on-campus ESL placement exam after arrival at Clarkson and complete any resulting requirements. These courses are not counted toward degree requirements. GMAT/GRE is not required for EGOM in lieu of professional experience.

All admission 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, the recommended application deadlines are January 31 for the fall semester and August 31 for the spring semester for US applicants. International applicants are encouraged to apply by April 15 for the fall semester and October 1 for the spring semester.

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 well prior to 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;
- achieved a School-defined minimum score on a designated national exam; the CUSB requires the GMAT exam and all others require the GRE.

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

**Graduate Application Procedure**

Application for admission is made on forms furnished by the University, obtained 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. Applications should be sent to the appropriate School office as indicated on the application. Details concerning application procedures or to complete the application online, go to www.clarkson.edu/admission/graduate/index.html.

**Fellowships and Instructional or Research Assistantships**

Applicants who submit their applications by January 31 for entry the following August (fall semester) or by August 31 for entry the following January (spring semester) will receive priority for assistantships and other financial aid. Fellowships, instructional or research assistantships, and tuition scholarships are available in the departments of Biology, Chemistry, Chemical 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 p. 203).

**DEGREE REQUIREMENTS AND ACADEMIC POLICIES**

**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 Graduate Handbook 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

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 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 the Faculty vote 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 Graduate Handbook for additional requirements. Requirements for students enrolled in the Doctor of Physical Therapy (DPT) program vary from those outlined here and are described on p. 164.

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 p. 200).
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 program has been designed to assist qualified non-resident candidates to matriculate at Clarkson University as doctoral degree candidates. It is conducted through direct contact and quality 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 entering with an M.S. degree can be allowed to transfer up to 30 credits for Clarkson University equivalent courses.

2) The student must satisfy all the entrance requirements of the academic department. This is beyond the basic graduate school 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 be 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 Graduate School 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.

**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. In computing this average, all grades earned by a student in graduate courses and seminar work taken at Clarkson are to be counted. 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** lowest passing graduate grade with 2.0 quality points per credit hour
- **P** passing. This grade may be employed only for seminar courses and special projects, and only with the approval of the department chair and the Dean of the appropriate School.
- **I** incomplete grade. The incomplete grade is used for the graduate dissertation or thesis. When the thesis or dissertation is accepted by the Graduate School, incomplete grades for the thesis or dissertation are removed. For other graduate courses, the incomplete grade may be submitted with the prior approval of the department chair and the dean of the respective School. Academic work required to remove this incomplete grade must be completed by the end of the seventh week of the next semester. Otherwise a grade of “F” is recorded. Thesis, project, and continuing registration numbers for graduate students are exempt from this policy.

**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 student fails, studies cannot proceed until approval is obtained from the department chair and from the Dean of the respective School and arrangements are made to repeat the comprehensive examination in the major field. 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 copies of accepted dissertations must be received in the student’s School office no later than 10 working days before Commencement to qualify a student to receive a degree at the end of the spring semester. Before final submission of the Ph.D. thesis, each student must pay a fee, subject to change,* to cover the cost of microfilming and binding the dissertation.

**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 the faculty vote to confer degrees.

*For the current price, contact the Graduate School.
• 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 10 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.

DEPOSIT
A $75 security deposit is required when a graduate candidate is accepted for admission. For the Graduate Business programs, the security fee is $300. A graduate student will not be officially enrolled until this fee is paid. The deposit is not refundable if the student decides not to attend
Clarkson. It is credited to the first term’s charges.

**Tuition and Fees**

Tuition for the 2008–2009 graduate program is at the rate of $1,011 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 $220 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 are required to begin paying 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 2008-2009 these assistantships carry stipends of $20,670 plus tuition. Instructional requirements are 12 hours of service per week in laboratory or other designated work for the University. (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 2008-2009 are $20,670 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 government fellowships**

These permit concentration on the student’s research problem during the entire period of study. Stipends for 2008-2009 range from $20,670 to $25,000 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.

**Partial Tuition Scholarships/Assistantships**

A number of partial tuition scholarships/assistantships are made available each year. These scholarships may be awarded to deserving students or in addition to other types of financial assistance.

