CLARKSON UNIVERSITY
2026-2027 CATALOG

THE CLARKSON EDUCATION

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

Mission of Clarkson University

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

Vision of a Clarkson Education

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

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

1. Solve real-world, open-ended problems with creativity and risk taking to obtain solutions that are practical and sustainable, including those they encounter in state-of-the-art research under the direction of distinguished faculty;
2. Develop and refine exceptional communication skills with an awareness of potential cultural differences;
3. Lead effectively and work productively within disciplinary and multidisciplinary teams composed of members with diverse interests and backgrounds;

4. Excel in using computing and information technologies;
5. Learn through instruction and guidance by nationally recognized faculty whose commitment to both teaching and research has made Clarkson a nationally ranked university.

A Clarkson student's education is greatly enhanced by a personal and friendly learning environment, within a small, residential, nationally recognized University, which:

1. 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;
2. 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;
3. Use our campus as a living laboratory to improve learning, and uses the wider region to broaden and extend Clarkson's outreach and service;
4. Provides personal advising and interaction with faculty and staff as well as supportive relationships among students;
5. Offers many leadership opportunities through co-curricular groups and activities;
6. Respects and learns from its community of diverse people, backgrounds, and cultures.

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

Major Values of the Clarkson Community

"Lead by Example and Others Will Follow"

Caring : A positive and friendly atmosphere is created when we care about each other, when we are open to constructive criticism, and when we show appreciation for a job well done.
Diligence: "A workman that needeth not to be ashamed." Initiative and hard work are key ingredients in getting the task done.
Diversity: The mutual appreciation of differences and a plurality of opinions, beliefs, and cultural traditions inform and enrich our lives.
Integrity: Honesty and accountability in one's actions and words form the foundation of our relationships with others.
Growth: Educational experiences in and out of the classroom enliven our minds, broaden our horizons, and facilitate dialogue and consensus. Learning is a lifelong activity.
Service : Offering our time and skills for the good of our fellow citizens leads to the prosperity and environmental health of the community and to the well-being and character development of the individual.
Teamwork: Effective teamwork encourages creativity and self-initiative in our respective roles and partnerships. It is essential in getting the task done and in

developing the skills needed to meet the challenges of ensuring sustainability of local and global economic, environmental and social systems.
Vision : Having a vision of a sustainable future helps us prepare for it. Embracing the inevitable changes in our world as opportunities allow us to anticipate, promote, and facilitate change.

ABOUT CLARKSON UNIVERSITY

Clarkson University is a private, national, STEM-focused research university where students, faculty and partners work across disciplines to solve real-world problems and create lasting impact. Founded in 1896 to meet the real needs of people, Clarkson delivers a highly participatory education in engineering, business, science, technology and health — combining rigorous academics with hands-on learning, research, innovation and professional experience.

From its main campus in Potsdam, New York, and additional locations and programs across New York and online, Clarkson connects students with the people, technologies and industries shaping what's next. Every undergraduate completes a professional experience, and Clarkson's close relationships with employers, research partners and alumni create powerful pathways from the classroom to meaningful careers.

That approach delivers results. Ninety-six percent of the Class of 2025 was placed in their chosen field or continuing education within six months of graduation, with an average starting salary of $82,786. Clarkson alumni salaries rank among the top 2% nationally, and one in five alumni leads as a CEO, senior executive or business owner.

Research is equally solutions-driven. Clarkson faculty and students collaborate across disciplines and with industry, government and community partners in three focus areas with significant potential to improve lives: materials and sensors, power and energy, and environment and health. Across these fields, the University advances technologies, knowledge and talent that strengthen industries, communities and economies.

Across Clarkson, students do more than prepare for the future — they help create it. In classrooms and laboratories, makerspaces and startups, internships and communities, Golden Knights learn to connect ideas across disciplines, challenge convention and put knowledge to work.

It is an education grounded in Clarkson's founding purpose and increasingly important today: developing capable, curious and confident people prepared to meet the real needs of the world.

Selected Rankings and Distinctions

1. Top 10 nationally for economic mobility among students who move from the lowest income quintile to the highest as adults — The New York Times, 2026
2. Top 2% nationally for alumni salaries — PayScale College Salary Report

3. 96% career placement rate within six months of graduation — Clarkson Class of 2025
4. $82,786 average starting salary — Clarkson Class of 2025
5. Best Value College — The Princeton Review
6. Top-tier National University and Best Value School — U.S. News & World Report
7. 45 Goldwater Scholars, including a record of Goldwater winners in 22 consecutive years
8. 18 Fulbright Scholar awardees in the past decade

Changes in Curricula

Information contained in this catalog is current at the time the catalog is posted on our Website, 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 Graduate School, Student Achievement Services, and the appropriate academic program.

Please be aware that the information concerning academic requirements, courses, and programs of study in the catalog does not establish an irrevocable contract between the student and the University. The University can change, discontinue, or add academic requirements, courses, and programs of study at any time, without notice. Although every effort is made to provide timely notice to students in order to help in the planning process, it is the responsibility of the student to confirm that all appropriate degree requirements are met.

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.

Unforeseen Conditions

The University reserves the right, with or without prior notice, to modify, suspend, or otherwise alter its operations, academic programs, methods of instruction, schedules, housing arrangements, student activities, and the availability or delivery of student services when, in the University's judgment, circumstances beyond its reasonable control make such action necessary or advisable. ("Unforeseen Conditions").

In response to Unforeseen Conditions, the University may, in its discretion, transition courses or programs to remote, online, hybrid, or alternative instructional formats; restrict access to campus facilities; postpone, reschedule, or cancel academic or non-academic activities; modify academic calendars; or take such other actions as the University determines are appropriate.

The University's exercise of the rights described in this section shall not result in any refund, credit, rebate, offset, or reduction of tuition, fees, housing charges, or other amounts owed to the University, except to the extent specifically authorized by the

University in writing in its sole discretion. The temporary or permanent unavailability of particular facilities, activities, programs, services, or in-person instruction resulting from Unforeseen Conditions shall not relieve the student of financial obligations to the University. Nothing in these Student Regulations is intended to, nor shall it be interpreted as, creating a contractual obligation of the University to provide any specific academic programs, methods of instruction, schedules, facilities, housing arrangements, student activities, or student services.

Courses

Typical courses for each program are listed in this catalog, but not all courses are offered each year. Descriptions of courses and terms in which specific courses are offered are accessible in Clarkson's Student Information System. Viewing Clarkson's searchable course catalog will give up-to-date course descriptions, pre- or co-requisites, course attributes, and other information pertaining to all courses offered. Clarkson's browse course catalog may be viewed here:

https://mycu-g.clarkson.edu/psp/guest/EMPLOYEE/SA/c/SA_LEARNER_SERVICES.SSS_BROWSE_CATLG_P.GBL?

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

Accreditation

Clarkson is accredited by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104-2680, 215-662-5606.

The undergraduate programs in aerospace, chemical, civil, computer, electrical, environmental, mechanical, and software engineering are accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org/. Students who have completed at least three years towards a bachelor's degree in engineering are eligible to take the Fundamentals of Engineering examination toward licensure as professional engineers.

The David D. Reh School of Business 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.

The Healthcare Management MBA is accredited by the Commission on the Accreditation of Healthcare Management Education (CAHME).

The entry level doctor of physical therapy program is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE) of the American Physical Therapy Association (APTA). The Accreditation Review Committee (ARC-PA) on Education for the Physician Assistant has granted continuing Accreditation to the Physician Assistant Studies Program. The Occupational Therapy Program is fully accredited by the

Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA).

In addition, the University 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.

Student Retention and Persistence

Retention studies of independent institutions in New York State show on average that 73.7 percent of students who enter as freshmen complete their degrees within six years, and 61.8 percent in four years. At these same schools, the sampling of transfer students shows 67.4 percent completing their degrees in four years and 71.3 percent in six years.

At Clarkson the graduation rate is well above the norm: averaged among those completing degrees over the past three years, 76.2 percent of freshmen completed their studies for a bachelor's degree within six years; 74.4 percent in five years; and 63.6 percent in four years or less. *Among transfer students, 48.4 percent complete their bachelor's degrees in two years and 80.0 percent in four years.

*Under the Student Right to Know Act, the federal government requires the University to publish the six-year graduation rate for students who have enrolled as first-time freshmen. Clarkson operates a unique program known as The Clarkson School, which allows students to begin their college career one year early (see Undergraduate Admission). This program attracts some students who may not intend to remain at Clarkson for four years and inclusion of these students in the total has the effect of making that published rate misleading. The inclusion of Clarkson School students makes the University's six-year graduation rate 72.5 percent.

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The Higher Education General Information Survey (HEGIS) code designated by the New York State Education Department for classifying these academic programs may be found in the list of degree programs and HEGIS Codes near the end of the catalog.

Applied Data Science MS
Biomedical Engineering MS
Bioscience & Biotechnology MS, PhD
Business Administration MBA
Business Analytics MBA
Chemical Engineering MS, PhD
Chemistry MS, PhD
Civil & Environmental Engineering MS, PhD
Clinical Leadership in Healthcare Management MS
Computer Science MS, PhD
Electrical and Computer Engineering MS, PhD
Electrical Engineering MS
Engineering Management MS
Engineering Science MS, PhD
Environmental Policy MS
Environmental Science & Engineering MS, PhD
Global Supply Chain Management, MBA
Healthcare Data Analytics MS
Healthcare Management MBA
Leadership in Medicine- Clinical Leadership in Healthcare Management MS
Leadership in Medicine-Healthcare Management MBA
Materials Science & Engineering PhD
Mathematics MS, PhD
Mechanical Engineering MS, PhD
Occupational Therapy MS
Physical Therapy DPT
Physician Assistant Studies MS
Physics MS, PhD

Graduate Advanced Certificates
Bioethics
Business Fundamentals
Business of Energy
Construction Engineering Management
Environmental Management
Global Supply Chain Management
Healthcare Management
Human Resource Management
Innovation and New Venture Management

Management and Leadership
Power Systems Engineering

UNDERGRADUATE DEGREE PROGRAMS

All bachelor's degree programs at Clarkson require completion of 120 credit hours and the learning expectations of the Clarkson Common Experience. Program length for a bachelor of science degree is four years.

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

Aerospace Engineering
Applied Mathematics & Statistics
Biochemistry
Biology
Business Administration
Business Analytics
Business of Biotechnology
Chemical Engineering
Chemistry
Civil Engineering
Computer Engineering
Computer Science
Data Science
Electrical Engineering
Engineering & Management
Environmental Engineering
Environmental Science & Sustainability
Financial Information & Analysis
Global Supply Chain Management
Healthcare
Healthcare Business
Individually Designed Program, BPS
Innovation & Entrepreneurship
Mathematics
Mechanical Engineering
Neuroscience
Physics
Psychology
Software Engineering

Double Majors and Second Clarkson Degrees

Undergraduates may also enhance an academic major by combining it with a second major. This may lead to a single bachelor's degree with a double major or to two Clarkson bachelor's degrees.

Minors

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

Applied Machine Learning
Architectural & Facilities Engineering
Anthropology
Bioethics
Biology
Biology, Behavior & Society
Biomedical Engineering
Biomedical Science & Technology
Business
Chemistry
Cognitive Neuroscience
Communication
Computational Science
Computer Science
Digital Arts
Economics
Electrical Engineering
Engineering Science
Environmental Engineering
Environmental Health & Safety
Environmental Policy
Environmental Science
Gender & Sexuality Studies
Health Psychology
History
Human Resource Management
Individually Designed Minor
Information Technology
Interdisciplinary Social Sciences
Law Studies
Literature & the Arts
Manufacturing Engineering

Mathematics
Materials Engineering
Medicine and Healthcare
Military Leadership Studies
New Product Development and Marketing
Physics
Physiology
Pre-Teaching
Political Science
Project Management
Psychology
Robotics
Social Justice and Equity Studies
Sociology
Software Engineering
Statistics
Sustainable Energy Systems Engineering
Sustainable Solutions
War Studies

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 advisors.

ACADEMIC REQUIREMENTS

Bachelor Degrees

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

Learning Expectations of the Common Experience
Each Clarkson graduate will achieve academic abilities that include:

1. Mastery of a major field of study;
2. Effective communication in oral, written, and technological forms, critical and imaginative thinking; and
3. Problem solving skills using both quantitative and qualitative reasoning where appropriate

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

1. An increased understanding of and insight into his or her own behavior
2. An appreciation of the need for self-motivated life-long learning
3. An increased social awareness and interpersonal competence, including an appreciation for the value of experiencing diversity; and
4. 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:

1. The nature of culture and societies
2. Contemporary and global issues
3. The imaginative arts and their role in society
4. Science and technology, including their relationship to society and their impact on the environment
5. Economic and organizational concepts and decision-making; and
6. Methods for studying and explaining individual and group behavior

Components of the Clarkson Common Experience
The Clarkson Common Experience provides a common set of learning expectations and outcomes for all Clarkson students. To achieve these outcomes, each student is

required to complete a set of courses and a professional experience. Course work consists of required and elective courses both from within a student's major field and from across the spectrum of all disciplines in the university. Embodied in the Common Experience are four components that serve as common threads through multiple courses:

1. Learning to communicate effectively
2. Developing an appreciation for diversity in both working and living environments
3. Recognizing the importance of personal, societal, and professional ethics
4. 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 UNIV 190, The Clarkson Seminar, then across the curriculum and in the major. Courses designated as writing intensive are assigned communication points on a scale of one of two (C1 or C2) to indicate the extent of communication experience in that course. Beyond UNIV 190, 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 UNIV 190. Students for whom English is a second language must also meet the ESL requirements as described below.

The Diversity Component

From the moment they arrive on campus, Clarkson students prepare for the culturally diverse environments they will inevitably experience in their future careers. FY100, First-Year Seminar, helps students "respect and learn from Clarkson's diverse community." In UNIV 190, The Clarkson Seminar, students will be urged to question their own assumptions and to consider different worldviews. Later in their academic coursework, students will gain a deeper understanding of cultural diversity within and among societies, recognizing how it influences their own actions and affects the lives of those around them. The professional requirement in the major area of study will prepare students to enter the global workforce by helping them understand the importance of diversity in the workplace.

The Ethics and Values Component

Through a repeated emphasis on ethics and values, Clarkson promotes in its students the profound reflection necessary to sustain personal, academic, professional, and civic integrity. Students are expected to view this process not just as an academic issue, but as critical for all aspects of their lives, including community activities, sports, student organizations, and work. Issues of personal ethics and values are

addressed beginning with FY100, First-Year Seminar. Social and cultural values are discussed as part of UNIV190, The Clarkson Seminar. Several courses in the knowledge sequence emphasize social and cultural values or philosophical and ethical issues. In the Professional Requirement, students identify ethical problems in situations typically encountered within their professions and analyze these issues from different ethical perspectives.

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

Requirements of the Clarkson Common Experience
FY 100, First Year Seminar. First Year Seminar treats personal and social adjustment topics as well as Clarkson values, ethics, and diversity.

UNIV 190, The Clarkson Seminar
The Clarkson Seminar welcomes first year students into a world of cultures, histories, and the global forces that will shape their personal and professional lives beyond their Clarkson education. Students will define issues within a broad cultural context and gain experience in evaluating and interpreting texts. Seminar classes will be small and thematically structured, with an emphasis on discussion, critical reading and thinking, extensive writing, and collaborative work.

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

1. Cultures and Societies (CSO)
2. Contemporary and Global Issues (CGI)
3. Imaginative Arts (IA)
4. Science, Technology, and Society (STS)
5. Economics and Organizations (EC)
6. Individual and Group Behavior (IG)

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

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

Communication
Clarkson places a strong emphasis on developing students' abilities to communicate effectively in a variety of contexts using diverse forms of communication. Students must select coursework and possibly extra-curricular activities that carry a total of at least six communication points. Courses and activities with a communications component will be identified as carrying either one or two points. At least two points must come from within the student's major discipline in a course at the 300 or 400 level.

Major Field of Study
A significant characteristic of the Common Experience is the integration of requirements from both outside and within a major field of study. Each student pursues a degree program in a major field and completes a set of prescribed courses to demonstrate mastery of that field. As part of these courses, students achieve outcomes of the Common Experience.

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

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

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

BACHELOR'S DEGREE GRADUATION REQUIREMENTS

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

EAP/ESL Requirements
Students for whom English is a second language must take an English language placement examination upon entering Clarkson. Based on the outcome of this examination, a student may be required to complete one or more English for Academic Purposes (EAP, formerly ESL) courses prior to enrolling in UNIV 190, or any course assigned one or two communication points.

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

Master Degrees

Note: This section does not apply to students in The Earl R. and Barbara D. Lewis School of Health Graduate Programs. Students in these degree programs should refer to the program sections of this catalog for degree requirements.

The minimum graduation requirements for students in Master's degree programs at Clarkson are listed below. Additional graduation requirements are set by each degree program. Consult the program office for details.

1. A minimum of 30 credit hours of graduate coursework, as follows
    a. At least 20 credit hours of course and seminar work. The balance of coursework must be consistent with the research or professional experience component.
    b. Only courses numbered 500 and above are accepted for graduate credit.

    c. 10 credit hours of transfer credit (B grade or better) may be accepted, or with the Dean of The Graduate School's approval, a maximum of 12 credit hours of transfer credit from a post-baccalaureate certificate program (B grade or better) may be accepted.
2. Satisfactory completion of one of the research or professional experience components listed below. Please note all options may not be available in every program.
    a. A written these based on independent research
        i. A thesis submitted in partial fulfillment of the requirements for the Master of Science degree will be examined by a committee of at least three Clarkson faculty appointed by the student's department. After approval by the examining committee, a thesis requires signature approval by the Dean of The Graduate School, and must be submitted according to the procedures defined by the Graduate School. For information and assistance contact the graduate coordinator representing your discipline.
    b. A comprehensive examination
        i. A comprehensive examination taken in partial fulfillment of the requirements for the Master of Science degree will be administered by a faculty member or faculty committee approved by the appropriate academic administrator.
    c. An appropriate, professionally oriented special project
        i. A project submitted in partial fulfillment of the requirements for the Master of Science degree will be examined by a faculty member, or faculty-member committee, as approved by the appropriate academic administrator.
3. At least one academic year of study beyond the B.S.
4. A cumulative GPA of 3.000 in courses used to meet graduation requirements.
5. All work must be completed in 5 calendar years. Former Union Graduate College students active in their respective programs prior to Summer quarter 2016 must complete in 6 calendar years.

Doctoral Degrees

The minimum requirements for all students in Doctor of Philosophy (PhD) degree programs are described below. Please consult your program office for additional requirements.

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 6 credit hours of seminar.
    d. A maximum of 30 credits transferred from an MS degree towards PhD 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 PhD program are exempt from this residency requirement (see below section).
3. Satisfactory completion of the PhD comprehensive examination for admission to candidacy ("candidacy procedure") within two years of full-time study after admission to the PhD program or, for part-time students, before completing 66 credits (see below).
    a. After completion of the candidacy procedure, the student will be identified as a "PhD 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 section).

Requirements for students enrolled in the Doctor of Physical Therapy (DPT) program vary from those outlined here and are described in the General Requirements for DPT Curriculum.

Any changes in the student's degree program must be approved by the Academic Standards Committee.

Off-Campus PhD Program Policy

The off-campus PhD program has been designed to allow Clarkson University doctoral degree candidates to conduct their dissertation research at their employer's research facilities. A Clarkson faculty advisor directs the dissertation research with the assistance of a co-advisor at the student's employer, and up to 50% of required coursework can be taken from Clarkson via online and distance learning.