**Loan Funds — U.S. Students**

Clarkson participates in the William D. Ford Federal Direct Loan Programs and we have developed a list of lenders that you may want to consider when making your financing decision. Graduate students may obtain information on financing their education by contacting Student Administrative Services.

**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 the first day of classes .....................................................100% refund
   after 1st day through first 10% of the enrollment period ......................90% refund
   after 10% through 25% of the enrollment period .................................50% refund
   after 25% through 60% of the enrollment period .................................25% refund

The percentage of the enrollment period is determined by the number of days enrolled divided by the total number of days in the period (75 during the academic year).

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, although single or married graduate students may request assignment if desired. 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 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; Constance M. Ferguson, 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, wave forces, surface shear viscosity, nutrient regeneration in lakes, flow slides, copper and zinc protein, nanotechnology, artificial intelligence, oxygenation of metal complexes, asychronous networks, communication networks, detection of random signals, renewable energy production, power transmission, energy conversion, plasma deposition, osmotic work, and corrosion.
In the business area, studies have been conducted relative to dispute settlement techniques, scientific and technical information systems, effects of organizational changes, economic impact of environmental damage from acid rain, marketing approaches, pricing environmental alternatives, banking systems, and monetary policies.

**ACADEMIC CENTERS**

**CENTER FOR ADVANCED MATERIALS PROCESSING (CAMP)**

**A New York State Center for Advanced Technology**

S.V. Babu, **Director**; John E. Prendergast, **Deputy Director**

The essential roles of advanced materials in modern manufacturing include producing “small” particles for advanced ceramics, photo-imaging and inks and medical diagnostics; fabricating integrated circuit chips and electronic packages for computers; producing high-performance plastics and composites for aircraft, and myriad other uses.

Since its inception in 1986, the Center for Advanced Materials Processing (CAMP) has been dedicated to developing Clarkson’s research and education programs in high-technology materials processing. The Center emphasizes development of scientific and technological expertise in the field of colloids, thin films and surfaces. CAMP researchers produce, modify and convert solids and liquids for which “small” particles, colloidal media or surfaces play an important role, either in the processing or in the properties of the final product. CAMP is an interdisciplinary endeavor, bringing together participants from six departments of science and engineering.

CAMP was designated a New York State Center for Advanced Technology (CAT) in 1987. As one of the 15 CATs at New York State universities, CAMP receives one million dollars per year from the New York State Office of Science, Technology and Academic Research for applied research, technology transfer and operating expenses. In addition, CAMP-related work receives several million dollars each year from the federal government and private industry. CAMP places a particularly strong emphasis on cooperative projects with industry, including exchange programs for students, scientists, and engineers. Materials processing activities at Clarkson include undergraduate projects, educational lectures and seminars by international experts, special short courses, and research by graduate students, research associates, and visiting scientists from around the world.

A building funded by New York State was completed in 1991 to house CAMP’s educational and research activities. Occupying 190,000 square feet and containing 70 laboratories, 102 offices, and a variety of special facilities and equipment, the complex is a valuable resource for promoting cooperative research projects with New York State industries.

For more information, check out the CAMP Web site at www.clarkson.edu/camp.

**Center for Quantum Device Technology**

Vladimir Privman, **Director**

As the dimensions of computer components become smaller, quantum effects will have to be accounted for in transport equations used for device modeling. Coherent quantum dynamics (quantum computing) has promise of speeding up certain information processing tasks. The Center for Quantum Device Technology was established at Clarkson in the fall of 2001 to address these and related challenges.

The goal of the Center is to devise comprehensive modeling approaches within the new developing semiconductor solid-state physics needed in device design, with the potential to offer new paradigms for fast and low-power computation, new uses of semiconductor materials, secure information transmission — with implications for future utilization of semiconductor devices, optical fibers, very short pulse lasers, single-photon detectors, and spintronics devices.
The Clarkson Center for the Environment is home to Clarkson’s environmental research activities; graduate degree programs with a focus on environmental science, environmental engineering, policy; campus environmental initiatives; and outreach programs.