1. The minimum credit- hour requirement after the bachelor's degree is 90 hours (current requirements). The normal course requirements for the student's department and the University must be met. Students may take up to 50% of required coursework through distance learning. Students who enter the program with an MS degree may transfer up to 30 credits toward the PhD from their master's program.
2. The student must satisfy all the entrance requirements of the academic department. This is beyond the basic University requirements already in place for admission to the PhD 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 PhD Committee.
4. The student must fulfill all degree requirements according to each department's policy. It is considered essential that each candidate is carefully examined for both the depth and breadth of their knowledge in the chosen field of study.
5. The dissertation should be defended at Clarkson University in the normal manner and according to the University and department requirements and regulations. The candidate must demonstrate a sufficient fundamental knowledge in their 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 students' employing organization and Clarkson University must conform to the Clarkson Conflict of Interest Policy.

A listing of courses available through distance learning is published each semester. Off campus PhD students may choose from that list and enroll in those courses. These courses shall meet the matriculation requirements set forth in the University course catalog.

The courses for this program will be delivered using a video conference/classroom facility or through the internet. Graduate classes that include off-campus students are scheduled at a video conference facility at Clarkson. An appropriate faculty member is assigned to oversee the courses, coordinate the examinations and evaluation of the student's performance. Courses may also be given through other means of delivery, provided they meet the University and department requirements. These courses shall meet the matriculation requirements set forth in the University catalog.

Comprehensive Examination for Admission to Candidacy

A comprehensive examination based on general preparation in the major field must be taken within two years after admission to the PhD program. If the comprehensive examination is failed twice, the student will be dropped.

Time Limit

After the comprehensive examination is passed; all work done specifically for the doctorate is to be completed within a period of seven calendar years.

Final Examination

A final examination must be passed. This examination will include, as a minimum, an oral examination based on the dissertation. For the final oral examination, a committee will be selected by the faculty advisor and approved by the division head and dean. The committee will consist of a minimum of five members. The members should include at least four Clarkson faculty of assistant professor rank or higher and possessing an earned doctoral degree. At least one of the members must be from a department other

than the candidate's major department. With the approval of the Provost, an external examiner with appropriate credentials from another University or industry may also be appointed to serve as one of the five committee members. This committee will judge the technical competence of the dissertation and the oral presentation. Final completion 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. The thesis must be submitted according to the procedures defined by The Graduate School. For information and assistance contact the graduate coordinator representing your discipline.

ACADEMIC AFFAIRS AND SIGNATURE PROGRAMS

Academic Affairs Signature Programs support the many functions that contribute to the academic mission of the University through teaching, research and scholarship, and academic service.

Institute for a Sustainable Environment

The Clarkson Institute for a Sustainable Environment (ISE) is home to Clarkson's environmental activities associated with research, interdisciplinary graduate and undergraduate degree programs, and outreach programs. The Institute was established to support Clarkson's long-standing expertise in this field and to increase interdisciplinary collaboration among faculty.

The Institute for a Sustainable Environment is a collaborative and multidisciplinary community that serves as the hub for the University's drive toward a sustainable world. We facilitate high impact learning experiences, foster transformative scholarship, and engage the campus and broader community in order to understand and address environmental and sustainability challenges

Recognizing that sustainability problems increasingly require the expertise of many disciplines and points of view, the Institute promotes partnerships and interdisciplinary activities that enable the integration of basic and applied research, providing the increased understanding about environmental and social systems that is needed for informed decisions and policies. Fostering links among its affiliates is facilitated by its activities, including ISE sponsored workshops, seminars, and student co-curricular activities. Faculty and students also participate in ISE's interdisciplinary offerings.

Institute for STEM Education

The Mission of the Institute for STEM Education (STEM Ed) is to combine disciplinary rigor with pedagogical science in outreach, teacher training, graduate student and

faculty professional development to establish Clarkson University as a national leader in all aspects of STEM Education.

Vision
STEM Ed will:

- Build a reputation of student achievement, exemplary pedagogy, and K12 outreach. STEM Ed will focus on engagement and workforce preparation,
- Support faculty across disciplines and campuses to create learning experiences and curriculum that support all undergraduate and graduate students to be successful beyond Clarkson.
- Deploy Clarkson values of collaborative and innovative STEM teaching and learning to impact undergraduate and graduate student recruitment, retention and education of students from diverse backgrounds and on teacher preparation for K-12 and college-level.

STEM Ed's current objectives include coordination and expansion of Clarkson's STEM Education activities:

- Outreach projects and new grant opportunities coordinated across divisions and campus units Coordinate student work experiences in educational projects
- Informal education
- Academic Retention Programs (First Year Council etc.)
- Create and implement programs to support faculty in the classroom and improve learning experiences for Clarkson students
- Dissemination of Scholarship of Teaching and Learning both on campus and in publications
- Advise students in the pre-teaching minor

Through all of this, STEM Ed will further enhance Clarkson's reputation on the national and international stage.

Institute for Artificial Intelligence, Innovation, and Leadership

The Clarkson Institute for AI, Innovation, and Leadership is an interdisciplinary campus hub for applied artificial intelligence. The Institute brings together faculty, staff, and students from across the University to explore how AI can strengthen teaching, research, university operations, entrepreneurship, innovation, and other areas of university life.

The Institute emphasizes practical, responsible, and human-centered uses of artificial intelligence. It supports experimentation with emerging tools while encouraging approaches in which human judgment, creativity, expertise, and responsibility remain

central. Through collaboration across disciplines, the Institute helps members of the Clarkson community move promising ideas from experimentation toward sustainable programs, research projects, partnerships, and other forms of impact.

Mission

The Institute supports practical, responsible, ethical, and visible uses of AI at Clarkson across teaching, research, management, entrepreneurship, and other areas of university life. Its purpose is to help faculty, staff, and students test tools, improve workflows, strengthen research and instruction, and develop projects that can lead to new programs, external partnerships, and funding opportunities.

Vision

The Institute will become a credible campus hub for applied AI: a place where Clarkson coordinates its teaching, research, and innovation efforts; supports experimentation across disciplines; develops novel applications; and builds a recognizable identity in AI that strengthens the University's academic profile and public visibility.

Honors Program

Clarkson offers a separate four-year undergraduate Honors curriculum for motivated, curious students majoring in any of our degree programs. Honors students are engaged learners who collaborate and work with each other, our campus, and our community to research solutions and solve problems. Clarkson Honors fosters the potential of students and faculty who, together, create a transformative educational experience. From this foundation, Honors students pursue deep learning in research and in hands-on experiences, culminating in a capstone they design. This community-based model means Honors students lean on and learn from each other, take the same Honors courses together, live together, socialize together, and support each other throughout their time at Clarkson. Honors students must maintain a grade-point average of 3.25 and keep up with the program's service requirement to remain in good standing.

Applicants to the Honors Program must complete an online application, which includes two short essay questions, a résumé, and a "show and tell" question about their passions. The Honors Program admits up to 60 new first year students and up 10 sophomore or junior students per year

Clarkson Honors complements curriculum in all majors, emphasizing the development of critical thinking, problem solving, teamwork, and communication skills. Students take one Honors course per semester. Courses develop as interlocking, multidisciplinary sequences, bringing perspectives from different academic disciplines to bear on contemporary problems at the interface of science, technology and society. The Honors approach is open-ended and project-based.

The Honors curriculum is a unique four-year sequence of courses specifically designed for Honors students in which students develop skills in teamwork, problem-solving, ethical decision-making, and oral and written communication. The Honors track replaces the Clarkson Knowledge Areas and offers different (but not additional) coursework to complement Honors students' major coursework. Clarkson Honors courses capitalize on the strengths of the Honors community: we emphasize diverse academic disciplines and social perspectives, so the courses complement any major and strengthen your own skills. The climax of this sequence is the Honors capstone, which allows students to define and explore an original topic of their choosing.

Clarkson Honors also offers students opportunities to engage in original research through its summer research programs where students participate in cutting-edge research with faculty mentors for up to ten weeks. The Honors five-week "pre-frosh" summer research program also provides a unique opportunity for incoming first year students before they matriculate at Clarkson.

All students must complete an Honors capstone of their own design which is generally imagined and completed in their junior and senior year under the guidance of their Honors advisor and a faculty member. A wide range of topics and formats is accepted, from laboratory research to business plans, from engineering design to creative artwork, and from software applications to co-op assignments and internships.

Honors students enjoy many other benefits, including:
1. The Honors Scholarship as part of their Clarkson financial assistance package;
2. The Honors Educational Enhancement Scholarship that funds high impact scholarly and professional development activities;
3. A residential living-learning community; and
4. Holistic Honors advising

The Honors Program at Clarkson is supported by an Honors Council composed of representative faculty and staff, and Honors students who are elected by their peers to serve on the Honors Student Steering Board.

The Clarkson School

The Clarkson School is a unique program for talented high school age students who are ready to begin college early. Unlike many early-entrance college programs, The Clarkson School provides a full-time residential program and dedicated advising that facilitates the transition to college life. The Clarkson School has been bringing academically advanced students to Clarkson University since the fall of 1978.

Students who enroll in The Clarkson School live together on campus in a community with specially trained residential advisors. Commuting day students from St. Lawrence County may also join the community. Our students are matriculated as first year University students and typically earn about 32 - 34 college credit hours during the year.

Courses are selected from the University's offerings across the curriculum. With assistance from the school staff, students design their programs of study to meet their individual interests and needs.

The low student-staff ratio of The Clarkson School ensures individualized attention. Our advising programs emphasize time-management and study skills that are essential for success in college. We assist in career and major exploration and each student's progress toward their goals is carefully monitored. Individualized assistance is provided where necessary. Through our PE100 - First Year Seminar class, students build on their personal and professional skills through in-class exercises, guest speakers and workshops focusing on resume and cover letter writing, preparation for career fairs and job interviews, communication skills, networking and other topics. We believe that our students will grow personally and professionally to become fully contributing members of our community and of their communities in the future.

Family dinners are held to build a sense of community amongst The Clarkson School students, themed to address the needs of first year students. For example, students enjoy guest speakers, meeting faculty mentors and alumni of The Clarkson School, an "etiquette dinner" as well a dinner at the President of the University's home. Field trips are also an integral part of the program, and they typically combine educational and community-building activities. The Clarkson School students may also participate in University organizations and clubs, including intercollegiate and intramural sports.

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

The cost of The Clarkson School is comparable to the cost of a year at Clarkson University. Merit and need-based financial aid is available to all accepted students. Please note that students who elect to remain concurrently enrolled in high school while attending The Clarkson School are not eligible for federal financial aid. Students have the option to either graduate in January or June from their former high school. Credit may be given for Advanced Placement or college courses taken in high school, dependent on scores or grades achieved.

Applying to the Clarkson School

The Admission Committee evaluates each applicant's credentials with great care. In general, applicants accepted to The Clarkson School demonstrate personal maturity, high levels of achievement in their academic work, and engagement in extra-curricular activities. In order to determine whether a student is ready for the early college experience at The Clarkson School, we consider academic preparation as evidenced in the cumulative GPA, rank in class, standardized test scores, and the rigor of the

curriculum the student has taken. Attention is also given to letters of recommendation as further evidence the student is prepared for the early college experience.

A completed application portfolio includes The Clarkson School Application, Essay, Secondary School Report, official high school transcript, standardized test scores, and at least two letters of recommendations. There is a $50 Application Fee, along with a $500 Enrollment Deposit for accepted students who wish to reserve a spot in the class.

All applicants are strongly encouraged to visit for an interview and campus tour. Students who interview with an Admission Representative for The Clarkson School will have their application fee waived.

The priority application deadline is June 1, but earlier application is highly recommended. Admission decisions are made on a rolling basis for students who have completed their Application Portfolio. Please note that all students are admitted to The Clarkson School subject to policies and procedures set forth in The Clarkson School Admission guidelines.

PEAK-Paths for Experiential and Applied Knowledge

Experiential education is increasingly recognized as a distinguishing feature of higher education institutions. Clarkson has long excelled in providing hands-on, applied learning opportunities, and has launched a dedicated center to help students realize and capitalize on the full breadth and impact of these experiences

Experiential learning is any opportunity that is not contained by the classroom and grading model, but a student still gains skills, expertise, and knowledge from. At Clarkson, experiential learning is not supplemental to the classroom. Students regularly participate in co-curricular experiences, such as research, competitive engineering challenges, making and machining -- a vast array of activities that develop skills, mastery, and expertise that become part of a student's professional identity they build throughout college. Learning in these environments is iterative and developmental: students apply concepts, test ideas, reflect, and improve. PEAK facilitates weaving experiences and skill development alongside classroom learning, providing assessment and demonstrable mastery of skills and knowledge, and mentoring and guidance for building an experiential portfolio as part of a student's academic credentials.

Assessment within applied and co-curricular learning environments emphasizes demonstrated *skill development*, increased mastery, and measurable growth rather than relying solely on traditional letter grades. The objective is not simply the completion of an experience, project, or activity, but clear evidence that students leave better prepared, more capable, and more confident than when they began.

Applied and integrated experiences at Clarkson are intentional learning opportunities in which students actively apply academic knowledge in real-world, project-based,

team-based, or practice-oriented contexts. These experiences are intentionally iterative, allowing students to try, reflect, improve, and reapply knowledge over time, rather than a one-and-done project or activity. These experiences are integrated when they are purposefully connected to curriculum, learning outcomes, and academic progression, rather than existing as isolated or optional activities.

Applied and integrated experiences may occur inside or alongside coursework and are characterized by:

- Active application of disciplinary knowledge
- Hands-on problem solving, design, research or practice
- Faculty engagement or intentional academic alignment
- Reflection, documentation, feedback and *iterative* skill development
- Repeated practice that contributes to a student's broader educational and professional trajectory

The PEAK ecosystem includes the Innovation Hub, located in the Andrew S. Schuler Educational Resources Center, as well as a network of collaborative learning environments that support innovation and experiential education. Together, these spaces, including flexible collaboration areas, the Dorf Makerspace, and the Makers' Loft, provide students with opportunities to apply classroom knowledge through hands-on design, making, prototyping, creative production, and interdisciplinary collaboration.

The Shipley Center for Innovation

The Shipley Center for Innovation, which is organized within the Office of Sponsored Research Services, is a University-wide resource dedicated to bringing Clarkson innovations to market via technology transfer, gaining recognition for the technology created by our faculty and students, and creating local jobs for graduating Clarkson students. The Center, which acts as the "business incubation" component of Clarkson Ignite, serves as an engine for economic development in the North Country by engaging in the creation of new enterprises that capitalize on emerging technologies.

In addition to providing general mentorship and services to Clarkson startups, the Shipley Center manages a thriving business incubator location on Clarkson's downtown campus. In 2018 the Shipley Center launched a new student accelerator program, The Cube, which provides dedicated student entrepreneurs with additional resources to help grow their idea into a profitable company. Shipley Center staff also conduct workshops and hold office hours to provide instruction in basic early-stage concepts such as business modeling and customer discovery.

Advising Services

University Advising is an important resource embedded in each of the Schools. Professional and faculty advisors provide key infrastructural support to ensure advising

consistency, equitable access, quality assurance, and continual assessment to meet strategic metrics in support of student achievement and persistence to graduation.

Pre-Health Professions Advising
Students receive advising to prepare them for acceptance into professional school for the health sciences through any major at Clarkson. For a more structured path into these professions, students can choose to complement their primary degree with a minor in Medicine and Health Care, which includes courses covering the interdisciplinary range of knowledge and perspectives necessary to be an effective health-practitioner. Regardless of the undergraduate path taken, Clarkson'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 program requirements and ensuring preparation for entrance into professional schools.

Clarkson offers an undergraduate Pre-OT advising program and a graduate degree program in Occupational Therapy, an undergraduate Pre-PT concentration and an entry level Doctor of Physical Therapy graduate degree program, and an undergraduate Pre-Physician Assistant advising program and a graduate degree in Physician Assistant Studies. For more information about these pre-health profession advising programs, please contact the Lewis School.

Pre-Health Tracks
Students intending to apply to professional school for any of the health sciences (including, but not limited to, Pre-Medicine, Pre-Dentistry, Pre-Veterinary Science, Pre-Optometry, Pre-Pharmacy, Pre-Chiropractic) will receive guidance in the planning and completion of required coursework and professional experience, in addition to assistance in submitting their final application. Clarkson provides committee letters to accompany applications when requested and also offers a preparatory course for students required to sit the MCAT. Students may contact healthadvising@clarkson.edu for further details.

Pre-Law Advising
Students from many degree programs at Clarkson have entered law school. Educators agree that success in a law career depends more upon the development of skills and habits conducive to legal reasoning than a student's specific major. Students planning to seek admission to law school should use elective courses to develop a broad cultural background; intellectual curiosity; and reading, writing and speaking skills. Students interested in law school may consider completing the Law Studies Minor. Courses in business, engineering, and science help develop analytical skills and the technical background is often helpful in understanding potential legal problems. Liberal Arts courses in the humanities and social sciences provide broad cultural background and the opportunity to develop analytical and verbal skills, since they entail a wide range of reading assignments, emphasize class discussion, and offer students the opportunity to prepare and criticize oral and written work.

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

Students admitted to Clarkson as first-year students can file a joint admission application with Franklin Pierce. When they complete their baccalaureate degree from Clarkson, they will be fully admitted to the Franklin Pierce Law Center providing they have a final undergraduate grade-point average of at least 3.25, an LSAT (Law School Admissions Test) score at or above the 75th percentile, and that they have not engaged in any intentional academic misconduct or criminal activity. Pre-law advising is available for students in all majors to help them develop academic programs that will serve as a strong foundation for future legal studies. A list of pre-law advisors is available through the Dean's Office in the School of Business at 315-268-2300. The advisors provide counseling and information about law schools and careers in law.

University Studies Advising

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. Students registered under University Studies are full-time matriculated undergraduate students who have yet to declare a specific major area of study. In all cases, a selection of an academic major will occur prior to the end of the freshman year.

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 advisors 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 activities that help to 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.

Individually Designed Bachelor of Professional Studies Program - BPS

In addition to the Bachelor of Science (BS) degree, Clarkson offers a Bachelor of Professional Studies degree, individualized major, providing 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. The BPS is offered both full-time or part-time and may be completed in residence, distance format, or a combination of both.

Non-Degree Students
An individual may enroll at Clarkson University for non-degree study on either a full-time or a part-time basis. Although such individuals are classified as non-matriculating, 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.

Undergraduate students who are enrolled as non-degree students may not earn a degree from the University without gaining admission to an undergraduate degree-granting program. Non-degree students may accumulate up to 15 hours of coursework credit while in this status and must matriculate into a Clarkson degree program to earn credit beyond this. Persons interested in admission as a non- degree student should contact Student Administrative Services. Non-degree students must obtain approval for courses they want to enroll in from the School of Arts and Sciences Professional Student Advisor. This approval is given on the basis of the student's academic preparation/background and personal goals. Students have no class standing and are not eligible to participate in any extracurricular activities involving intercollegiate competition.

Paramedic Program: Non-Degree Clock-Hour Program Certificate

Credential Awarded
Upon successfully completing this course, the student will be eligible to take the New York State Paramedic exam and the National Registry exam.

Program Description
The paramedic certificate program will provide students with the advanced knowledge and skills necessary to care for the sick and injured in the prehospital setting as a paramedic. This course does prepare entry-level paramedics in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains to enter the profession. Through performance of assessments and providing medical care, paramedics are able to recognize and treat a variety of ailments and trauma to the human body from the beginning of the healthcare continuum (outside the hospital). Their goal is to reduce the mortality and morbidity due to illness and injury. Paramedics are responsible and accountable to their patients, the emergency services field, and their peers.After successfully completing this course, the student will be eligible to take the New York State Paramedic exam and the National Registry exam. Once certified,

students will be field trained ready to utilize their skills in multiple positions within the healthcare field or help prepare students for future healthcare studies and careers.

Admission Requirements

- Submission of an application and one letter of reference
- At least 18 years of age
- High school diploma, GED, or an unofficial college transcript*
- Ability to read, write, and speak English*
- Be able to meet the minimum requirements for the cognitive and psychomotor components of the examination with reasonable and appropriate accommodations for those persons with documented disabilities, as required by the Americans with Disabilities Act (ADA)*
- Active New York EMT, AEMT or NYS Critical Care Technician certification upon enrollment*
- Copy of a current driver license or government-issued ID
- Submit clinical health requirements to Clarkson University Student Health no later than 30 days prior to the start of class.
- Computer access (with audio and video), with internet access, camera and microphone (capable of working with remote meetings, i.e. Zoom), email, and printer for homework

*All students will need to establish a FEMA student identification to participate in required online learning activities. The FEMA student ID can be obtained by going to https://cdp.dhs.gov/femasid.

Tuition and Fees

- Tuition is $10,600.00
- NREMT Written Exams (Post-course) $152.00
- NREMT Psychomotor Exam (if taken off-site) $250-$350

Program Length and Class Schedule

A 9-month program divided up into two parts. The first 4 ½ months is classroom every Monday, Tuesday, Thursday and Friday from 8:30 am till 4:30 pm. The second half of the program requires good coordination from the student but they should dedicate about 36-40 hours per week to plan for clinical and field time.

Refund Policy

Students who voluntarily withdraw from the program or who are unable to meet the academic requirements of the program and are asked to withdraw are eligible for a refund of tuition according to the following schedule:

- Within the first week of class: 80%
- Within the second week of class: 50%
- Within the third week of class: 30%

- Within the fourth week of class: 10%
- After the fourth week of class: 0%

Enrollment Process
Applicants must submit an application and meet the required deadlines to be eligible for a spot in the class. Deadlines can be found on the website: Paramedic Program | Clarkson University

Licensing or Regulatory Body
New York State Department of Health Bureau of Emergency Medical Services.

Location of Instruction
Clarkson University
Clarkson Hall, Room 3009
59 Main Street
Potsdam, NY 13699

Didactic Portion
Fourth week of August till 3rd week of December is class from 8:30 am till 4:30 pm on Monday, Tuesday, Thursday and Friday.

Required Courses
Introduction to Paramedicine - 119 hours
Paramedic Assessments - 77 hours
Paramedicine II - 63 hours with 35 hours of lab
Specialty Populations in Paramedicine - 77 hours
Advanced Trauma & Scene Operations - 119 hours

Clinical/Field Portion
First week of January till 3rd week of May. Good coordination and planning through the clinical coordinator and the student will place the student in a variety of venues to accomplish their skills, see patients and then later work under the guidance of a field training officer/preceptor in their field. These courses include:

Phase II Clinicals - 284 hours
Phase III Field & Capstone - 320 hours

Multidisciplinary Project and Multidisciplinary Team 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.

Summer Sessions
Clarkson offers summer sessions for undergraduates. A well-balanced offering of courses enables students to:

- Participate in programs such as Cooperative Education of study abroad and still graduate with their class;
- Enrich their academic program with electives that do not fit into the normal semester; or
- Take courses required for continuation in a specific program or transfer into a new area.

Three-Year Bachelor's Degree Option
Students who have graduated in the top ten percent of their high school class and who enroll in Business 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.

Major Fellowships and Awards
Clarkson's Coordination Service for Major Fellowships, Scholarships & Awards promotes the full potential of award candidates through a deep learning experience, developing scholars by way of one-on-one advising throughout the application process to facilitate rigorous intellectual and personal growth. Advising guides undergraduates, graduate students, and alumni through the major award application process and serves to leverage their high-quality research and scholarship education into transformative and life-long success within their careers and as citizens of their communities. This service provides outreach to all students and campus partners on available awards, such as Fulbright, Udal, Goldwater, and works in concert with Clarkson's globally-oriented faculty and staff to identify qualified students and awards suited to their future goals while facilitating national scholarship competitions and nomination processes on Clarkson's campus. This service adheres to the values of integrity, collaboration, respect, and fairness of professional fellowship advising as identified by The National Association of Fellowship Advisors (NAFA) Code of Ethics and views the major scholarship and fellowship advising experience as an integral part of the Clarkson transformative educational approach to engage the Clarkson community in promoting, participating in, and celebrating the excellence of our high-achieving students.

Student Achievement Services

The Student Achievement Services (SAS) Office serves as the University's central resource providing a suite of services related to course enrollment, academic records, grading, transcript requests, degree conferral, the academic calendar, student accounts, student billing, collections, and other essential student administrative processes.

In addition to transactional services, SAS staff conduct thorough reviews of matters involving student billing, financial aid, and academic progress. Through this integrated

approach, the office supports student retention, degree completion, and preparation for professional success.

The SAS team of professional specialists applies a concierge-style service model designed to guide students through course planning, connection to relevant University resources, and ensure timely access to information that supports academic, financial, and sustainable achievement.

Student Records

Grading System

Grades are reported in accordance with the following system:

A+	Passed with 4.000 quality points per credit hour
A	Passed with 4.000 quality points per credit hour
A-	Passed with 3.667 quality points per credit hour
B+	Passed with 3.334 quality points per credit hour
B	Passed with 3.000 quality points per credit hour
B-	Passed with 2.667 quality points per credit hour
C+	Passed with 2.334 quality points per credit hour
C	Passed with 2.000 quality points per credit hours
C-	Passed with 1.667 quality points per credit hours
D	Lowest passing grade with 1.000 quality points per credit hour
F	Failed with 0.000 quality points per credit hour

Therefore, a student who passes a 3-hour course with an A will earn 3 x 4.000 or 12.000 quality points; an A-, 3 x 3.667 quality points, etc. The quality-point average is determined by dividing the total number of earned quality points by the total number of credit hours taken at Clarkson on a traditional basis (A+, A-, B+, B …). Selected courses may be taken on the Pass/ No Credit system where P is passed, quality point average not affected; NC (no credit) on student's record for C-, D, or F grade in courses taken as Pass/No Credit, quality point average not affected.

Academic Standing

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.
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.
Academic Separation	A full-time undergraduate student on Academic Probation who fails to complete at least 12 credit hours with a current semester QPA of at least 2.000 will be separated from the University. Any undergraduate student who fails to attain a current semester QPA of at least 1.000 shall also be separated from the University.
To be continued, if separated	An undergraduate must request continuance by submitting a request for continuance form available in myCU. Former students who have been away from Clarkson for at least one semester following an academic separation must request readmission by submitting a Request for Readmission Following Separation form which can be found on the website at https://www.clarkson.edu/continuance-and-readmission one month before the beginning of the semester the student wishes to return to the Continuance and Readmission Review Committee at the following e-mail address: registrar@clarkson.edu. The student needs to complete all answers on the form and provide the program(s) of study the student wishes to be continued in. All cases on continuance require approval of the University's Continuance and Readmission Committee. If continued, a student's academic standing will be Academic Probation

The Academic Standing acquired at the end of the semester shall take effect at the beginning of the next summer school or semester in which the student enrolls.

Although a student's GPA may subsequently change due to courses being repeated or omitted, academic standing will not change; academic standing is based solely on the original semester performance. Further information may be found in the Undergraduate Regulations Section III-R, Academic Standing.

Undergraduate Academic Honors

An undergraduate student must be enrolled in at least 14 credits, of which 12 or more must be for letter grade, and receive no failing grades in order to qualify for the Dean's List or as a Presidential Scholar.

- A student is eligible for the academic Dean's List in any semester in which they earn at least a 3.250 quality-point average.
- A student is eligible for the Presidential Scholar List in any semester in which they earn at least a 3.800 quality-point average.
- Cross-registered course work is considered transfer credit and therefore credits taken cannot be used to qualify for Dean's List or Presidential Scholar Honors.

Degree with Distinction
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.

Double Major and Second Degree
A single Clarkson bachelor's degree with a double major is awarded when the student satisfies all curricular requirements for two Clarkson bachelor's degree programs, but does not qualify for a second degree.

A student can be awarded two Clarkson bachelor's degrees. A student qualifies for a second Clarkson bachelor's degree if he or she satisfies all degree requirements for two different Clarkson bachelor's degree programs and has a minimum of 150 credit hours, including at least 30 credit hours unique to each program.

Scholarships and Financial Assistance
Financial assistance from Clarkson may consist of scholarships, grants, loans, and employment, either singly or in combination. The Office of Financial Aid distributes aid in such a way as to help the maximum number of qualified students enroll and continue in school until graduation. Students will not have the entire cost of education met by Clarkson; every student will be expected to pursue other sources of aid outside the University. Students are encouraged to explore outside scholarship opportunities through their high school guidance offices as well as Federal, State, and alternative/private educational loan opportunities.

Prospective U.S. first year students who wish to be considered for aid from Clarkson must complete the following:

1. File a completed application for admission by January 15th of the final year of secondary school
2. File the free Application for Federal Student Aid (FAFSA) by February 1st. The preferred and easiest method to apply is online at https://studentaid.gov/h/apply-for-aid/fafsa. The paper form may be available from high school guidance offices. Early Decision Plan applicants will receive appropriate applications and instructions directly from Clarkson's Admission Office.

Prospective U.S. transfer students who wish to be considered for financial aid must apply for admission to Clarkson and submit the FAFSA form. Financial aid award

notices are issued to transfer students on a rolling basis beginning in early March for fall admission and in early November for spring admission.

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

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

Clarkson Need Based Awards

Clarkson Grant
Substantial funds are available for students who show above-average promise for success at Clarkson.

Award amounts vary according to the financial need and academic achievement. Awards for the academic year are made during the preceding spring by the Office of Financial Aid. Students must file the FAFSA each year to be considered for Clarkson grants.

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

Clarkson Merit Based Awards

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

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

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

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

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

Spirit of Innovation
This scholarship recognizes select high school seniors who have been a Spirit of Innovation participant at their high school. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by January 15.

SAGE Tuition Rewards (Saving and Growth for Education)
This is a unique, private college savings program. Tuition Rewards are discounts off tuition at participating colleges that represent the minimum scholarship that an eligible student will receive if attending a member college. A student receives Tuition Rewards from multiple "sponsors" (for example, parents and grandparents). A sponsor designates the tuition rewards to the student when she/he begins her/his senior year of high school. If the student does not use the tuition rewards, they are rolled back into the sponsor's account for use by other students.

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

Clarkson WACE National CO-OP Scholarship Program
Up to $6,000 per year scholarship based on academic record and scholarship application. Any major may apply. Submit the scholarship application online at https://www.waceinc.org/scholarship/index.html. Application is required. Early Decision Applications must be received by December 1 and Regular Decision Applications by January 15.

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

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

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

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

Phi Theta Kappa Scholarship
For transfer students only. Amounts vary.

Alpha Beta Gamma Scholarships
For transfer students only. Amounts vary.

Alumni Connection Awards

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

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

Alumni Legacy Award
If you indicate on your application for admission that you have a mother, father, grandmother, or grandfather who attended Clarkson, you may qualify for a $1,000 Alumni Legacy Scholarship. Only one scholarship will be granted regardless of how many qualifying family members you have.

Early Decision Incentive Scholarship
An additional $8,000 scholarship is available exclusively to Early Decision applicants. The scholarship is split evenly over 4 years/8 semesters of undergraduate study ($2,000 per year/$1,000 per semester).

To qualify students must apply to Clarkson via Early Decision Admission no later than December 1 of the senior year of high school. Be a new incoming freshmen applicant. Submit the Early Decision Admission deposit within 2 weeks of receiving the Financial Aid Award Notice (extenuating circumstances will be evaluated on a case by case basis).

Heintzelman Cape Cod Scholars Program
This program is for high achieving Cape Cod, Massachusetts high school students. The program provides a $50,000 scholarship split evenly over 4 years/8 semesters ($12,500 per year) of undergraduate study at Clarkson University. An application is required.

Clarkson Visit Scholarship
Clarkson offers a $1,000 renewable Visit scholarship to any student who has an official undergraduate admission visit to our Potsdam, NY campus. Visits must be completed no later than January 15 of the senior year of high school.

Qualifying visits include personalized visits set up directly through the Undergraduate Admissions Office, pre-arranged overnight admission visits for accepted students, Summer Visit Day, Fall Open House, Spring Accepted Students Day, and Group Visits to campus set up directly through the Undergraduate Admissions Office.

Conrad Foundation Scholarships

The Conrad Foundation and Clarkson University have partnered together to offer 2 scholarships:

1. Conrad Foundation Spirit of Innovation Scholarship - all Conrad Challenge participants with the exception of the finalists, are awarded $12,000 per year for a total value of $48,000 over four years.
2. The Conrad Challenge Scholarship - the finalists of the Conrad Challenge receive $15,000 per year, for a total value of $60,000 over four years.

To qualify you must apply for admission and have participated in at least one year of the Conrad Challenge. You must notify us of your participation by December 15th if you are applying for early decision admission and January 15th for regular decision admission.

For the Conrad Challenge Scholarship, you must have been named a finalist in the Conrad Challenge in any year. You may only receive one scholarship regardless of the number of years you have participated.

The Conrad Foundation is a nonprofit organization dedicated to promoting collaborative, student centered, real world-relevant learning that fosters innovation and entrepreneurship.

The Conrad Challenge is an international, team-based competition for students ages 13-18 to innovate new products and services that address global issues in one of six categories.

New York State Tuition Assistance Program (TAP)

New York State residents may be eligible for TAP. NYS Legal Residency is required. For dependent students, parent NYS residency is also required. Awards range from $1,000 to $5,665 annually for up to 8 semesters. No repayment is required. Students must file a FAFSA application and an Express TAP Application (ETA) at https://www.hesc.ny.gov/ each year to be considered for assistance.

Awards are based on multiple factors including family size, number of siblings attending college in NYS and NYS taxable income. Students are notified directly by the New York Higher Education Authority Corporation (HESC) of their awards. TAP can only be credited toward tuition charges. For students who receive other tuition only scholarships or grants, the total of TAP and the other aid cannot exceed the tuition charge. TAP awards are credited to the student account after certification of full-time enrollment status and confirmation of satisfactory academic progress. The standards

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

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

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

Calendar: Semester Program: Baccalaureate									
Program Prior being certified for this payment:									
1st	2nd	3rd	4th	5th	6th	7th	8th	9th**	10th**
A student must have accumulated this many credits:									
0	3	9	21	33	45	60	75	90	105
With at least this grade point average:									
0	1.1	1.2	1.3	2.0	2.0	2.0	2.0	2.0	2.0

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

Calendar: Semester Program: Baccalaureate									
Program Prior being certified for this payment:									
1st	2nd	3rd	4th	5th	6th	7th	8th	9th**	10th**
A student must have accumulated this many credits:									
0	6	15	27	39	51	66	81	96	111
With at least this grade point average:									
0	1.5	1.8	1.8	2.0	2.0	2.0	2.0	2.0	2.0

Other NYS Scholarships

New York State offers other scholarships in addition to TAP. Visit www.hesc.ny.gov for more information.

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

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

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

Supplemental Educational Opportunity Grant (SEOG)
This is a non-repayable federal grant, administered by the University and awarded to Pell Grant recipients. Students must submit a FAFSA each academic year. Awards are contingent based upon financial need and the availability of federal funding. Awards typically range from $300-$800 annually.

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

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

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

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

1. Type I : Tuition and mandatory fees for a full-time student
2. Type II : $18,000 towards tuition
3. Type III : $9,000 towards tuition
4. Type VI: $3,000 towards tuition
5. Type VIII: Competitive-based academic upgrade of a Type II, pays up to 80% of tuition and fees

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

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

Clarkson ROTC Incentive Scholarship (Army and Air Force)
Eligible ROTC Scholarship recipients may receive the Clarkson ROTC Incentive Scholarship. This scholarship is valued at the average cost of room and board for an academic year. Proceeds from the Clarkson ROTC Incentive Scholarship may only be used for housing and meal expenses.

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

In accordance with Title 38 US Code 3679 subsection (e), Clarkson University adopts the following additional provisions for any students using U.S. Department of Veterans Affairs (VA) Post 9/11 G.I. Bill® (Ch. 33) or Vocational Rehabilitation and Employment (Ch. 31) benefits, while payment to the institution is pending from the VA. Clarkson <u>will not:</u>

- Prevent, nor delay the student's enrollment;
- Assess a late penalty fee to the student;
- Require the student to secure alternative or additional funding;

- Deny the student access to any resources available to other students who have satisfied their tuition and fee bills to the institution, including but not limited to access to classes, libraries, or other institutional facilities.

However, to qualify for this provision, such students are required to provide a Certificate of Eligibility to the School Certifying Official no later than the first day of class.

Part-Time Student 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 Achievement Services is able to assist interested students find employment at the University.

Clarkson Payment Plan (PP)
Clarkson provides a 4-month payment plan per term, an option attractive to many families. The maximum amount to be financed is the total charges less estimated financial aid, and the minimum amount is $1,000 per term. The PP is available with no finance or interest charges, provided payments are made in accordance with the terms of the contract.

Clarkson Endowed, Sponsored, and Share Clarkson Scholarships
Various individuals, foundations and corporations have donated funds to establish scholarships for Clarkson students who meet certain criteria. Endowed scholarships provide assistance to students in perpetuity. Sponsored scholarships provide assistance on an annual basis. In general, these awards are made to incoming new students who show academic promise and leadership potential as well as continuing upper-class students who maintain exceptional cumulative grade point averages and meet other specific criteria. Recipients are selected by the Office of Financial Aid Scholarship Committee. Students are notified of the award by the financial aid package notification process (paper award letter for new students; on-line for continuing students) and amounts are credited to the student's account each semester.