Recognizing that environmental problems increasingly require the expertise of many disciplines and points of view, the Center 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. Faculty members from all of Clarkson’s Schools (Arts & Sciences, Business, and Engineering) are affiliated with the Center.

Research conducted under the Center includes a wide range of environmental science, engineering and policy issues. Current major emphases are housed in the Center for Air Resources Engineering and Science (CARES). Some of the other research areas include the fate of pollutants in air, water, and soil systems; treatment technologies; fluid flow in environmental systems; and sustainable energy systems.

A student majoring in any desired field can concentrate electives in a compatible environmentally related area such as Environmental Engineering (p. 149), Environmental Health Science (p. 171) or Environmental Science and Policy (p. 167). Graduate students may obtain an M.S. or Ph.D. in Environmental Science and Engineering (ESE).

The Clarkson Center for the Environment sponsors workshops and seminars to foster links among its members and facilitate environmental activities. Outreach activities include the University’s sustainability initiative, a K-12 Project-Based Learning outreach program that introduces middle school students to environmental problem solving and research experiences for undergraduate students.

Further information can be found at www.clarkson.edu/cce.

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, acification 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.
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.

**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 Center for the 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, analog and digital video 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 helps improve education through the effective pedagogical use of electronic media.

CEC staff assist faculty and students on communication-related teaching and research including communication-across-the-curriculum consulting, usability testing, educational video production, and more. In addition to onsite work across Clarkson University, the CEC includes five teaching, working, and learning areas on the first floor of new Snell Hall.

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 client presentation area — including a 72-inch touchscreen Windows and Linux workstation with electronic whiteboard capabilities — in order to support project-based learning and service learning. The workstations in the CEC Lab also include basic digital video editing capabilities. In addition to drop-in hours for communication projects, the CEC Lab and staff are available for communication-related research, classes, and projects on an individually scheduled basis.

2. The CEC Advanced Multimedia Room (Snell 130E) offers individuals and small teams access to professional-level editing hardware and software for communication projects (both research and educational) involving extensive digital video and audio. Editing platforms include both PC and Mac.

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.

5. The CEC Media Studio (Snell 127) offers a fully equipped distance education classroom, digital audio recording capability, Internet streaming teleconference technologies, and serves as the primary control system for Clarkson’s on-campus, closed-circuit television station.

CENTER FOR GLOBAL COMPETITIVENESS

As we move forward in the global economy, the challenges facing the business community have become more technically complex and require a multidisciplinary approach to problem solving. The Center for Global Competitiveness (CGC) was created to ensure the University’s continued leadership position in these areas. Given the longstanding reputation of Clarkson University in the areas of technology, innovation and business leadership, the CGC is continually looking for emerging or proven practical concepts to explore, research, develop and share. Previously, the Center was successful as an incubator for the Global Supply Chain Management initiative, which has resulted in the undergraduate CUSB and iE&M concentration being recognized by U.S. News and World Report’s “Top Supply Chain Programs” list for five (5) consecutive years. Now, fully embedded in the University’s academic structure, the CGC is currently developing concepts for new opportunities to share its expertise with students and external constituencies. Business strategy is increasingly carried out via a series of projects, many of an extremely technical nature. The synergy created through this center allows Clarkson to educate undergraduate and graduate students, as well as young professionals and corporate executives, in a seamless manner that reflects the realities of tomorrow’s workplace.

Specifically, the Center’s current focus is two areas. One is a new initiative that is exploring the merger with traditional quality management principles and tools with the rapidly growing field of project management. The second is a long-term international economic development specialty for nearly 20 years. Here are the programs in summary:

1. Project Management Professional Development (PMPD) Programs — Development of emerging and career-focused project management professionals. Project management initiatives will provide the necessary expertise that our graduates need to meet the challenges of designing, financing, procuring, producing, marketing and distributing high-quality projects in the construction, product development and information technology areas to customers throughout the world. The PMPD program will focus on the following key activities:

   • Integration of quality management principles, tools and techniques within the context of the field of project management. Employ “Design for Six Sigma” methodologies within the Project Life Cycle. Special emphasis on project management for product development, construction and information technology.
   • Deliver a state-of-the-art, project-focused curriculum in the interdisciplinary iE&M program as well as the rest of the University. Provide students with classroom experiences in technology management, project financials, market analysis and other primary business knowledge. Add to that base, higher order planning and problem solving skills.
   • Provide assistance to students and their academic advisors for the University-wide minor in project management. Work with students as they prepare for the Project Management Institute’s "Certified Associate Project Manager" examination.
   • Develop and facilitate world-class project management preparation for career oriented individuals, especially those requiring professional certification — from initial quality and project credentialing to professional certification readiness for future project leaders.
   • Work with companies and other organizations to evaluate specific project problem areas and develop product and service concepts that will help them better meet customer needs and facilitate organizational learning.


   Director: Martin Heintzelman (mheintz@clarkson.edu)

This Center provides a rich educational and research environment that focuses on developing student
and faculty awareness and knowledge of economic and business relations between Canada and the U.S. By promoting and facilitating collaboration among business, government and academic institutions from both sides of the border, the Center enables all parties to achieve greater understanding of the two nations’ business and economic environments and their positions in the global marketplace. The study of Canada-U.S. business relations has been an integral part of Clarkson's graduate business programs for more than a decade through the annual Graduate Business Forum. In addition, academic government and industry representatives from both countries conduct seminars to present ideas and collaborate on various issues throughout the year. Finally, students and faculty pursue research on a broad range of topics, including free trade, comparisons of business costs between the two countries and analyze strategies that firms in one country can employ to best enter the other country’s market.

More information about the Center for Global Competitiveness can be obtained at [www.clarkson.edu/cgc](http://www.clarkson.edu/cgc), or contact the School of Business Dean's Office at 315-268-2300.

**CLARKSON SPACE GRANT PROGRAM**

Daniel T. Valentine, *Director*

The National Aeronautical and Space Administration (NASA) established the National Space Grant College and Fellowship Program in 1989 under a mandate of the U.S. Congress. The Space Grant Program reinforces NASA's commitment to space-related science and engineering education by designating Space Grant Colleges- Consortia throughout the United States.

Clarkson joined with Cornell University in January 1990 to form the New York Space Grant Consortium. The space grant designation recognizes that the participants are substantially involved in a broad spectrum of NASA research, offer advanced study in aerospace fields, and are significantly active in related public service. The space grant, one of the first 17 awarded nationwide, provides funding to the consortium to develop unique technical capabilities and to encourage the participation of aeronautical and aerospace corporations in this initiative.

The primary focus of the Clarkson Space Grant Program is the enhancement of undergraduate and graduate education in space-related fields. The program aims to attract highly qualified students to space-related technical studies. We help undergraduates, primarily juniors, find summer research internships at universities within the consortium and at NASA facilities. Two areas of research are of particular interest: (1) fluid dynamics problems that arise in aeronautical engineering systems; and (2) nonlinear problems that arise in materials processing and other fluids engineering applications.

**INSTITUTE FOR STATISTICAL PHYSICS**

Lawrence Schulman, *Director*

The Clarkson Institute for Statistical Physics focuses on a common approach to a variety of scientific disciplines, including biology, astrophysics, neurology, cosmology, and the traditional areas of chemistry and physics. About a half dozen faculty members are involved, as well as research associates and undergraduate and graduate students.

An early problem solved by the techniques of statistical physics is the collective motion of atoms in a gas. It has provided experience in the way in which the properties of a complex many-constituent system may have simpler, emergent features that do not require detailed knowledge of the microscopic constituents. A common example of such an emergent feature is the collective behavior that leads to liquefaction. The same techniques can be applied to other multiconstituent systems: neurons in the brain, galaxies in the universe, buyers and sellers in a market, links on the Internet, or wiring schemes for large computer chips. The need to go beyond traditional measures of order has been strongly felt in recent years as the scientific community tries to quantify the notion of complexity. At Clarkson, particular attention is being paid to biological complexity, as manifested in ecological systems and to societal complexity as derived from networks, such as the Internet. Members of the Institute perform research on these and many other topics.
Student research, both graduate and undergraduate (funded through the National Science Foundation) has also been wide-ranging, including studies of catalysis, biological membranes, large-scale structure of the universe, vulnerability of the electronic Web, nonlinear crystal relaxation, and spectral properties of the song of whales.