Generally, students retain the award for the remainder of their undergraduate career at Clarkson to the extent of a four-year period, provided academic and financial aid satisfactory academic progress standards are maintained. Some scholarships have higher minimum GPA requirements. Scholarships established through the generosity of Clarkson benefactors are awarded with the understanding that there is a moral obligation for the student to repay the funds received. By accepting the grant award, the student accepts the moral responsibility to contribute to Clarkson when financially able to do so. By fulfilling this moral obligation, the student will help replenish the grant fund ensuring Clarkson will be able to offer institutional aid to future students. A list of endowed and sponsored scholarships follows:

Endowed Scholarships
Advani Endowed Scholarship Fund Ackermann

The Arthur, Dora and JoAnn L. Armani Endowed Scholarship Fund
Frank and Lee Augsbury Endowed Scholarship Fund
Azote Inc. Endowed Scholarship Fund
Gordon W. Babcock ’46 Endowed Scholarship Fund
Edward J. Barno ’77 Endowed Scholarship Fund
The Gordon C. "Stub" Baker ’27 Endowed Scholarship Fund
Raymond and Esther Baker Endowed Scholarship Fund
The Arnold and Helen Barben Endowed Scholarship Fund
The H. Douglas and Sara Barclay Endowed Scholarship Fund
Professor Robert Barr Endowment Scholarship
Charles E. Becker Memorial Scholarship Fund
John J. Bero, Sr. Memorial Scholarship Fund
Robert and Elaine Birrell Endowed Scholarship
Joseph I Bishop ’61 Endowed Scholarship
Bart Blaner '83 Endowed Scholarship
Professor Owen E. Brady III Endowed Scholarship
Andrea K. Bridge ’68 and John E. O’Beirne Endowed Presidential Scholarship
Bradford Broughton Technical Communications Endowed Scholarship Fund
Robert Brunner, Jr. '83 Memorial Endowed Scholarship Fund
William G. Brown '37 Memorial Endowed Scholarship Fund
Ernest and Evelyn Bulriss Endowed Scholarship
A. Douglas Burrow ’31 Endowed Scholarship
Purcell J. and Edith O. Brownell Endowed Scholarship
Cala Family Endowed Scholarship Fund
Janice L. Campbell Endowed Scholarship Fund
Robert '61 and Cynthia Campbell Hockey Endowment Scholarship Fund
Robert W. Carroll Jr. ’63 Graduate Endowed Scholarship Fund
Robert W. Carroll Jr. ’63 Undergraduate Endowed Scholarship Fund
James D. Cartin Memorial Scholarship Fund
Castrinovo Endowed Scholarship
Tony /54 and Carol Cecere Endowed Scholarship
Brian Y. Changlai MD, PhD '70, Mary C. Daye MD '71 and Brian A. Changlai MD Endowed Scholarship Fund
John D. and Helen Chapple Endowed Scholarship Fund
Siren R. Chudgar, MD ’96 and Jennifer L. Chudgar Endowed Scholarship
Fund Edwin C. Clark Memorial Scholarship Fund
Clarkson University General Scholarship Fund
Clarkson University Memorial Scholarship Fund
Clarkson University Parents Endowed Scholarship
Class of 1947 Endowed Scholarship Fund Class of 1963 Endowed Scholarship Fund
Frederick W. Cleveland North Country Merit Scholarship Fund
Thomas F. Clough ’62 Endowed Presidential Achievement Scholarship Fund
Doug and Jane Collette Endowed Scholarship Fund Wallace H. Coulter Endowed Scholarship
Wendall O. Covell Scholarship Fund
Kristin Bandy Craig Memorial Scholarship Fund
The Crane Family Endowed Scholarship Fund
Cristo Endowed Scholarship
Clarkson University Pep Band Alumni Association Endowed Scholarship
Ralph S. Damon Endowed Scholarship Fund David E. Davies ’77 Endowed Scholarship Fund

DeCrescenzo-Lupe Endowed Scholarship
Deneka Family Endowed Scholarship Fund
The Development Authority of the North Country (DANC) Endowed Scholarship Fund R. David Diederich ’64 Memorial Endowed Scholarship
Benson G. Diefendorf Endowed Scholarship
Louis ’54 and Joan Dino Endowed Scholarship
James L. Dohr Accounting Scholarship Fund Dolphin Legacy Endowed Scholarship
Brendan Donohue ’84 Memorial Endowed Scholarship Fund
Richard C. ’55 and Joy M. Dorf Endowed Scholarship Fund
Glendon '79 and Margaret Duclos Endowed Scholarship
John M. ’59 and Joyce A. Eikenberg Endowed Scholarship
Dave ’69 M’75 and Debi Elkins Scholarship Endowed Fund
Arthur ’47 and Dorothy Engle Distinguished Scholarship Fund
Emerson Foundation Matching Grant for Endowed Presidential Scholarships Allen ’44 and Kathleen Fales Endowed Scholarship
Famigghia Castronovo/Carrington Endowed Scholarship
Daniel P. Fellegara ’06 Memorial Endowed Scholarship
James E. Fassett Endowed Scholarship Fund
The Samuel B. Feitelberg Physical Therapy Fellowship Endowed Scholarship
Alan T. Finn '87 Memorial 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
George Floyd Memorial Scholarship
John F. Frazier ’38 & L.K. Sillcox Endowed Scholarship
J. Ronald Frazer ’45 Endowed Fellowship
Stig E. Friberg Undergraduate Research Endowment Award
Walter Fuss ’51 Endowed Scholarship for Civil Engineering
Phil Garda ’67 Memorial Endowed Scholarship Fund
Nelson Gibbs '59 Endowed Scholarship
Alan W. Gibney ’69 Endowed Scholarship Fund
FLIR Systems, Inc. Endowed Scholarship Fund
Fred and Betsy Garry Endowed Scholarship Fund
William B. Gero Memorial Scholarship Fund
Alan W. Gibney ’69 Endowed Scholarship
Christopher W. Gilmore ’88 Memorial Endowed Scholarship
The Ruth and Sandy ’54 Ginsberg Endowed Scholarship Fund
Giromini Family Endowed Scholarship
The Joel ’57 and Lynda Goldschein Endowed Scholarship Fund
Frank C. Goodrich Memorial Endowed Scholarship Fund
George A. Gray Endowed Fellowship Fund
Karl A. Greenhagle '69 Endowed Scholarship Fund
Anna and Frank Greenwall Scholarship Fund
Frank E. Gutmann Memorial Scholarship Fund
Margaret Van Hamlin Haddad Scholarship Fund
Steven W. ’68 and Laurie Hafener Endowed Scholarship Fund
David L. Hall ’65, ’68 Memorial Endowed Scholarship
Erwin C. ’48 and Jeanne Hamm Scholarship Fund
Hammam Endowed Scholarship Terry O. Harden ’76 Memorial Scholarship Fund

Frank M. Hardiman Scholarship Fund
Harrison-Campbell Endowed Scholarship Fund
The Lynn P. Harrison, III and Tonya P. Harrison Endowed Scholarship Fund
William P. Harrison Endowed Scholarship Fund
Blayne Hartman '75 Endowed Scholarship
Ralph E. ’55 and Solita Hawes Endowed Scholarship Fund
David ’83 and Sheryl Heacock Endowed Scholarship for Engineering and Management
Charles W. Hearl ’51 Endowed Scholarship Fund
Steven Hearl ’80 Endowed Scholarship for Civil and Environmental Engineering
William Randolph Hearst Endowed Scholarship Fund
Richard Hemphill '67 Endowed Scholarship
Ellen Herrick Endowed Scholarship Fund
Barbara Hewett Lowers Endowed Scholarship
Mildred Dear Hill and Robert R. Hill ’48 Endowed Scholarship
George O. and Clara E. Hodge Endowed Scholarship Fund
Bruce ’69 and Suzanne Hoffman Endowed Scholarship
David L. ’75 and SaraAnne Baker Hopkins Endowed Scholarship
Harry and Florence P. Hull and Katherine Hull Endowed Scholarship Fund
William ’61 and Elaine Hurd Endowed Scholarship Fund
Albert C. and Ella W. Hyde Endowed Scholarship
Michael Lewis Jaeger Memorial Endowed Scholarship
Clarke H. Joy ’29 Memorial Endowed Scholarship
Sol Kaplan Scholarship Fund/ The Kardan Scholarship Fund
Peter A. Klein ’87 Memorial Endowed Scholarship
The Gary F. Kelly Endowed Scholarship Fund
Kent Family Endowed Scholarship
Kenyon Endowed Scholarship
Kretis Family Endowed Scholarship
Lally Endowed Scholarship
William H. ’53 and Beverly Lane Endowed Scholarship Fund
William H. Lane Incorporated Endowed Scholarship Fund
Earl L. LaPointe ’22 Memorial Scholarship Fund
Sylvain L. Larose '75 Endowed Hockey Scholarship Fund
Kristine M. Layn Endowed Scholarship Fund
The Howard E. ’48 and Mary Lou Lechler Endowed Scholarship
Cecile and Herman Lieberman Endowed Scholarship Fund
Joseph ’82 and Rachel Loo Endowed Scholarship
Barbara Hewett Lowers Endowed Scholarship Fund
The Norman ’51 and Pat Maggione Endowed Scholarship
Jason Marsden ’91 Endowed Scholarship
Egon Matijevic´ Endowed Chemistry Scholarship Fund
Peter M. Mayo ’71 Endowed Scholarship
Theodore Sr. and Wanda McWharf Endowed Scholarship
Arthur, Eleanor and Jack Mietz Endowed Scholarship Fund
Gus’82 and Magda Mininberg Endowed Scholarship
Charles T. Mosier ’72 Memorial Endowed Scholarship Fund
Steve Neely Endowed Memorial Scholarship Fund
Nelson Endowed Scholarship
Theodore ’56 and Priscilla Nelson Endowed Honors Scholarship

J. Paul Nessler ’69 Memorial Endowed Scholarship Fund
The Ronald R. "Monk" Neugold ’52 Endowed Scholarship Fund
The Newell Family Endowed Scholarships
Edgar A. Newell Endowed Scholarship Fund
Jean S. Newell Society of Women Engineers Endowed Scholarship Fund
W. Allan Newell Endowed Scholarship Fund
New York State Federation of Home Bureaus (St. Lawrence County) Scholarship Fund
New York State Federation of Home Bureaus (Louise Villeneuve McMahon) Scholarship Fund
Newkofsky Endowed Scholarship
Lisa Niles ’78 Memorial Endowed Scholarship
Nathan and Janet Owen Endowed Scholarship Fund
Anthony J. Palumbo '60, and Phyllis A. Palumbo Chemical Engineering Endowed Scholarship
James P. Papayanakos Scholarship
Kenneth R. and Margaret K. Parker Endowed Scholarship Fund
Matt and Prue Pecorella Endowed Scholarship
Sara Snell Petersen/W. Hollis Petersen Endowed Scholarship Fund
The Dick Pratt Endowed Prize Fund (PEP Fund) established by Phyllis A. Palumbo and Anthony J. Palumbo, M.D. (1960), and Family
Ledyard H. Pfund ’40 Presidential Achievement Award Scholarship Fund
Leo ’25 and Gertrude Ploof Endowed Scholarship Fund
Harold A. and Dorothy Putnam Endowed Scholarship Fund
Peter Radding ’63 Memorial Endowed Scholarship
George H. Randall ’16 and Paul W. Randall ’92 Endowed Scholarship Fund
Stephen C. Redding ’63 Memorial Scholarship Fund
Kyle G. Reichley ’85 Memorial Endowed Scholarship
Gerald ’58 and Judith Reinman Endowed Scholarship Fund
Relyea Endowed Chemistry Scholarship
Relyea Endowed Engineering Scholarship
The Ernest ’42 and Constance Richmond Memorial Endowed Scholarship Fund
Ridings Family Endowed Scholarship Fund
Robbins "I Pay it Forward" Endowed Scholarship
Elwyn J. Rodee Endowed Scholarship Fund
Paul Rodgers Memorial Endowed Scholarship
William J. Rowley Endowed Scholarship Fund
Sackett Endowed Scholarship
Willard G. '53 and Barbara B. Shafer Endowed Scholarship
Francis E. ’63 and Mona K. Sage Endowed Scholarship Fund
Sapia '58 Endowed Scholarship
Albert L. and Mary S. Sayer Endowed Scholarship Fund
Joseph Scaturro Endowed Scholarship Fund
Fred Schoenhut '78 Endowed Scholarship Fund for Hockey Ralph and Jessie Scott Endowed Scholarship Fund
Thomas ’70 and Gayle Sette Scholarship Endowment
Willard G. ’53 and Barbara B Shafer Endowed Scholarship Fund
Shelly Electric Endowed Scholarship Fund
Thomas E. Simpkins '30 Endowed Scholarship Fund
John and Verna Sherrick Endowed Scholarship
William ’70 and Sandra Shusda Endowed Scholarship
F. Carlton and Ethel B. Simpson Endowed Memorial Scholarship Fund

Sisson Family Endowed Scholarship Fund
Jay P. Smee ’52 Endowed Scholarship Fund
Barry P. Smith ’65 Endowed Scholarship Fund
James T. and Grace B. Smith Endowed Scholarship Fund
William D. ’54 and Shirley Smith Endowed Scholarship Fund
John Ben Snow Foundation Endowed Scholarship
George J. Stanley Endowed Scholarship Fund
Bill ’64 and Sherrie Taylor Endowed Scholarship
Charles Thomas ’63 Adirondack Endowed Scholarship
The Thompson Family Endowed Scholarship Fund
Tilling Endowed Scholarship
Fay ’62 & Nadine Tolman Endowed Scholarship Fund
Mel Tomalty '61 Endowed Scholarship
Toole-O'Donnell Families and MVW Endowed Scholarship Fund
Earle E. Towlson ’27 Memorial Endowed Scholarship Fund
Donna and Steve Tritman '68 Endowed Scholarship
Tubbs Family Endowment
Edward F. Tucker Endowed Scholarship Fund
Merton Van Sant/Industrial Development Agency Endowed Scholarship Fund
David A. Walsh ’67 Endowed Scholarship Fund
Melissa A. Walsh ’03, ’05 Memorial Endowed Scholarship
Mr. and Mrs. Robert N. Wagner Scholarship Fund
The Dr. John ’73 and Roberta Wasenko and Family School of Engineering Endowed Scholarship
The Dr. John ’73 and Roberta Wasenko and Family Health Sciences Endowed Scholarship Fund
John ’52 and Jane Ward Endowed Scholarship
Weimer Endowed Scholarship
Dr. Mark W. and Beulah Welch Endowed Scholarship Fund
John “Jack” S. ’54 and Norma Welch Memorial Endowed Scholarship
Richard and Gina Weniger Memorial Endowed Scholarship
J.R. Weston Endowed Scholarship Fund
Stanley '57 and Viola Wetreich Endowed Scholarship
Carol Wicks '80 Endowed Scholarship
Allen '63 and Barbara Winegard Endowed Scholarship
James P. Witkowski Endowed Scholarship
Nancy E. and James E. Wood ’64 Endowed Scholarship Fund
MK Woods ’82 Endowed Scholarship Fund
Clarence F. Wright Endowed Memorial Scholarship Fund
Eugene R. Yeager Jr. ’75 Memorial Scholarship Fund
Yentzer Endowed Scholarship Fund
Terry Yurkiewicz ’66 Memorial Hockey Endowed
Zieger Endowed Scholarship Fund
Zuman Award in Chemistry

Sponsored Scholarships

AAA Ehrlich Sponsored Scholarship
Kenneth R. Baker Family Engineering Sponsored Scholarship
Barrett Paving CEM Sponsored Scholarship
Bechtel Foundation Sponsored Scholarship

Boothill Stepping Stone Scholarship
Buyers Sponsored Scholarship
Donald Clark Sponsored Scholarship
Clarkson Club Sponsored Scholarship
Clarkson University General Sponsored Scholarship
Colden Corporation Sponsored Scholarship
James A. Comstock Memorial Sponsored Scholarship
Bill Cotter ’73 Sponsored Scholarship
Kristin Bandy Craig Memorial Sponsored Scholarship
Crane Fund for Women and Children Sponsored Scholarship
DDS Companies Sponsored Scholarship
Delta Upsilon Sponsored Scholarship
Daniel P. Fellegara '06 Memorial Sponsored Scholarship
Elkins Sponsored Scholarship
The Brothers of Delta Tau Tau Scholarship in memory of Michael Fahrenkopf ‘11
Stig E. Friberg Award for Undergraduate Research
Sponsored Scholarship Giromini Family
Glens Falls Contractors Association Sponsored Scholarship
Kenyon Sponsored Scholarship
NewPage Corporation Sponsored Scholarship
Edwin E. Hatch Foundation Sponsored Scholarship
Honors Program Sponsored Scholarship
Hurd Sponsored Scholarship
Ralph A. Janaro Memorial Sponsored Scholarship
Lally Sponsored Scholarship
Michael Lewis Jaeger Memorial Sponsored Scholarship
Andrew Joseph Jankowiak Sponsored Scholarship
Kathleen Kafka and Reed Phillips Memorial Sponsored Scholarship
Key Bank Sponsored Scholarship
Krigman '63 MME Undergraduate Research Grant Fund Sponsored Scholarship
Joel Lerich '62 Memorial Sponsored Scholarship
Stuart Lott '70 Sponsored Scholarship
Edward T. Misiaszek Sponsored Scholarship
Miss New York of the North Country Sponsored Scholarship
National Starch & Chemical Company Sponsored Scholarship
Steve Neely Memorial Sponsored Scholarship
North Country Friends Sponsored Scholarship
O'Brien & Gere Sponsored Scholarship
Karen Mazzella Olmstead ’84 Memorial Sponsored Scholarship
N I Rea Sponsored Scholarship
Gerald '58 and Judith Reinman Sponsored Scholarship
Ruston Paving Company CEM Sponsored Scholarship
Sage Scholars North Country Scholarship
David Scaringe '01 Memorial Sponsored Scholarship
Todd Stanley Searfoss '79 Memorial Sponsored Scholarship
Sprout Foundation Sponsored Scholarship
Sprout Foundation Sponsored Scholarship #2
Stantec Consulting Services Incorporated Sponsored Scholarship
James P. Witkowski Sponsored Scholarship

Norman Westerman Thurston '63 Sponsored Scholarship
Wildwood Foundation Sponsored Scholarship
Wyeth-Ayerst Sponsored Scholarship

Share Clarkson Direct Scholarships

Gilbert and Ruth Adams Class of 2017 Share Clarkson Direct Scholarship
Gordon Boncke '47 Class of 2016 Share Clarkson Direct Scholarship
Bruce G. Boncke ’71 Class of 2019 Share Clarkson Direct Scholarship
David William ’88 and Kristina Art Buchwald Share Clarkson Scholarship
Bouchard/Mountjoy Class of 2013 and 2018 Share Clarkson Direct Scholarship
Amy Castronova '04 Class of 2014 and 2019 Share Clarkson Direct Scholarship
Cecere Share Clarkson Scholarship
Bill ’73 and Carol Cotter Share Clarkson Scholarship
James M. Coughlin ’53 Share Clarkson Direct Scholarship
Richard J. Creek '66 Share Clarkson Class of 2023
Sean '89 and Lori '89 Donohoe class of 2013 and 2018 Share Clarkson Direct Scholarship
Richard Dwyer '77 Share Clarkson Scholarship 2023
William V. ’83 and Susan Fiacco Share Clarkson Scholarship
Richard Fiesinger ’67, M’68 Share Clarkson Scholarship
Goldman Class of 2013 Share Clarkson Direct Scholarship
Joel '57 and Lynda Goldschein Class of 2014 and 2018 Share Clarkson Direct Scholarship
Fred ’61 and Selma Goldstein Share Clarkson Scholarship
Jim Greenfield ’64 M’66 Share Clarkson Scholarship
Elinore and Beecher '50 Greenman Classes of 2014, 2015, 2016, 2017 and 2018 Share Clarkson Direct Scholarship
Rosemary A. Harrington Class of 2015 Share Clarkson Direct Scholarship
W. Jon Harrington Class of 2015 Share Clarkson Direct Scholarship
M. Hubbard Construction, Inc. Classes of 2013 and 2016 Share Direct Clarkson Scholarship
Jacobsen Family Share Clarkson Scholarship in Honor of Robert Jacobsen '66
Jolyn Foundation Class of 2013, 2014 and 2018 Share Clarkson Direct Scholarship
Gerald ’61 and Mary Kilanoski Share Clarkson Scholarship
Donald B. Kloeber '71 Class of 2023 Share Clarkson Scholarship
Matthew J. Maslyn '77 Class of 2015 Share Clarkson Direct Scholarship
Northern Lights Share Clarkson Scholarship
Francis ’85 and Christine Peverly Family Share Clarkson Scholarship
David D. Reh '62 Classes of 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022 Share Clarkson Direct Scholarship
Reinman Share Clarkson Scholarship
George Schreiber '64 Share Clarkson 2023
John and Verna Sherrick Class of 2013 and 2018 Share Clarkson Direct Scholarship
Richard ’60 and Nancy Siewert, P’ 95 Share Clarkson Scholarship
Robert '74 and Julia Storms Class of 2015 and 2018 Share Clarkson Direct
Frederick W. Swanton Jr. ’68 Share Clarkson Scholarship
Scholarship Structural Associates, Inc. Class of 2013 Share Clarkson Direct Scholarship
Alissa, Donna and Steven M. '68 Tritman Class of 2017 and 2023 Share Clarkson Direct Scholarship
Susan J. and Ellsworth F. '65 Vines Class of 2015 Share Clarkson Direct Scholarship
Rita Fadale Wagner Class of 2013 Share Clarkson Direct Scholarship

David A. Walsh '67 Class of 2023 Share Clarkson Scholarship
In Honor of Katherine H. Wears Class of 2019 Share Clarkson Direct Scholarship
Wolfley Family Share Clarkson Direct Scholarship

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

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

Prize awards
Raymond R. Andrews Achievement Award
Gregory P. Arnold ’73 Memorial Endowed Prize
The Cathy Avadikian and David Wells Award in Engineering and Management
Jerome D. Barnum Memorial Award
Randy Brockway ’91 Memorial Award
Stephen Brunauer Memorial Award for Excellence in Chemistry CEE Junior Faculty Endowed Prize Fund
Charles Martin Clark Award
Clarkson Alumni Frederica Clarkson Award
Clarkson Alumni Levinus Clarkson Award

Vern Clute Memorial Academic Achievement Award
Communication & Media Sophomore Award
Communication & Media Junior Award
Communication & Media Senior Award
Major William Coleman Award
Francis DeLucia '66 Endowed Prize Fund Digital
Arts & Sciences Sophomore Award
Digital Arts & Sciences Junior or Rising Senior Award
Francis Dineen Award
The Dean William J. Farrisee Memorial Award
John W. Graham Jr. Leadership Award
George A. Gray Endowed Fellowship
Doc Jones Prize Fund
Elizabeth A. Kissel ’90 Endowed Memorial Award
The John H. Koerner, Jr. ’76 Intramural Award
The John H. Koerner, Jr. ’76 Memorial Award
The Martin M. Koshar ’55 Endowed Prize
Richard Brady Legro ’82 Memorial Award
Albert D. Merrill ’13 Endowed Faculty Prize
Dr. Carl Michel Award
Mike Morrison ’89 Memorial Coaches Award
Fran Neragin Award
Perkins Family Memorial Award
Dick Pratt Endowed Prize Fund
The Norman L. Rea Award
Kyle G. Reichey ’85 Memorial Alumni Award for Excellence in Business Intelligence and Data Analytics
The Shirley Rogers Residence Hall Advisor Award
Robert E. Rosati ’52 Award for Excellence in Mechanical Engineering
Keith M. Russ Memorial Award
John B. Russell Memorial Prize
Ilse J. Shaw School of Management Freshman Award
Ilse J. Shaw School of Management Sophomore Award
Sigurds Arajs Memorial Award STAFDA Outstanding Junior Award
STAFDA Outstanding Senior Award
Arthur L. Straub Memorial Award
R. Shankar Subramanian Prize for Outstanding Scholarly Achievement in Chemical Engineering
The Peter ’90 and Chandra Wargo Digital Arts & Sciences Award
Arthur J. Wells Prize
Martin A. Welt ’54 Family Awards Loans

William D. Ford Federal Direct Loan

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

Aggregate loan limits for subsidized loans for all undergraduate students may not exceed $23,000.

Clarkson Loan Funds
Clarkson has 23 separate loan funds from which students may borrow up to $4,000 in any semester, subject to availability and borrower qualification. These loans are available through Student Achievement Services. Repayment begins nine months after a student's enrollment at Clarkson terminates. A list of loan funds follows:

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

Satisfactory Academic Progress for Federal and Institutional Financial Aid
The US Department of Education has issued Satisfactory Academic Progress (SAP) requirements effective July 1, 2011. These requirements are part of the Program Integrity and Final Regulations issued on October 29, 2010.

The revised Satisfactory Academic Progress (SAP) policy that follows includes the requirements of the Program Integrity Regulations and is effective at the beginning of the Fall 2011 term. Revisions to this policy were made on March 13, 2020 and are effective with the SAP evaluation that will be conducted at the end of the Spring 2020 semester and moving forward.

Federal regulations require institutions to evaluate Financial Aid SAP at the end of the fall, spring, and summer terms. Both full-time and part-time enrollment status must be evaluated as well as periods of enrollment during which the student did not receive financial aid. All students are encouraged to become familiar with the policy as eligibility for federal and institutional aid may be an important factor in being able to continue one's education at Clarkson. Students must maintain SAP to retain eligibility for federal and institutional financial aid. SAP comprises three areas as required by federal regulations: a student must complete their degree within a specified period, demonstrate PACE by earning a minimum percentage of attempted credit hours and maintain a cumulative GPA that is consistent with meeting graduation requirements. Some institutional scholarships (i.e. Honors, Endowed and Sponsored Scholarships) may require higher academic achievement than the standards outlined in this section. Students with questions regarding specific scholarships are advised to contact their Student Achievement Specialist.

Satisfactory Academic Progress Standards for Financial Aid are based on a student's cumulative record and are separate from Academic Standing determinations. A student who is on academic warning, academic probation, or has been approved to continue after separation retains financial aid eligibility provided the Satisfactory Academic Progress Standards for Financial Aid (detailed below) are met.

1. Maximum Time Frame for Degree Completion
    a. Federal Regulations specify that a student must complete his/ her degree within 150% of the published length of the program. The maximum time frame at Clarkson is measured in attempted hours. A student must earn 120 credits to receive a Bachelor's degree. Therefore, to retain financial aid eligibility, the maximum time frame to complete the program for full time students cannot exceed 180 attempted credit hours, 6 years, or 12 terms, whichever comes first.
    b. A part-time student cannot exceed 180 attempted credit hours. A student pursuing a second Bachelor's degree with the first Bachelor's degree must complete the additional required coursework within the 150% time frame period. Effective March 13, 2020 for the SAP evaluation period that will occur at the end of the Spring 2020 semester and going forward, a student may appeal the Maximum Time Frame requirement based on extenuating circumstances.
    c. Credits counted in the maximum time are all attempted credits and include:
        i. Earned hours - Passed (A-D), Pass (P)
        ii. Repeated courses - All attempts (see repeated course section below)
        iii. Withdrawal - Maximum time frame regulations do not allow for the exclusion of courses in which a student has remained past the drop period and earned a grade of "W"

iv. Failure - F
v. Incomplete - I
vi. All accepted transfer - T
vii. All courses attempted at Clarkson, even if they are not used to meet degree requirements.

2. Pace Standards PACE is defined by federal regulations as steady progress towards degree completion within the 150% time frame. Clarkson is required to measure a student's PACE as a percentage as indicated below:
    a. A minimum percentage of attempted credit hours must be earned every semester
        i. Cumulative number of earned hours
        ii. Cumulative number of attempted hours
    b. Earned credit hours for PACE:
        i. Grades of A, B, C, D or P (with credit)
        ii. All accepted transfer credits and (including consortium agreements & Study Abroad Courses) & Test credits (T)
    c. Attempted credit hours include:
        i. Earned hours - Passed (A-D), Pass (P)
        ii. Repeated courses - All attempted (see repeated course section below)
        iii. Withdrawal - "LW" and "W". PACE regulations do not allow for the exclusion of courses in which a student has remained past the drop period and earned a grade of "W".
        iv. Failure - F
        v. Incomplete - I
        vi. All accepted transfer - T
    d. The chart below indicates the PACE required to maintain Satisfactory Academic Progress for Financial Aid. New transfer students are placed on the chart based on the number of transfer credits that have been accepted by Clarkson.

Cumulative Attempted Credit Hours	**PACE – Minimum required percentage of earned credit hours divided by attempted credit hours**
0-18	**50%**
19-36	**50%**
37-54	**67%**
55-72	**67%**
73-180	**67%**

3. Qualitative Standards – Cumulative Grade Point Average (GPA)
    a. Federal regulations require the student to meet minimum Cumulative GPA standards to retain eligibility for aid. As indicated in the following chart, after 4 semesters a student must maintain a 2.00 cumulative GPA to be eligible for financial aid.
    b. Grades earned in prior attempts of repeated courses are excluded from the GPA calculation. The chart below indicates the GPA required to maintain Satisfactory Academic Progress for Financial Aid.
    c. Transfer students are placed on the GPA chart based on the number of semesters they have attended Clarkson

End of semester	Minimum GPA required at the end of semester
First	**1.00**
Second	**1.40**
Third	**1.75**
Fourth-Twelfth	**2.00**

Warning Term
A student who does not meet both the PACE and GPA standards is not making Satisfactory Academic Progress for Financial Aid. The student is notified by the Financial Aid Office that he/she is on Financial Aid Warning for the subsequent term of attendance. During the Financial Aid Warning Term, the student retains eligibility for both federal and institutional aid.

A student who meets both the PACE and GPA standards at the conclusion of the Financial Aid Warning Term is again meeting Satisfactory Academic Progress for Financial Aid and is eligible for federal and institutional aid for the subsequent term of attendance.

A student who does not meet both the PACE and GPA standards at the conclusion of the Financial Aid Warning Term is notified by the Financial Aid Office that he/she is not making Satisfactory Academic Progress for Financial Aid and is ineligible for federal and institutional aid. The student is also notified of the Appeal Process. A student may have more than one Financial Aid Warning Term; however they may not be consecutive.

Appeal Process
A student may file an appeal based on catastrophic or extraordinary circumstances “beyond the student’s control,” such as personal illness or injury, or the death, illness or injury of a family member, relative or close personal friend. A student is allowed to appeal once based on a change of major.

Students who have been disqualified from aid are notified at the end of the term or when readmitted regarding how to begin the appeal process. It is recommended that students submit the appeal within 3 weeks of notification of their disqualified status.

There are three required elements of an appeal:

1. A written statement from the student – Federal regulations require a student who is requesting an appeal to submit a written statement explaining: Why the student was not able to meet the satisfactory academic progress standards. What has changed that will allow the student to meet the standards at the conclusion of the academic plan (See #3 below)
2. Supporting documentation – A student requesting an appeal must submit supporting documentation such as physician's written statement to substantiate illness from clergy, family member(s), or other third party familiar with the student's situation, or a written statement from an academic advisor, professor, or counselor
3. Development of an Academic Plan – As part of the appeal, the student must work with a Program Administrator to develop an academic plan. The academic plan is designed to enable the student to meet both PACE and GPA standards at the conclusion of the plan. An academic plan may entail one or more terms and includes specific requirements the student must achieve. Although the student is not making satisfactory academic progress, federal and institutional aid is reinstated on a term by term basis.

A student filing an appeal must authorize the release of pertinent information as part of an investigation of the facts concerning the failure to meet satisfactory academic progress standards.

Each appeal will be investigated and reviewed by the Dean of Students in conjunction with faculty members from the student's program of study as well as other Clarkson University personnel as necessary.

The Dean of Students will make a recommendation to approve or deny the appeal and notify the Office of Financial Aid. The Director of Financial Aid will make the final decision to approve or deny the appeal.

The Office of Financial Aid will notify the student by letter or e-mail of the final decision. Upon approval of an appeal including an academic plan the student is placed on Financial Aid Probation for the next term of attendance.
At the end of the Financial Aid Probationary term, the student will be evaluated according to the requirements specified in the academic plan. Provided that the student is successfully meeting the conditions of the plan, the student may continue to receive federal and institutional aid for the subsequent term. In cases in which an academic plan includes more than one term, the student will be evaluated at the end of each term.

If the student continues to meet the requirements of the plan, the student remains eligible for financial aid.

A student who does not meet the conditions of the academic plan or whose appeal is denied is no longer eligible for federal and institutional aid at Clarkson until bother standards are met. A student who is ineligible for aid may regain eligibility by:

1. Taking courses at Clarkson without receiving federal or institutional aid that raises their GPA to the minimum standards and/ or increases earned hours to the minimum PACE requirements. The students must contact their SAS representative at the end of the term to request an evaluation of their financial aid, satisfactory academic progress standing and financial aid eligibility.
2. Transferring in course credit – A transferred course must count toward degree requirements. A minimum of a "C" is required for transfer credits. Transfer credits are included in both attempted and earned hours. Transfer credits for repeated courses may have an effect on the GPA. Transfer credits for non-repeated courses have no effect on the GPA.

SUBSEQUENT APPEALS - effective March 13, 2020

A student who does not meet the requirements of their academic plan, is permitted to submit a subsequent appeal. The appeal must be based on new extenuating circumstances that have occurred during the current semester and are outside of the student's control.

Repeated Courses

Courses in which a grade of F or W is recorded on a student's transcript may be repeated a maximum of 2 times. The earned hours are counted once. The attempted hours are counted each time and may be used to establish full time enrollment status.

The student may receive financial aid for these course repeats. Courses in which a student has previously earned credit (A, B, C, or D) Federal regulations allow a student to repeat a course once if the student previously earned credit for the course. The repeated course(s) will be used toward full time enrollment status and are eligible for financial aid. Courses repeated more than once will not count toward enrollment status and are ineligible for financial aid. More than one course may be repeated per term. This does not apply to students receiving International Scholarships.

The attempted hours are counted each time. The earned hours are counted once. The grade from the prior completion(s) is excluded from the GPA calculation.

Academic Grade Changes and Incompletes

For purposes of determining SAP for federal and institutional financial aid, all grade changers including incompletes must be submitted to SAS prior to the 10th day of the subsequent term. This deadline may differ from academic program guidelines. The student must contact their SAS Specialist to request a recalculation of SAP.

Readmitted Students
A student who has left the University for one or more terms and has been readmitted will have Satisfactory Academic Progress for Financial Aid reviewed at the time of readmission. Transfer credits must be received prior to the 10th day of the term in order to be included in the SAP determination.

If the student is determined to be meeting SAP, federal and institutional aid will be offered provided the student meets all other eligibility requirements.

If it is determined that the student is not meeting SAP, the student will be notified by letter of his/ her status and the appeal process. There is no guarantee that a readmitted student will receive the same type or amount of institutional aid they received during prior terms.

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

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

The law specifies how Clarkson must determine the amount of Title IV program assistance a student has earned as of the date of the withdrawal. The Title IV programs that are covered by this law are: Federal Pell Grants, Iraq and Afghanistan Service Grants, Federal Direct Student Loans, PLUS Loans, Federal Supplemental Educational Opportunity Grants (FSEOG) and Federal Perkins Loans.

When a student withdraws from the university during the term, the amount of Title IV program assistance that the student has earned up to that point in time is determined by a specific formula. If the student received less assistance than the amount that earned, the student may be able to receive those additional funds. If the student received more assistance than earned, the excess funds must be returned to the US Department of Education.

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

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

The Federal Title IV Refund Procedure is separate and distinct from the University's Refund Policy for tuition, fees and other charges at Clarkson. Therefore, a student may still owe funds to cover unpaid institutional charges.

Clarkson scholarships, grants and loans may be reduced based on individual circumstances, the date of withdrawal and the University's Refund Policy. Satisfactory Academic Progress for students who return to the University for a subsequent term will be reviewed and a determination will be made based on the Maximum Time Frame, PACE and GPA standards as stated above.

Undergrad Student Accounts

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

University Undergraduate Program Charges
The summary of annual fixed University charges for the 2026-2027 academic year follows:

Fixed Charges 2026-2027	
$61,594	Undergraduate full-time charge (12 to 19 credit hours)
$2,053	Undergraduate credit hour rate (11 hours or less)

$10,840	Room (based on weighted average)
$8,528	Meal Plans
$1,370	Undergraduate student fees
$1,920	Clarkson School student fees
$82,332	Undergraduate full time direct costs

Undergraduate students registered for 12 to 19 credit hours (inclusive) are designated as full-time students and are charged at the full-time rate. Students exceeding the full-time load of 19 credits will be charged at the credit hour rate for each credit hour in excess of 19 in addition to the full-time tuition rate charge. Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $4,056 for one academic year.

Clarkson University Student Association (CUSA) Activity Fee
Assessed by CUSA on all undergraduate students carrying a minimum of 6 credit hours per semester and distributed to clubs and organizations.

Clarkson University Student Association (CUSA) Campus Improvements Fund Fee
Assessed by CUSA on all undergraduate students carrying a minimum of 6 credit hours per semester for capital projects as identified by students.

Resources Fee
Assessed to all full-time students. Covers operations for recreational facilities, fitness facilities, health facilities & services, counseling facilities & services, computing facilities, services & related software, webinars, etc.

The Clarkson School Event Fee
Assessed to The Clarkson School students to assist in covering various student activities such as field trips. In addition, a portion of the fee provides for any guest lectures and special meals sponsored by The Clarkson School.

Health Insurance
Health insurance is mandatory at Clarkson University for non-distance program students. All students must either have health insurance coverage under their own policy or be covered by their parent's policy or enroll in Clarkson's contracted insurance. The current rate is $2,536 for coverage from 8/1/2026 – 7/31/2027. To assure clearance for check-in, students need to complete an activity guide in their myCU account and secure an approved waiver if need be on a yearly basis.

Payment
Payment in full for all tuition, fees, residence and dining expenses must be made on or before the financial clearance deadline. 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 monthly. Enrollment indicates that the student agrees to pay tuition, fees, room, board and other charges on their student account in addition to 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 diplomas until the balance of the account is paid in full.

Tuition and Fees Refund Policy
In cases of Complete Withdrawal or Partial Withdrawal (each as defined below), refunds of tuition and fees shall be provided in accordance with the following.

Proration of tuition and fee charges shall be based on the last recorded day of the student's University attendance as determined by and attested to by the Student Achievement Services Office in conjunction with the following tables.

Complete Withdrawal for students enrolled in Semester (Fall & Spring) based programs and Trimester (Fall, Spring & Summer) based programs:

Prior to the start of the term	100%
1st week of the term	90%
2nd week of the term	75%
3rd week of the term	50%
4th week of the term	25%
5th week of the term through the end of the term	0%

**A Complete Withdrawal consists of a student withdrawing from all of their enrolled credits within a term.*

Summer Proration of Charges Policy can be found at https://intranet.clarkson.edu/student-life/sas/summer-semester/.

The corresponding percentages above will be applied to tuition, CUSA activity fee, CUSA Campus Improvements Fund Fee, Resource Fee, The Clarkson School Event Fee, Residential Program Resource Fee, Non-Residential Program Resource Fee, Housing and Meals (consumption is not taken into consideration). There will be no

proration of the Student Health Insurance Premium if the coverage is in force. There will be no proration of the Clarkson Bound Book Program (if applicable).

Complete Withdrawal for students enrolled in quarter (Summer, Fall, Winter, & Spring) based programs:

Prior to the start of the term	100%
1st week of the term	90%
2nd week of the term	65%
3rd week of the term through the end of the term	0%

**A Complete Withdrawal consists of a student withdrawing from all of their enrolled credits within a term.*

The corresponding percentages above will be applied to tuition, Residential Program Resource Fee, Non-Residential Program Resource Fee. There will be no proration of the student health insurance premium if coverage is in force.

Partial Withdrawal for students enrolled in a Quarter (Summer, Fall, Winter & Spring) based programs:

Prior to the start of the term through the 2nd week of the term	100%
3rd week of the term through the end of the term	0%

**A Partial Withdrawal consists of a student withdrawing from one or more of their enrolled credits within a term, but still remains enrolled in at least one credit for the term.*

Adjustments will be made only to the tuition cost associated with the withdrawn credit(s).

Questions regarding categories of withdrawal should be addressed to Student Achievement Services Specialists.

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

Military Exceptions

An exception to the Refund Policy has been made for students that are enlisted and active (prior to the start of the term) in the military that are forced to withdraw during a term due to a military deployment or a change of assignment.

Official documentation of the deployment or change of assignment may be requested by Clarkson University from the student for the exception to the Refund Policy to take effect.

If the student meets the aforementioned criteria, the student's account will receive a 100% refund of tuition, fees, and housing (if applicable).

This exception to the Refund Policy does not apply to Board (if applicable) or Student Health Insurance (if applicable) fees or the Clarkson Bound Book Program (if applicable).

Graduate Student Accounts

Expenses

Tuition and other charges at Clarkson are set at the minimum permissible for financially responsible operation of the University and are considerably less than actual costs. Gifts and grants received through the generosity of alumni, industry, foundations, and friends play an important part in reducing the difference. Although Clarkson will make every effort to maintain charges at current levels, the University reserves the right to revise or change financial requirements.

Tuition and Fees

The tuition rates charged by the University are not dependent on the format of the educational programs for which they are payable. Accordingly, if the University is required to alter the structure of its on-campus educational programs or transition students to remote learning models (in whole or in part) due to restrictions imposed by federal, state or local governmental authorities or applicable law, or if the University determines such action to be warranted in light of continuing or potential impacts of the COVID-19/coronavirus pandemic, no reduction or refund of tuition or fees will be made based on the resulting changes to the programs in which students are enrolled.

Tuition costs for 2026-2027 graduate programs vary and are charged on a per credit hour basis. Residential program graduate students are subject to a Residential Program Resource Fee each term and a Residential Program CUGSA Activity Fee each term. Non-residential program graduate students are subject to a Non-Residential Program Resource Fee each term and a Non-residential Program CUGSA Activity Fee each term.