**INTERNATIONAL CENTER FOR GRAVITY MATERIALS SCIENCE AND APPLICATIONS**

Liya L. Regel, *Director*; William R. Wilcox, *Associate Director*

The International Center for Gravity Materials Science and Applications was established at Clarkson University in 1991. Its objective is to encourage international collaboration on research involving the influence of gravity on materials processing. Research is carried on in the laboratory, in space, and in large centrifuges. The first centrifuge in the world dedicated to materials processing research and to related flow visualization was constructed at Clarkson University in 1993. Projects are described at http://people.clarkson.edu/~regel/research.htm. Most recently, diamond crystals have been grown at low temperature and pressure on plastics, glass, metals and graphite, resulting in a U.S. patent in 2006 with others pending.

The Center has organized and hosted four international workshops, with publication of conference proceedings. Over a thousand scientists from around the world have participated in Center activities, including 10 visiting professors who did collaborative research here.

The Center has received grants from NASA, NSF, New York State, corporations and funding from private individuals. Twenty-four Ph.D. and 35 M.S. students completed their research in the Center and are now holding responsible positions in industry, government and academia around the world.

**SHIPLEY CENTER FOR INNOVATION**

Timothy F. Sugrue, *Managing Director*; Goodarz Ahmadi, *Director of Technology*; Jessica Kelly, *Deputy Director*

The Shipley Center for Innovation, affiliated with the School of Business, 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 Timothy Sugrue, dean of the School of Business, and Goodarz Ahmadi, dean of the Wallace H. Coulter School of Engineering, as its director of technology, bringing together complementary knowledge from both areas into one resource.

The Shipley Center for Innovation will be comprised of a museum with Clarkson University’s past technology on display, a workshop for future technology to be developed, and a business incubator. The business incubator will provide the essential tools needed for the emerging technologies to be commercialized and developed into profitable companies.
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P.E., Minnesota
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Director of First Year Biology

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ZEIGLER, Stacey L.
B.S., SUNY Upstate
M.S., California College for Health Sciences
D.P.T., Simmons College
Clinical Assistant Professor of Physical Therapy
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#### Fall Semester

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<td>August 24</td>
<td>August 23</td>
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<tr>
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<td>August 25</td>
<td>August 24</td>
</tr>
<tr>
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<td>September 26</td>
<td>September 25</td>
</tr>
<tr>
<td>Thanksgiving recess begins*</td>
<td>October 1</td>
<td>September 30</td>
</tr>
<tr>
<td>Classes resume</td>
<td>November 25</td>
<td>November 24</td>
</tr>
<tr>
<td>Examinations begin</td>
<td>December 1</td>
<td>November 30</td>
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<tr>
<td>Examinations end</td>
<td>December 8</td>
<td>December 7</td>
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<td>January 6</td>
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<tr>
<td>Classes begin</td>
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<td>January 7</td>
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<tr>
<td>February break begins*</td>
<td>February 11</td>
<td>February 10</td>
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<tr>
<td>Classes resume</td>
<td>February 16</td>
<td>February 15</td>
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<tr>
<td>Spring recess begins*</td>
<td>March 13</td>
<td>March 12</td>
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<tr>
<td>Classes resume</td>
<td>March 23</td>
<td>March 22</td>
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<tr>
<td>Examinations begin</td>
<td>April 27</td>
<td>April 26</td>
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<td>May 13</td>
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*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 Robyn Seifert, Acting Affirmative Action Officer, Clarkson University, P.O. Box 5542, Potsdam, NY 13699-5542, or telephone 315-268-6497. 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 printed, 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.
MAJORS

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**

**BUSINESS**

**Bachelor of Science**
- Global Supply Chain Management 0506
- Innovation and Entrepreneurship 0509
- Financial Information Analysis 0599
- Information Systems and Business Processes 0504