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. If recorded as a

part-time student, these students are not required to pay a Residential Program Resource Fee nor a Non-Residential Program Resource Fee, but may be required to begin re-payment of outstanding loans. Exception from payment of the tuition for this credit hour may be granted to the student (when circumstances warrant) by the Appropriate Academic Administrator.

University Graduate Program Charges
The summary of annual University charges for the 2026-2027 academic year follows:

Per Credit Hour	Program Type
$1,046	Interdisciplinary ● Construction Engineering Management (MS) ● Construction Engineering Management (Advanced Certificate ● Engineering Management (MS) ● Applied Data Science (MS) ● Dual degree MS in Data Science/MB
$1,576	Sciences ● Basic Science (MS) ● Bioscience & Biotechnology (MS) ● Bioscience & Biotechnology (PhD) ● Chemistry (MS) ● Chemistry (PhD) ● Computer Science (MS) ● Computer Science (PhD) ● Mathematics (MS) ● Mathematics (PhD) ● Physics (MS) ● Physics (PhD)
$1,576	Engineering ● Business of Energy (Advanced Certificate) ● Chemical Engineering (MS) ● Chemical Engineering (PhD) ● Civil and Environmental Engineering (MS) ● Civil and Environmental Engineering (PhD) ● Electrical and Computer Engineering (MS) ● Electrical and Computer Engineering (PhD) ● Materials Science and Engineering ● Mechanical Engineering (MS) ● Mechanical Engineering (PhD) ● Power Systems Engineering (Advanced Certificate)
$1,046	Business ● Business Administration, 1-year Residential MBA ● Business Administration, Online MBA ● Business Analytics, Residential MBA ● Business, Advanced Certificates ● Global Supply Chain Management, Residential MBA ● Healthcare Management, MBA

	● Clinical Leadership, MS ● Healthcare Data Analytics, MS ● Combined MBA/MS Health Care Data Analytics
$1,576	Institute for Sustainable Environment ● Environmental Policy (MS) ● Environmental Science and Engineering (MS) ● Environmental Science and Engineering (PhD)
Varies	Non-Degree (determined by plan)

Flat Rate per term	Health Sciences Programs
$13,959 **$12,973** **$11,256**	● Physician's Assistant ● Physical Therapy ● Occupational Therapy

Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $4,130 for one academic year.

Graduate Resource Fee (Potsdam Residential)
The $852 per year fee is assessed to all full-time graduate students in residential programs. Covers operations for access to recreational facilities, fitness center, health center services, computing lab resources and related software, webinars, etc (Note: This is not a health insurance premium).

Graduate Resource Fee (Online)
The $95 per term fee covers operations for access to computing lab, online resources and related software, webinars, etc. This includes guest speakers and lecturers, computer lab resources and related software, the learning management system, Echo 360, which allows for asynchronous learning sessions, voice thread and other online related services, library and database access and free transcripts for life.

Student Activity Fees
Covers athletics, student clubs and other miscellaneous programs for all Clarkson University students.

- Potsdam Residential $38 per term
- Online $15 per term

Health Insurance
Student health insurance is mandatory at Clarkson University for residential program students. Students must either have adequate health insurance coverage through their own policy, be covered by their parent's policy or enroll in Clarkson's contracted insurance. The rate for 2026-2027 is $4,769 for coverage from 8/1/26 – 7/31/27. To assure clearance for check-in, students need to complete an activity guide in their myCU account and secure an approved waiver on a yearly basis.

Payment
Payment in full for all tuition, fees, residence and dining expenses must be made on or before the financial clearance deadline. 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 per 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 diplomas until the balance of the account is paid in full.

Sponsored Research Services

Sponsored Research Services (SRS) 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. SRS 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, SRS promotes innovation and creativity, thereby increasing knowledge and making the knowledge available and useful for scholarship and education.

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. Special events are publicized through joint calendars and other means. Each of the four libraries permits students from all of the colleges to draw upon the total holdings of approximately one million volumes (See Educational Resources Center).

Students may cross-register for courses within the consortium, and some sharing of faculty takes place. To be eligible to cross-register, undergraduate students must be enrolled in at least 12 credits at Clarkson, including the cross-registered course, eligible students can take up to two courses (not available in their home institution) per academic year totaling no more than eight credits on a space-available basis at one or another of the campuses. An academic year for cross-registration includes the fall and spring semesters. A form for cross-registration is available at https://associatedcolleges.org/services/cross-registration/

Students will be enrolled as non-matriculated students at the host institution and the course(s) will be transcribed at the host institution. At the end of the semester, an official transcript will be sent to the student's home institution and credit will be posted as transfer credit on their Clarkson transcript. Undergraduate students must receive a grade equivalent to a C (2.000) or higher to receive transfer credit at Clarkson. Grades in such courses are not used in computing a student's GPA, and are not counted toward the minimum number of credits required for academic honors. If cross-registration credits result in a course load requiring additional tuition charges, the student is responsible for those additional charges.

University Libraries

The University Libraries provide comprehensive knowledge resources and services to support research, scholarship, teaching, and learning. We are dedicated to offering collaborative support for exploration, discovery, and life-long learning skills to all Clarkson University faculty, staff, students, and to citizens of our local community no matter their location and with respect to diverse needs.

The Harriet Call Burnap Memorial Library is the main library located on the Potsdam Collins Hill Campus in the Educational Resources Center (ERC). Its collections offer materials in various formats including journals, books, audio visual materials, government documents and reports, Clarkson University dissertations, and archival materials. The Health Science Library (HSL) is the University Libraries' extension library and is located in The Earl R. and Barbara D. Lewis School of Health Sciences (Clarkson Hall) on the downtown Potsdam campus. It provides a wide range of information resources focused on medicine and healthcare. Both locations offer a comfortable place for study.

Physical Education

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

Optional physical education courses include Weight Training Techniques, EMT/CPR Lifesaving, Gold, Racquetball, Aerobic Fitness, and Badminton. In cooperation with the University medical staff, the Physical Education Department will assist those students who are physically disabled to design a program best suited to their capabilities.

The Henry R. Hodge Sports and Recreation Complex is located on the Potsdam campus, adjacent to the residence halls and easily accessible to all students. Facilities include the Denaka Family Fitness Center, Alumni Gymnasium, Schuler Recreation Building (which houses the Stephenson Field House and the Fuller Pool), the Denny

Brown Adirondack Lodge, and the Snell Athletic Fields. Additional facilities include Walker Center, Hantz Turf Field, Bagdad Field, Scott Field, Neugold Field, and the Cheel Campus Center and Arena.

The Department of Athletics and Recreation offers a number of summer camp opportunities. For more details, contact 315-268-6622 or visit the website.

ADMISSIONS, ENROLLMENT, AND STUDENT ADVANCEMENT

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

The Committee on Admission places particular emphasis upon the following:

1. The secondary school record
2. Clarkson University has adopted a test optional policy. Students may submit self-reported scores if they choose for the purpose of application review. Official scores will be required prior to enrollment if the student has chosen to submit scores as part of their application. See policy guidelines.
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 an English proficiency test. For further information on these exams, please see page 83.
6. SAT subject tests are optional

A personal interview and a visit to the campus are strongly recommended. The purposes of the interview are to increase the applicant's knowledge about Clarkson, provide an opportunity for the applicant to ask questions, and to share information about relevant personal, extracurricular and coursework preparations and backgrounds. For more information, call 800-527-6577 or email admissions@clarkson.edu. Candidates for admission to Clarkson as transfer students should review the transfer admission section below.

Academic Preparation
A thorough secondary school background in English, mathematics, and sciences 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:

Engineering, Science, and Engineering & Management Programs:

- English (4 units)
- Mathematics (4 units)
- Science (3-4 units); including Chemistry (1 unit) and Physics (1 unit)

Business and Liberal Arts:

- English (4 units)
- Mathematics (3 units)
- Sciences (1 unit)

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

First Year Application Procedure

Students can apply using either the Clarkson University Application or the Common Application. The applications are available at Applying for Undergraduate Programs.

The application fee is waived for students who submit an application online. Candidates are encouraged to submit their completed applications between October 1 and January 15 of their final year in secondary school. It is the student's responsibility to make certain that appropriate secondary school transcripts, SAT or ACT test results if students choose to submit for consideration, 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, SAT or ACT test results if students choose to submit for consideration, and recommendations should be received no later than December 15. Admission notification will occur by January 1. Students who complete the Free Application for Federal Student Aid (FAFSA) will also receive financial aid notification.

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

The Office of Admission is open on weekdays from 9 a.m. until 4 p.m. and on Saturdays by appointment only. Interviews on campus should be arranged by email or phone at least one week prior to the intended visit. A personal interview conducted by a local alumnus 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 or via email at admissions@clarkson.edu.

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

Deposit
A $500 deposit is required when the first year candidate accepts the offer of admission; the class is filled as deposits are received. The deposit is payable any time prior to the Candidate's Reply Date, as established by the National Association for College Admission Counseling. The reply date is May 1st. The deposit is credited to the first year University charges. It is nonrefundable if the student decides not to attend Clarkson.

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 Articulation Agreements. 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 and the local community welcome a large number of new transfer students each fall and spring to the campus. The quality and success of these students is consistently 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 the first full time experience as a matriculated student 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:

1. Submit a completed Transfer Common Application or Clarkson University Transfer Application at https://www.clarkson.edu/apply-now
2. 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.
3. Submit the Dean of Students Recommendation or Common Application College Report. This can be completed by Dean or equivalent title.
4. Clarkson University has adopted a test optional policy. Students may submit self-reported scores if they choose for purpose of application review. Official scores will be required prior to enrollment if the student has chosen to submit scores as part of their application. See policy guidelines.
5. Arrange for English proficiency test scores to be submitted if English is not their native language.
6. Submit two letters of recommendation, including one from an academic professor/ instructor (optional).
7. A personal statement describing a special interest, experience or achievement that is important and meaningful to you

In addition, applicants should be aware that:

1. The $50 application fee is waived by applying online or by completing an on- or off- campus or virtual interview
2. An on- or off- campus or virtual 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 $500 deposit which will be credited to the first year University charges. It is non-refundable if the student decides not to attend Clarkson.

After acceptance to Clarkson, the appropriate academic division 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 with approximately two weeks of acceptance.

Financial Assistance for Transfers

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

2+2 Transfer Student Policy
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, and Box 5610, Potsdam, NY 13699.

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 visit http://www.clarkson.edu.

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

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

1. Provides merit-based international scholarships to qualified applications;
2. Has an International Student Advisor on campus;
3. Supports several international student organizations; and

4. Has established a special office in Undergraduate Admission to support international students

International Student 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. 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), the PTE – Pearson Test of English, Duolingo Test of English Language or IELTS (International English Language Testing System) scores submitted (if English is not your primary language). For further information on these exams, please visit www.ets.org/toefl, https://pearsonpte.com/the-test/, https://englishtest.duolingo.com/edu or www.ielts.org/.

See the information regarding English requirements below.

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

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

Recommendations. A minimum of two recommendations should be submitted, preferably one from a math or science teacher for applicants wishing to pursue an engineering or science degree. The letters should discuss the student's ability to succeed at the university level and present reasons to admit the student. *Personal Statement.* Describe a special interest, experience or achievement that is important and meaningful to you.

Campus Visit/Interview (optional). International students are strongly encouraged to visit the campus or schedule an interview via video or phone. The International Admission Office (tel. 315-268-2125) can greatly assist in coordinating the visit to

include pick-up from nearby airports, arranging for student hosts, faculty appointments, campus tours, admissions interview, meals, and hotel arrangements.

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

At the time of admission, an International student is considered for a merit-based international scholarship. The awards vary according to the strength of the student's academic record. Students who accept the offer of admission must submit a $500 nonrefundable deposit to reserve a place in the entering class which will be credited to the first year University charges.

Admission Criteria for International Students
Students are selected for admission based on the following:

1. Academic performance in secondary school, college, or university, and class standing
2. Recommendations
3. Clarkson University has adopted a test optional policy for the 2021-22 admission cycle due to the impact of COVID-19 on availability and accessibility of standardized testing. Students may submit self-reported scores if they choose for the purpose of application review. Official scores will be required prior to enrollment if the student has chosen to submit scores as part of their application. See policy guidelines.
4. TOEFL, PTE – Pearson Test of English, Duolingo or IELTS or ELITE PLUS or EF SET (English Proficiency) scores.
5. Participation in extracurricular events, community service, and sports
6. 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 ranging from $5,000 to $40,000 per year.

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

Employment: International students are allowed to work on campus for up to 20 hours per week. The jobs include office worker, lifeguard, food service, etc. The number of positions available varies from year to year.

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

English Requirements

Clarkson University must verify all international students' English language proficiency when English is not a first language. This requirement, as part of the application process, must be completed prior to the issuance of a 'Certificate of Eligibility' for student status. Once the university has verified this requirement, and the applicant is accepted, the 'Certificate of Eligibility' may be used to obtain a student visa. Clarkson University requires one of the following language proficiency exams:

- TOEFL (Test of English as a Foreign Language): http://www.toefl.org
- IELTS (International English Language Testing System): http://www.ielts.org
- PTE (Pearson Test of English): https://pearsonpte.com/
- DET (Duolingo English Test): https://englishtest.duolingo.com/
- Applicants inside the USA who are enrolled in one of these two institutions: Open Hearts Language Academy (OHLA) or Education First (EF) University Preparation may submit one of these two English exams ELITE PLUS through (OHLA) and EF SET Level C2 (EF).

Admission of international graduate students requires minimum test scores as below, in all programs *excluding* DPT, MS in PAS, and MS in OT:

- IBT TOEFL score of 80
- TOEFL Essentials 8.5
- IELTS band score of 6.5
- PTE score of 56
- DET score of 115 (or 61 on pre-July 2019 exam scoring)
- IELTE PLUS 80
- EF SET level C2 80

A TOEFL/IELTS/PTE/DET/IELTE PLUS/EF SET (C2) official score must be submitted as part of the application requirement. Admission Requirements to the language proficiency exam may be waived with evidence of documentation showing the student studied in a United States school or originated from a country with English as its first language. Students may submit on a case-by-case basis other proof of English

proficiency. Requests for waiver of exams should be sent to the Coordinator of International Students.

I-20 Visa

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

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

The supporting documents usually consist of the acceptance letter sent to the student by Clarkson; an I-20 for an F-1 (student) visa; evidence of ability to pay for studies; and sometimes evidence that the student does not intend to become an immigrant to the U.S.. Please check the specific requirements for your home country. When the Consul is satisfied with the application, the student's passport will be returned with a visa stamped in it. This stamp allows the student to enter the U.S. only when possessing the I-20.

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

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

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:

1. 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;
2. Exhibited the quality of character expected of an entering graduate student of Clarkson University, as indicated by a letter from their academic advisor, division head, or the dean in which their baccalaureate degree resides;
3. Maintained a minimum grade-point average of 3.500 in their major; and
4. Achieved a school-defined minimum score on a designated national exam, the CUSB requires the GMAT or GRE exam and all others require the GRE

Applications for graduate admission from students receiving a Clarkson University baccalaureate degree who have not met all conditions specified above will still be considered, but admission will no longer be automatic. Please see the Graduate Catalog for The Graduate School application procedures. Exclusions to the automatic acceptance practice may be in effect per program requirement.

Part-Time Matriculated Students

A person may pursue a baccalaureate degree as a part-time matriculated student. For further information, contact sas@clarkson.edu.

Advanced Placement/ Advanced Credit

A majority of students receiving Advanced Placement credit at Clarkson have taken the Advanced Placement Examination of the College Board. The most common AP areas are listed below. Credit in more other subjects is awarded when a score of 4 or greater is received.

Clarkson also grants credit based on International Baccalaureate Exams and CLEP Exams. Advanced Placement credit based on tests or examinations (includes AP, CLEP, IB, etc.) will be limited to a combined 30 credit hours.

Below is a list of AP scores and the transfer credit it translates to:

Biology	
AP Score	**Course Credits**
1,2, or 3	No credit
4	BY 100 Biology Elective with Lab

5	BY 140/142 and BY 160/162 Biology I and II with labs

Chemistry	
AP Score	**Course Credits**
1,2, or 3	No credit
4	CM 131 General Chemistry
5	CM 131/132 General Chemistry I/II

Computer Science*	
AP Score	**Course Credits**
1,2, or 3	No credit
4 or 5	CS 141 Intro. To Computer Science

English		
AP Score	**Language and Culture Credit**	**Literature and Culture Credit**
1,2, or 3	No credit	No credit
4 or 5	COMM 210 Theory of Rhetoric	LIT 101 Literature and Writing

Mathematics**		
AP Score	**Calculus AB Credit**	**Calculus BC Credit**
1,2, or 3	No credit	No credit
4 or 5	MA 131 Calculus I	
4		MA 131 Calculus I
5		MA 131 / 132 Calculus I / II

Physics***				
AP Score	**Physics 1 Credit**	**Physics 2 Credit**	**Mechanics**	**Electricity & Magnetism**
1,2, or 3	No credit	No credit	No credit	No credit

4 or 5	SC 141 Intro to Physics I	SC 142 Intro to Physics II	PH 131 Physics I	PH 132 Physics II

**The Computer Science program schedules an exam in C++ or Java for new students during the fall orientation each year. Students earning a satisfactory grade receive credit for CS 141 Introduction to Computer Science I. The exam may also be taken in other pre-approved languages. Contact the Computer Science Program Office for more information.*

***To be eligible for AP credit MA 131 or MA 132, first year students must also perform at a satisfactory level of the Math Readiness Survey (which is taken in late May) or successfully complete the on-campus advanced-standing exam given in the first week of the fall semester.*

****Credit awarded for Physics 1 or Physics 2, non-calculus-based physics, will not substitute for PH 131 and/ or PH 132 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 college 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 program responsible for the course curriculum.

Credit by Examination
Availability of such exams are at the discretion of the appropriate division academic administrator. Students interested in Credit by Examination are encouraged to notify the appropriate program administrator 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. These exams are scheduled into orientation.

Clarkson will consider the following for advanced credit: AP, CLEP, GCE A-levels, IB, OACs, French Baccalaureate, Abitur, Italian Maturita and the Swiss Maturite. While credit is usually granted, there are situations, due to the technical nature of some of the programs, where it is not. Each case will be reviewed on an individual basis. Advanced Placement credit based on tests or examinations (includes AP, CLEP, IS, etc.) will be limited to a combined 30 credit hours.

Graduate Student Admissions
Clarkson offers programs of study during the regular academic year leading to the Master of Business Administration, Master of Science, Doctor of Philosophy, and Doctor of Physical Therapy degrees. Interdisciplinary programs leading to Master of Science and Doctoral degrees offer a unique perspective on graduate study and are a key element in many of our programs.

Admissions to graduate study is on a merit basis. Evidence of intellectual achievement, motivation, and aptitude are required for admission to graduate programs. Prospective Clarkson graduate students must have or be a candidate for an undergraduate degree from an accredited college before applying for graduate admission, excluding students applying through specific, official, joint program agreements. Candidates for joint programs should contact a member of the Graduate Admissions Team regarding requirements for admissions. Application materials may include: resume, personal statement, transcripts, test scores, and letters of recommendation. Please contact the Graduate Admissions at graduate@clarkson.edu or (518) 631-9831 for details on the program's specific set of requirements.

A Masters in an accredited engineering program can count as one year towards NYS professional engineering licensing requirements. Please refer to the NYS Office of Professions (http://www.op.nysed.gov/prof/pels/) for more information.

GRE scores are optional for all graduate programs, except for the PhD and research-track MS programs in Mechanical Engineering, as well as both MS tracks (Research and Project) and the PhD program in Physics, where the GRE is required. In the David D. Reh School of Business, GMAT scores are optional. For full details, refer to the specific program requirements at www.clarkson.edu/academics.

All admission decisions must be approved by the applicant's graduate program representative, by the director of the program and/or the dean of the appropriate school. While there is a rolling admission policy, and all applications will be reviewed up to a reasonable time prior to the beginning of classes, it is recommended that students requesting financial aid apply by January 30 for the fall term and September 1 for the spring term. Students are encouraged to apply no later than five (5) months prior to the preferred term of entry to allow time for admissions processes. For applications and other inquiries about the status of an application, contact the specific program of interest or see Clarkson's Web site at http://clarkson.edu/graduate

Admission Graduate School Policy for Current Undergraduate Clarkson Students
This policy is intended to encourage early consideration and preparation for graduate work at Clarkson by highly qualified students.These students may accelerate their undergraduate course of study to graduate early and begin their graduate work as soon as possible. Please contact Graduate Admissions at graduate@clarkson.edu or (518) 631-9831 for further instructions. Superior Clarkson undergraduate students, with the permission of their division head and the dean, may enroll in graduate courses. Such courses may be allowed to count towards the graduate degree as specified in the Degree Requirements below.

International Applicant Language Verification Requirements
Clarkson University must verify all international students' English language proficiency when English is not a first language. This requirement, as part of the application

process, must be completed prior to the issuance of a 'Certificate of Eligibility' for student status. Once the university has verified this requirement, and the applicant is accepted, the 'Certificate of Eligibility' may be used to obtain a student visa. Clarkson University requires one of the following language proficiency exams:

- TOEFL (Test of English as a Foreign Language): http://www.toefl.org
- IELTS (International English Language Testing System): http://www.ielts.org
- PTE (Pearson Test of English): https://pearsonpte.com/
- DET (Duolingo English Test): https://englishtest.duolingo.com/
- Applicants inside the USA who are enrolled in one of these two institutions: Open Hearts Language Academy (OHLA) or Education First (EF) University Preparation may submit one of these two English exams ELITE PLUS through (OHLA) and EF SET Level C2 (EF).

Admission of international graduate students requires minimum test scores as below, in all programs excluding DPT, MS in PAS, and MS in OT:

- IBT TOEFL score of 80
- TOEFL Essentials 8.5
- IELTS band score of 6.5 PTE score of 56 DET score of 115 (or 61 on pre-July 2019 exam scoring)
- IELTE PLUS 80, EF SET level C2 80

A TOEFL/IELTS/PTE/DET/IELTE PLUS/EF SET (C2) official score must be submitted as part of the application requirement. Admission Requirements to the language proficiency exam may be waived with evidence of documentation showing the student studied in a United States school or originated from a country with English as its first language. Students in graduate programs leading to professional certification/licensure also may have a requirement relating to language verification requirements as defined in their field. Details are in the handbooks for these programs. Additionally, a program may request a World Education Services (WES) evaluation be submitted by the applicant.

Lastly, all matriculated students for whom English is a second language are required to complete the ESL placement exam upon arrival to campus and complete any resulting requirements. Waivers to the requirement of the ESL placement exam will be determined at the program level by the appropriate designated administrator(s) who may consider documented exceptions based on reasonable student experience and/or prior education. Any language courses required as a result of the placement exam are not counted toward degree requirements.

GRADUATE DEGREES & ADVANCED CERTIFICATES

Applied Data Science MS

The MS-Applied Data Science degree provides students with the skills to be effective professionals in a highly sought-after field of identifying, acquiring, managing, presenting, analyzing and interpreting large amounts of data in a variety of professional fields and organizational settings. The program offers close faculty student interaction with core courses ensuring that students acquire a common set of key critical skills in areas of data management, decision analysis, statistics, data mining and knowledge discovery. In addition, the program offers a variety of elective courses in various areas of data science and analytics from which students can build additional levels of proficiency and expertise. Upon completion of this program students will possess skills and demonstrate proficiency in the core areas of data analytics and will be able to apply them to one or more specialized contexts of business, engineering or science. Students will develop a deep understanding of how to identify and satisfy data requirements of a variety of stakeholders, working closely across organizational boundaries to create, analyze and present valuable information. Their acquired expertise will enable them to manage, review, analyze, and evaluate data at a very advanced level for critical decision making purposes. These skills will enable them to secure positions in private enterprises as well as government and other intuitions with job titles such as Data Engineer, Data Analyst, Data Solution Analyst and Data Scientist, among many others.

Prerequisites

The MS program requires completion of foundation courses in two specific areas: Mathematical Statistics and Basic Programming. These courses can be completed as part of the regular undergraduate degree program or through pursuing the Summer Analytics Foundation program offered by this program, lasting from June to August preceding the start of the regular fall semester.

Degree Requirements

The (36) thirty-six credits of the MS ADS degree program consist of six three-credit core graduate courses, four three-credit graduate elective courses, and a six-credit capstone course based on a sponsored project work.

The core course titles are:

IA 510	Database Modeling, Design and Implementation
IA 530	Probability and Statistics for Analytics
IA 605	Data Warehousing
IA 640	Information Visualization
IA 650	Data Mining
IA 651	Machine Learning

Some of the core courses may be waived if the students can demonstrate that their previous undergraduate or graduate coursework contains equivalent material. In those cases, students will be required to take a greater number of elective courses to satisfy the 36-credit program requirement.

Graduate elective courses are offered in a variety of areas and they include but are not limited to the following:

IA 626	Big Data Processing and Cloud Services
IA 628	Introduction to Big Data Architecture and Applications
IA 637	Data Driven Application Development
IA 653	Natural Language Processing
CE 502	Applications in Geospatial Analytics, Science, & Engineering
EM 680	Decision Analysis and Risk Management
EM 620	Introduction to Artificial Intelligence: Principles and Techniques
CS 502	Business Intelligence
CS 503	Systems Analysis and Design Methods
CS 570	Deep Learning
CS 572	Image Understanding
OM 680	Strategic Project Management
MK 696	Marketing Research Methods
EC 611	Econometrics
ES 505	Design of Experiments
EE 574	Pattern Recognition
ME 529	Stochastic Processes for Engineers
CS 551	Artificial Intelligence
CS 559	Human Computer Interaction
EE 501	Digital Signal processing
CS 549	Computational/Machine Learning

The electives list is not exclusive. We anticipate that students entering the program will have an interest in working in a focused area of data analytics. Students will build an individualized plan of study through the selection of course electives that align with their intended focus. Faculty advisors will work with individual students to choose proper electives by exploring all graduate courses offered in the curriculum of the different schools at Clarkson University.

IA690 - Capstone Project is a course centered on sponsored data analytics projects with interdisciplinary teams. Capstone projects, depending on project parameters could consist of a 2 unit seminar w/4 unit project (consistent with engineering curriculum as currently offered) and/or be a mentored capstone of 6 total units. Depending on the

nature of the capstone and its sponsorship, projects could be on-site fieldwork intensive.

Program Length

Expected program length for the MS ADS (residential) is three semesters, but it can be extended and expected program length for the MS ADS (distance) is (5) five semesters, but it can be extended.

Basic Science MS

Clarkson offers a Master's degree in Basic Science for qualified students who desire graduate study within the sciences, with a focus that does not fit within one of the degree programs already established.

The standard requirements for all Clarkson Master's degrees must be met: see "Degree Requirements and Academic Policies for Graduate Students: Requirements for the Master's Degree".

Basic Science (thesis and non-thesis options)

Biology Option

Prerequisites for Admission

Applicants must possess a baccalaureate (4-year) degree in biology or a relevant science major (e.g., biochemistry, biophysics, environmental science) and must have completed the following minimum college course preparation:

1. Three semesters of biology including genetics
2. Four semesters of chemistry including organic chemistry
3. Two semesters of physics, and
4. Two semesters of mathematics including calculus

Degree Requirements for the Basic Science MS

1. A minimum of 30 credit hours of graduate coursework, as follows:
    a. At least 20 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 BS
4. A cumulative GPA of 3.0 in courses used to meet graduation requirements.

Program Length
All work done for the master's degree in basic science is to be completed within five calendar years, although it is normative to complete this degree in two years.

One requirement for the Master in Basic Science (MBS) degree is either a *thesis* or else a *special project*. A special project can consist of writing a scholarly review, completing an experiment, or assembling a substantial data set. Before initiating a special project, a written proposal must be approved by the student's advisor and the Biology Graduate Program Lead. As a rule of thumb, the special project must be substantial enough to warrant a co-authorship on a paper. In the case of an experiment or data set, all deliverables (e.g. a written description of the full methods, orderly annotated lab notebook, computer data files with complete metadata) must be submitted to the advisor and subject to evaluation before project completion is approved. A completed project must be evaluated and approved by a committee of three: the student's advisor, a second faculty member, and the Biology Graduate Program Lead. All project deliverables must be submitted at least one month before the expected date of graduation, so that the committee has sufficient time to evaluate the deliverables and request any needed changes.

Biomedical Engineering MS

The Wallace H. Coulter School of Engineering offers a graduate program leading to the MS degree in Biomedical Engineering. Biomedical engineering is an interdisciplinary field that is experiencing rapid growth and having a significant impact on the quality and delivery of healthcare. The MS in Biomedical Engineering leverages university expertise in engineering, health sciences, and entrepreneurship. In addition to introducing important biomedical engineering courses, the program has a clinical experience, and an entrepreneurial element consistent with Clarkson's focus on innovation, and a team-based capstone design experience. Capstone experience projects may be carried out in conjunction with students and faculty in the graduate-level Biology, OT, PT, and PA programs or via industrial sponsorship. The capstone design process will follow FDA best practices, and projects may lead to a potentially viable marketable idea, complete with a business plan. The program will prepare students to enter the field of biomedical engineering.

Program Objectives and Learning Outcomes:

Program Objectives—goals of the MS Biomedical Engineering Program include:

- Provide a compelling reason for talented students interested in Biomedical Engineering to select Clarkson
- Provide a strong linkage to Clarkson Ignite to foster innovation in areas related to the clinical expertise of the health care faculty and the research expertise at the university

- Provide students with an introductory exposure to the clinical practices and with an opportunity to work with Clarkson's clinical faculty and students to design relevant and needed devices, concepts, or techniques
- Prepare students for advanced study or careers in the biomedical field

Learning Outcomes—upon completion MS in Biomedical Engineering students will:

- Understand human physiology from a systems biology perspective
- Understand the FDA clearance required for medical device clearance
- Be able to make sound ethical decisions related to bioengineering challenges
- Be able to work effectively in a clinical environment and understand the roles of different members of the healthcare delivery team
- Have a biomedical design and innovation experience

Prerequisite Courses

Prerequisites include the completion of an ABET accredited BS engineering degree. Completion of Clarkson's Biomedical Engineering Minor is required for students who received their BS engineering degree at Clarkson. Students who have not completed the biomedical engineering minor or who did not complete their BS engineering degree at Clarkson may be admitted to the program with permission of the Program Lead. Appropriate remedial courses may be recommended, as appropriate.

Degree Requirements

Thirty credits are required for the MS in Biomedical Engineering. The program is built upon one quantitative human physiology laboratory course and two CORE biomedical engineering courses. A biomedical engineering "depth" elective and a graduate-level "breadth" elective build on these courses. The program includes a course on bio-entrepreneurship & FDA fundamentals that is compatible with Clarkson's Ignite initiative and is designed to equip students with an "entrepreneurial mindset" in preparation for their capstone experience.

Program Requirements	
Area of Study	**Credit Hours**
Quantitative Human Physiology & Lab	4
Pick 2: (CORE) EE 585 Neural Engineering (CORE) BME 587 Advanced Biomechanics (CORE) ES 552 Biomaterials and Biomedical Engineering Applications	6
(Depth Electives) Two biomedical electives from an approved list *	6

(Breadth Elective) Any 500 or 600 level math, science, engineering, or business graduate course with technical content	3
Bio-entrepreneurship & FDA Fundamentals	3
Clinical Immersion & Bioethics	2
Capstone Experience I, II, and III***:	6
TOTAL	**30**

*Approved biomedical breadth elective courses - see attached list

Required Courses

BME 500	Clinical Immersion & Bioethics
BME 510	Quantitative Human Physiology & Lab

Core - Pick two:

EE 585	Neural Engineering
BME 587	Advanced Biomechanics (New)
ES 552	Biomaterials & Biomedical Engineering Applications
BME 520	Bio-Entrepreneurship And Fda
BME 530, 531, 532	Biomedical Engineering Capstone Experience I, II, and III

Depth Electives - Biomedical Engineering

BME 600	Selected Topics In Biomedical Engineering
BR500	Biomedical Engineering Fundamentals
EE 533	Human Exposure Analysis
EE 523	Introduction To Biometrics
EE 622	Advanced Biometrics
EHS 518	Principles Of Toxicology And Epidemiology
BY 514	Bioinformatics
PH 520	Physical Models Of Living Systems
PH 526	Introduction To Biophysics
CM 560	Biochemistry I
CM 561	Biochemistry Ii
CM 544	Medicinal Chemistry
CM 566	Bioelectronics And Bionanotechnology

Program Length

Expected program length is two semesters and two summer terms.

Bioscience and Biotechnology MS & PhD

Clarkson Biology offers graduate programs leading to the MS and PhD degrees in Interdisciplinary Bioscience and Biotechnology (IBB-PhD, IBB-MS). The goal of these

programs is to train students with the skills needed to work on complex problems in the biosciences. To support this aim, the graduate program faculty includes biologists, chemists, physicists, mathematicians, and engineers who serve as dissertation advisors. The program also requires participation of social scientists and ethicists who teach graduate courses in bioethics. In addition to the general program requirements described below, students are expected to acquire a significant specialized body of knowledge in at least one of the following four areas of specialization to provide intellectual depth to their education: (1) Molecular Bioscience and Biotechnology, (2) Biomedical Sciences and Neuroscience, (3) Computational Biology and Bioinformatics, or (4) Ecology, Evolution, and the Environment.

The program faculty are engaged in research covering a wide range of subjects in Bioscience and Biotechnology. Expertise of core program faculty include developmental genetics, tissue regeneration, tissues and biomaterials, biotechnology, plant molecular biology, toxicology, microbial evolution, genomics, cell and molecular biology, neurophysiology, pharmacology, bioinformatics, biomathematics, zoology and evolutionary parasitology, stem cell biology, animal behavior, conservation biology, ecology, and limnology.

Requirements for Admission

Applicants must possess a baccalaureate (4-year) degree in a Bioscience, Chemistry, or other Math, Science or Engineering affiliated-discipline that included coursework in cell & molecular biology, genetics, and organic chemistry.

Submitted application materials must include a statement of purpose including the names of 2-3 Biology faculty members who could serve as advisor, The admissions committee will select candidates on the basis of aptitude, programmatic needs, and overall excellence of academic qualifications.

PhD in Interdisciplinary Bioscience & Biotechnology Requirements

Clarkson University requirements include:

1. Completion of a minimum of 90 total credit hours including a minimum of 24 credits of coursework,
2. A minimum of 6 credit hours in research seminars, and
3. An original doctorate thesis research project submitted as a written dissertation defended orally and approved by a committee of five PhD faculty members

Specific Course Requirements for the Interdisciplinary Bioscience & Biotechnology (IBB) PhD Program include:

1. Two core courses in Cell and Molecular Biology (BY 580 and BY 582)
2. One Biotechnology or Molecular Biology lab course (BY 512 or CM 570)

3. Two specialization elective courses from one of four categories (Molecular Bioscience and Biotechnology; Biomedical Science and Neuroscience; Computational Biology and Bioinformatics; Ecology, Evolution, and the Environment)
4. One free elective course from any category
5. One course from the Computational Biology category, and
6. One course on Bioethics, Policy, or Law.
7. A minimum cumulative GPA of 3.0 in courses used to meet graduate requirements.

The IBB Program director maintains a list of courses that fulfill each category. For further details on the objectives, outcomes, and detailed requirements of the IBB-PhD program, please refer to the IBB Graduate Program Handbook.

MS in Interdisciplinary Bioscience & Biotechnology Requirements
Clarkson University requirements include:

1. Completion of a minimum of 30 total credit hours including a minimum of 20 credits of coursework,
2. A minimum of 2 credit hours in research seminars,
3. A minimum cumulative GPA of 3.0 in courses used to meet graduate requirements, and
4. An original masters thesis research project submitted as a written dissertation and defended orally and approved by a committee of three PhD faculty members or an appropriate professionally-oriented special project .

Specific Course Requirements for the Interdisciplinary Bioscience & Biotechnology (IBB) MS Program include:

1. Two core courses in Cell and Molecular Biology (BY 580 and BY582)
2. One Biotechnology or Molecular Biology lab course (BY 512 or CM 570)
3. Two free elective courses
4. One course from the Computational Biology category, and
5. One course on Bioethics, Policy, or Law.

Each and every candidate for the IBB M.S. or IBB Ph.D. must enroll in BY622 and present at least one seminar or more for every year they are in the program as part of their degree requirement.

The IBB Program director maintains a list of courses that fulfill each category. For further details on the objectives, outcomes, and detailed requirements of the IBB-MS program, please refer to the IBB Graduate Program Handbook.

Program Length

The PhD may be completed in a minimum of three years and a maximum of seven years of post-undergraduate study. The M.S. degree may be completed in a minimum of one year and a maximum of five years of post-undergraduate study.

Business Administration (MBA)

The MBA degree is meant to provide students with the skills to be effective business leaders. At Clarkson, there are three MBA programs to choose from:

A. Online MBA
B. Residential MBA
C. Business Analytics MBA
D. Global Supply Chain Management MBA
E. Healthcare Management MBA

Although the MBA programs offer distinct choices, all programs share the hallmarks of a Clarkson MBA which include small class sizes and close student interaction with renowned faculty, strong outcomes and globally recognized recognition.

Online MBA

The online MBA program is a 36-42 credit hour program (a total of 12- three credit courses). This program is designed to be completed part time, taking up to 2/3 courses during each of the four 11 week periods. On average, students complete the program in 20 months, or 7 quarters. Maximum time to complete the program will be 5 years. All students are required to take 10 (three credit hours each) online MBA core courses. The remaining 6-12 credits comprises 2-4 elective courses depending on the path chosen by the student.

Program Objectives/Outcomes:

- Apply advanced organizational behavior principles and leadership disposition to effectively manage, motivate, and lead diverse teams; demonstrating strong interpersonal and managerial communication skills.
- Synthesize business solutions that are multifaceted by integrating core knowledge across business disciplines to successfully analyze complex organizational problems, leading to making cohesive, ethical business decisions.
- Evaluate global market dynamics and cross-cultural management challenges that equip today's leader with the awareness/skills to successfully compete in international markets.

- Analyze an organization's internal competencies/capabilities as well as the external competitive environment to construct long-term strategic plans that are both agile and structured for success in navigating market disruptions and competition.

The online MBA has two distinct completion paths. These paths will determine total hours that the student will complete. A student can only choose one of the two options:

Option 1: General MBA
This option is 36 total hours for completion by taking ten core courses and two electives.

Option 2: MBA with Advanced Certificate
If a student is interested in earning an advanced certificate by carefully selecting their electives, the program will be 42 total credits or 14 courses. This is the ten core courses and four total electives.

- ***Waivers: MBA with Advanced Certificate with Waiver eligibility***: Students pursuing this option may be eligible for up to six credits of core course waivers (two courses) depending on their academic background, and if that program has been earned within five years of the start of the MBA program. If eligible for waivers, the program has the option of being completed in 36 credits (depending on how many waivers granted).

Students with extensive prior academic work in specific subjects may reduce the number of courses required by transferring courses. Transfers must be graduate courses not used as part of another degree and may apply to required or elective courses. Program requirements may be reduced by up to 9 credit hours (from 36 to29) with course transfers. Transfers are subject to approval and there are no guarantees certain courses will be accepted.

The Online MBA is offered fully online and follows the quarter calendar (four terms per year).