**ENGINEERING**

**Bachelor of Science**
- Aeronautical Engineering 0902
- Chemical Engineering 0906
- Civil Engineering 0908
- Computer Engineering 0999
- Electrical Engineering 0909
- Environmental Engineering 0922
- Mechanical Engineering 0910
- Software Engineering 0999

**ARTS AND SCIENCES**

**Bachelor of Science**
- American Studies 0313
- Applied Mathematics and Statistics 1703
- Biology 0401
- Biomolecular Science 0499
- Chemistry 1905
- Communication 0601
- Computer Science 0701
- Digital Arts and Sciences 0605
- Environmental Health Sciences 0426
- Environmental Science & Policy 0420
- History 2205
- Humanities 1501
- Interdisciplinary Liberal Studies 4901
- Interdisciplinary Social Sciences 2201
- Mathematics 1701
- Physics 1902
- Political Science 2207
- Psychology 2001
- Sociology 2208

**INTERDISCIPLINARY**

**Bachelor of Science**
- Environmental Science and Policy 0420
- Environmental Health Science 0426
- Interdisciplinary Engineering and Management 4904
- Software Engineering 0999

**Graduate Degree Programs**

**BUSINESS**

**Master of Science**
- Management Systems 0506
- Professional Management 0506
- **Master of Business Administration (MBA)** Management 0506

**ENGINEERING**

**Master of Engineering**
- Chemical Engineering 0906
- Civil Engineering 0908
- Electrical Engineering 0909
- Mechanical Engineering 0910

**Master of Science**
- Chemical Engineering 0906
- Civil Engineering 0908
- Electrical Engineering 0909
- Engineering Science 0901
- Mechanical Engineering 0910

**Doctor of Philosophy**
- Chemical Engineering 0906
- Civil Engineering 0908
- Electrical and Computer Engineering 0909
- Engineering Science 0901
- Mechanical Engineering 0910

**SCIENCE**

**Master of Science**
- Basic Science 4902
- Chemistry 1905
- Mathematics 1701
- Physics 1902

**Doctor of Philosophy**
- Chemistry 1905
- 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 Science and Engineering 0922
- Information Technology 0702

**Doctor of Philosophy**
- Environmental Science and Engineering 0922
Production Possibilities

Capital goods

Effect of an increase in the labor force

Consumer goods

Immigration increases the labor force which results in an outward shift in the PPF.
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1. Clarkson Field
2. Tennis Courts
3. Snell Field
4. Cheel Campus Center
5. Center for Advanced Materials Processing (CAMP)
6. William J. Rowley Science and Engineering Laboratories
7. Denny Brown Adirondack Lodge
8. Townhouse Apartments
9. Woodstock Field
10. Woodstock Village
11. Andrew S. Schuler Educational Resources Center (ERC)
12. Technology Advancement Center
13. Cora & Bayard Clarkson Science Center
14. Woodstock Lodge
15. Bertrand H. Snell Hall
16. President’s House
17. Moore House
18. Graham Hall (Donahue, Olson, Van Note, Wilson)
19. Price Hall (Farrisee, Newell, Ormsby, Thomas)
20. Brooks House
21. Reynolds House
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3. Snell Field
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14. Woodstock Lodge
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16. President’s House
17. Moore House
18. Graham Hall (Donahue, Olson, Van Note, Wilson)
19. Price Hall (Farrisee, Newell, Ormsby, Thomas)
20. Brooks House
21. Reynolds House
22. Cubley House
23. Ross House
24. Andrew M. Schuler Recreation Building (IRC)
25. Deneka Family Fitness Center
26. Alumni Gymnasium
27. Holcroft House (Admission)
28. Hamlin House
29. Student Health Center
30. Powers House
31. Walker Center
32. Hantz Field
33. Facilities and Services
34. Carpenter Shop
35. Crescent Apartments
36. Riverside Apartments
37. A. George Davis Park
38. Canoe House
39. Downtown Snell Hall
40. Congdon Hall
41. Old Main
42. Clarkson Hall (Center for Health Sciences)
43. Army ROTC
44. Air Force ROTC
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