The course numbers and titles for the required courses in the online program are:

AC 604	Financial and Managerial Accounting for Decision Making
OM 607	Global Supply Chain Management
EC 605	Managerial Economics
FN 608	Financial Management
OS 681	Strategic Management

IS 606	Business Information Systems
MK 610	Marketing Management
OM 603	Decision Analysis and Supply Chain Modeling
SB 610	Corporate Ethical and Social Responsibility
OS 603	Leadership and Organizational Behavior

Below is a list as a sample of some of the graduate elective courses students can take in the online MBA program. This list is subject to change from the time this version of the catalog is published. Coursework can be planned under advisement to earn advanced certificates in management and leadership, human resource management, and supply chain management (see curricular plan in this section).

OM 681	Strategic Project Management
MK626	Market Research Methods
OM 686	Quality Management and Process Improvement
OS 656	Leading Organizational Change
OS 667	Negotiations and Relationship Management
OS 676	Current Issues in Human Resource Management
SB 640	Advanced Topics in Supply Chain Management
OS651	High Performance Leadership
SB 620	Business Process Analysis
SB 651	Communicating Globally
SB 655	Building and Managing Effective Teams

In the course of their online MBA program of study, students may complete an advanced certificate or concentration by taking a certain set of electives as determined by the requirements of each certificate. Please contact the Reh School for additional information.

Program Length
Full time students can complete the program in as little as 1 calendar year; part-time students complete in 2 to 5 years with most choosing to complete in 2 years.

Residential MBA
The MBA consists of ten foundation knowledge disciplines and 35 credit hours of advanced graduate work. The foundation includes courses from the following subjects: financial and managerial accounting, information technology, corporate finance, microeconomics, macroeconomics, ethics, organizational behavior, marketing, operations and production management, quantitative methods/statistics. Students with undergraduate business majors will be able to waive most of these foundations. Through careful planning, students with backgrounds in engineering, liberal arts, or science may complete the foundation courses as part of an undergraduate minor or through pursuing the Reh Fundamentals program offered online year round, enabling students to complete at their own pace ahead of their term of entry. 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.

Program Objectives/Outcomes:

- Apply advanced organizational behavior principles and leadership disposition to effectively manage, motivate, and lead diverse teams; demonstrating strong interpersonal and managerial communication skills.
- Synthesize business solutions that are multifaceted by integrating core knowledge across business disciplines to successfully analyze complex organizational problems, leading to making cohesive, ethical business decisions.
- Evaluate global market dynamics and cross-cultural management challenges that equip today's leader with the awareness/skills to successfully compete in international markets.
- Analyze an organization's internal competencies/capabilities as well as the external competitive environment to construct long-term strategic plans that are both agile and structured for success in navigating market disruptions and competition.

Beyond the foundation, the 35 credits of the MBA degree program consist of ten two-credit interrelated core 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.

The MBA is offered at the Potsdam campus. All classes are taken in the classroom and follow the semester calendar.

The core module titles are:

AC 603	Management Accounting
OM 606	Supply Chain Management

EC 604	Applied Economics
OS 608	Organizational Behavior and Performance Management
FN 607	Financial Management
OS 610	Strategic Planning
IS 605	Information Systems
MK 609	Marketing Management
OM 602	Decision Analysis and Supply Chain Modeling
SB 609	Corporate Ethical Decision Making

A Strategic Planning module (2 credits) is offered as a 7 week course during the Spring term or as an accelerated interim term on-line course. The other modules are taught for 7 weeks each during the Fall term.

Below is a list as a sample of some of the graduate elective courses students can take in the Residential MBA program. This list is subject to change from the time this version of the catalog is published:

AC 623	Financial Statement Analysis
EC 660	Environmental Economics
FN 680	Strategic Financial Management
MK 689	New Product Marketing
MK 696	Marketing Methods
OM 676	Developing and Managing Technology
OM 680	Strategic Project Management
OM 685	Quality Management and Process Improvement
OM 671	Supply Chain Environmental Management
OS 657	Leading Organizational Change
OS 666	Negotiations and Relationship Management
SB 613	Innovation and New Venture Management

SB 641	Advanced Topics in Supply Chain Management
SB 681	Logistics Strategies

In the course of their Residential MBA program of study, students may earn a certificate by taking a certain set of electives as determined by the requirements of each certificate. Please contact the Reh School for additional information.

Experiential Learning Requirement
Experiential learning is a strong part of Clarkson's culture so each student participating in the Residential MBA program is required to take a three credit hour experiential course. Currently, the experiential requirement can be satisfied by completing the Seminar in International Business (part of the Reh School's Global Business Program), or by taking the SB 696 Global Business Strategies course (this requires a special exemption approval). The Seminar in International Business is designed to provide knowledge and new perspectives regarding international business, and helps develop critical skills necessary to compete and succeed in the global market. This experience includes a 2-3 week trip to an international destination, often led by the faculty from that area. This trip also helps students explore the global management issues facing business leaders and organizations in different parts of the world.

SB 693	Seminar in International Business
SB 696	Global Business Strategies

Length of Program
There are 3 length-of-study options for the Residential MBA program:

- The Accelerated One-Year study plan, with all 35 credits completed over the course of 2 consecutive semesters, or
- One and one half years study plan with core modules and electives completed over the 3 consecutive semesters, or
- Two years, with core modules and electives completed over the 4 consecutive semesters

While most students begin the MBA program in the Fall semester, Spring starts may be accommodated on an individual basis. Students starting in the Spring have their choices of elective courses in that first semester limited to those that do not have core modules as prerequisites and the Strategic Planning module cannot be taken during the first semester.

Global Specialty Track (with one semester abroad at one of the partner AACSB accredited schools)

The Global Specialty Track residential MBA follows the same curriculum structure and has the same foundation requirements as the regular MBA program, with students completing up to six courses over the spring semester at one of the partner institutions. The courses taken at the partner institutions need to be approved by the Graduate David D. Reh School of Business as elective courses and/or a substitute course for the Strategic Management core module. Students are allowed to participate in the Global track if they achieve satisfactory performance in the first set of core MBA modules as determined by the Graduate David D. Reh School of Business.

Clarkson University has many exchange partnership agreements across the globe.The courses you pursue at our partner institution will meet the elective requirement and experiential unit requirement of the Residential MBA program (as a total of six classes will be taken during the student's time at the partner institution). Students starting in the Spring semester cannot participate in the Global Track program in their first semester. Further exploration as to what specific locations a student can study at the time of interest will be facilitated with the coordinator of Clarkson's exchange programs.

Business Analytics MBA

The Master of Business Administration (MBA) in Business Analytics complements graduate work in business administration with modern methods of statistical analysis, data management, and decision analysis. The program emphasizes foundational principles of business and data science as well as practical leadership and analytical skills. The foundation includes courses from the following subjects: financial and managerial accounting, information technology, corporate finance, microeconomics, macroeconomics, ethics, organizational behavior, marketing, operations and production management, quantitative methods/statistics. Students with undergraduate business majors may be able to waive most or all of these foundations. Through careful planning, students with backgrounds in engineering, liberal arts, or science may complete the foundation courses as part of an undergraduate minor or through pursuing the Reh Fundamentals program offered online, year round so that students can complete them ahead of their admit term.

Program Objectives:

The objectives and expected outcomes for this program include the following:

- Develop proficiency in managing large databases and use of a variety of analytical methods to solve problems in a range of business domains.
- Ability to synthesize complex analytical findings into clear visual dashboards as well as author explanations to communicate data-driven recommendations effectively to non-technical stakeholders and C-suite executives.
- Apply advanced organizational behavior principles and leadership disposition to effectively manage, motivate, and lead diverse teams; demonstrating strong interpersonal and managerial communication skills.

- Synthesize business solutions that are multifaceted by integrating core knowledge across business disciplines to successfully analyze complex organizational problems, leading to making cohesive, ethical business decisions.
- Evaluate global market dynamics and cross-cultural management challenges that equip today's leader with the awareness/skills to successfully compete in international markets.
- Analyze an organization's internal competencies/capabilities as well as the external competitive environment to construct long-term strategic plans that are both agile and structured for success in navigating market disruptions and competition.

Beyond the foundation, the 38 credits of the MBA Business Analytics degree program consist of ten two-credit interrelated core modules, four fundamental data analytics courses, as well as two specialized electives which also include a professional internship or professional project option.

The MBA Business Analytics program is offered at the Potsdam campus. All classes are taken in the classroom and follow the semester calendar.

Ten Core MBA modules include:

AC 603	Management Accounting
OM 606	Supply Chain Management
EC 604	Applied Economics
OS 608	Organizational Behavior and Performance Management
FN 607	Financial Management
OS 610	Strategic Planning (capstone course)
IS 605	Information Systems
MK 609	Marketing Management
OM 602	Decision Analysis and Supply Chain Modeling
SB 609	Corporate Ethical Decision Making

Core Data Analytics coursework:

IA 510	Database Modeling
IA 530	Probability and Statistics for Analytics

IA 605	Data Warehousing
IA 640	Information Visualization

Six credits of electives/experiential coursework based on advisement:

IA 650	Data Mining
IA 651	Machine Learning
IA XXX	Free Elective
SI 500 or IS 687	Professional Internship or Professional Project

A Strategic Planning module (2 credits) is offered as a 7 week course during the fall or spring term, depending on the student's study plan. The other modules are taught for 7 weeks each during the Fall term only unless special scheduling plans are made for a cohort.

Length of Program
There are 2 study options for the MBA Business Analytics program:

1. This program is designed to be completed in three academic semesters, with either a fall or spring semester start.
2. Two years, or four academic semesters planned at an individual student basis can also be accommodated.

While most students begin the MBA Business Analytics program in the Fall semester, Spring starts can be accommodated with some changes to the overall academic schedule. Academic plans for spring students will be discussed with the program director at the time of entry.

Global Supply Chain Management MBA
The MBA consists of ten foundation knowledge disciplines and 35 credit hours of advanced graduate work. The foundation includes courses from the following subjects: financial and managerial accounting, information technology, corporate finance, microeconomics, macroeconomics, ethics, organizational behavior, marketing, operations and production management, quantitative methods/statistics. Students with undergraduate business majors will be able to waive most or all of these foundations. Through careful planning, students with backgrounds in engineering, liberal arts, or science may complete the foundation courses as part of an undergraduate minor or through pursuing the Business Concepts program, preceding the start of the regular Fall semester. 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.

Program Objectives/Outcomes:

- Leverage quantitative analysis, information technology, and operations management principles to evaluate, design, and continuously improve production systems and supply chain workflows, transforming technical data into strategic, bottom-line value.
- Apply advanced organizational behavior principles and leadership disposition to effectively manage, motivate, and lead diverse teams; demonstrating strong interpersonal and managerial communication skills.
- Synthesize business solutions that are multifaceted by integrating core knowledge across business disciplines to successfully analyze complex organizational problems, leading to making cohesive, ethical business decisions.
- Evaluate global market dynamics and cross-cultural management challenges that equip today's leader with the awareness/skills to successfully compete in international markets.
- Analyze an organization's internal competencies/capabilities as well as the external competitive environment to construct long-term strategic plans that are both agile and structured for success in navigating market disruptions and competition.

Beyond the foundation, the 35 credits of the MBA, Global Supply Chain degree program consist of ten two-credit interrelated core modules, two three-credit Supply Chain core, two Supply Chain electives, and a three credit experiential course. The core modules stress business functions, emphasizing the development of communication, interpersonal, and managerial skills.

The MBA Global Supply Chain Management is offered at the Potsdam campus. All classes are taken in the classroom and follow the semester calendar.

The core module titles are:

AC 603	Management Accounting
OM 606	Supply Chain Management
EC 604	Applied Economics
OS 608	Organizational Behavior and Performance Management
FN 607	Financial Management
OS 610	Strategic Planning

IS 605	Information Systems
MK 609	Marketing Management
OM 602	Decision Analysis and Supply Chain Modeling
SB 609	Corporate Ethical Decision Making

A Strategic Planning module (2 credits) is offered as a 7 week course during the Spring term or as an accelerated interim term on-line course. The other modules are taught for 7 weeks each during the Fall term.

There are two required Supply Chain courses, and then two electives that make up the subject depth of the Global Supply Chain Management curriculum:

OM 685	Quality Management and Process Improvement *(required)*
SB 641	Advanced Topics in Supply Chain Management *(required)*
Elective Options:	
EC 652	Industrial Organization in the Supply Chain
OM 671	Supply Chain Environmental Management
SB 681	Logistics Strategies
XXX	Other appropriate OM/IA/SB electives chosen with academic advisor

Experiential Learning Requirement
Experiential learning is a strong part of Clarkson's culture so each student participating in the Residential MBA program is required to take a three credit hour experiential course. Currently, the experiential requirement can be satisfied by completing the Seminar in International Business (part of the Reh School's Global Business Program), or by taking the SB 696 Global Business Strategies course (this requires a special exemption approval). The Seminar in International Business is designed to provide knowledge and new perspectives regarding international business, and helps develop critical skills necessary to compete and succeed in the global market. This experience includes a 2-3 week trip to an international destination, often led by the faculty from that area. This trip also helps students explore the global management issues facing business leaders and organizations in different parts of the world.

SB 693	Seminar in International Business
SB 696	Global Business Strategies

Length of Program
There are 3 length-of-study options for the MBA, Global Supply Chain Management program:

- The Accelerated One-Year study plan, with all 35 credits completed over the course of 2 consecutive semesters, or
- One and one half years study plan with core modules and electives completed over the 3 consecutive semesters, or
- Two years, with core modules and electives completed over the 4 consecutive semesters

While most students begin the MBA program in the Fall semester, Spring starts may be accommodated on an individual basis. Students starting in the Spring have their choices of elective courses in that first semester limited to those that do not have core modules as prerequisites and the Strategic Planning module cannot be taken during the first semester.

Healthcare Management MBA
The Master of Business Administration (MBA) in Healthcare Management is a fully online graduate program designed for working, and soon to be working, professionals seeking to advance their careers in healthcare organizations. The program prepares students to navigate the business, operational, and leadership dimensions of healthcare delivery through applied, graduate-level coursework in healthcare finance, strategy, operations, marketing, economics, and information systems. Grounded in a commitment to ethical practice, social responsibility, and student-centered learning, the curriculum develops the analytical, managerial, and leadership competencies required to address complex challenges facing healthcare organizations.
The program serves students with diverse educational backgrounds and work experiences fully supporting and encouraging those with limited or no clinical and managerial experience who matriculate on both a part-time and full-time basis. Graduates are prepared to assume leadership and management roles across a broad range of healthcare settings and health systems.

The MBA in Healthcare Management program is a 42 credit hour program (a total of 14 3-credit hour courses). Students with extensive prior academic work in specific subjects may reduce the number of courses required by waiving or transferring courses. Course waivers may be based on undergraduate work and apply only to required courses. Transfers must be graduate courses and may apply to required or elective courses. Program requirements may be reduced by up to six credit hours (from 42 to 36) with course waivers or transfers. .

The MBA in Healthcare Management program follows the quarter calendar and is completed online. The course numbers and titles for the thirteen required courses in the MBA in Healthcare Management program are:

AC 604	Financial and Managerial Accounting for Decision Making
HC 600	Introduction to Health Systems
HC 605	Healthcare Operations
HC 617	Healthcare Finance
HC 620	Healthcare Economics
HC 626	Healthcare Marketing
HC 647	Statistical Methods for Data Analytics
HC 648	Health Informatics
HC 650	Health Policy Dynamics
HC 651	Health Systems Management
HC 674	Legal Aspects of Healthcare
HC 680	Managerial Epidemiology
HC 681	Strategic Issues for Healthcare Organizations (Health Capstone)

One elective can be chosen from:

HC 604	Hospital Analytics
HC 606	Payer Analytics
HC 643	Advanced Applications of Healthcare Data Analytics
HC 627	Healthcare Strategy

Alternatively, any non-equivalent course offered as part of the Online MBA program could be used as an elective.

Program Length
Full time students may complete the program in 1 year, and part-time students usually complete the program in 2 to 5 years with an average completion of 2 years.

Program Learning Outcomes:
The MBA in Healthcare Management prepares graduates to:

- Think Critically — Approach complex healthcare problems analytically, drawing on evidence and data to inform sound decisions.
- Communicate Effectively — Engage professional stakeholders across healthcare environments with clarity and confidence, in both written and oral forms.
- Manage Healthcare Organizations — Apply business planning, monitoring, and control practices to the operational and financial functions of healthcare organizations.
- Lead with Purpose — Exercise leadership that advances organizational goals and supports the people and teams within healthcare settings.
- Collaborate Across Boundaries — Contribute meaningfully to interdisciplinary teams and professional partnerships in pursuit of shared goals.
- Apply Healthcare Management Knowledge — Integrate knowledge of healthcare management, finance, marketing, strategy, economics, and accounting to address real-world organizational challenges.
- Act Ethically and Responsibly — Make principled decisions grounded in ethical frameworks and advance equitable, socially responsible practice in healthcare.

Chemical Engineering MS & PhD

Graduate education in Chemical Engineering concentrates in the following specialties:

Biomaterials
Chemical Mechanical Planarization
Chemical Reaction Engineering and Catalysis
Electrochemical Processing
Energy Technologies
Functional Polymers and Nanocomposites
Modeling and Control of Biomedical Systems
Molecular Simulations
Multi-component Mass Transfer Separations
Plasma Processing
Thermochemical processes and non-equilibrium reactions
Water Desalination
Water Treatment of Legacy and Emerging Contaminants

MS Prerequisites

A prerequisite of BS or BE in chemical engineering. Those with degrees in other science or engineering disciplines may also be admitted, but will be required to make up undergraduate course deficiencies. The following are prerequisite courses for MS in Chemical Engineering: CH 210, 220, 260, 320, 330, 350, 360, 370, 430, 460, or their equivalent.

Students with a BS or BE in Chemical Engineering may complete this program in 2 calendar years (24 months).

MS in Chemical Engineering Requirements

1. Required courses are:
   a. CH 546 Chemical Reactor Analysis
   b. CH 560 Transport Phenomena
   c. CH 561 Chemical Engineering Analysis
   d. CH 571 Advanced Chemical Engineering Thermodynamics

   The student must obtain a Cumulative Grade Point Average (GPA) of 3.000 or better in the required CH courses.
2. Two additional 3-credit hour technical graduate courses selected in consultation with the student's advisor. David D. Reh School of Business courses cannot be taken to satisfy this requirement.
3. 2 credit hours of CH 610 (Seminar). (While in residence, all students are required to attend seminar, even if they are not enrolled in CH 610).
4. 10 credit hours of CH 611 Thesis. All students are expected to start their thesis research at the beginning of their first semester in residence.
5. The MS thesis must be orally presented and defended before a committee of three or more faculty members, at least two of whom are from the Department. A typical curriculum schedule follows. Individuals with an undergraduate degree in chemistry or physics have a different schedule - refer to "Requirements for the MS degree in Chemical Engineering for BS Chemists and Physicists."

First Semester	**Second Semester**
3 Three-credit courses (typically CH 560, CH 561 and an elective)	3 Three-credit courses (typically CH 546, CH 571 and an elective)
Five credits of thesis	Five credits of thesis
One credit of seminar	One credit of seminar
Third Semester	**Fourth Semester**
One credit of thesis	One credit of thesis

The Master of Science is a thesis-based degree; each student is required to complete and defend a research-based thesis.

MS in Chemical Engineering for BS Chemists or Physicists Requirements
A program is available for qualified BS chemists and physicists that will permit them to earn an MS in Chemical Engineering in 4 semesters. During the course of study, the student will take almost all the required courses in the chemical engineering undergraduate curriculum, as well as the chemical engineering graduate level courses required for the MS program.

A typical program, which may be altered depending on the background of the student, is illustrated below.

First Semester	Credits	Second Semester	Credits
CH 501 Directed Study in Chemical Engineering Principles I (CH 220, 320, 330)	3	CH 502 Directed Study in Chemical Engineering Principles II (CH 260, 360, 370, 430)	3
CH 561 (or CH 611)	3	CH 571 (or CH 611)	3
Graduate Elective	3	Graduate Elective	3
CH 610 Seminar	1	CH 610 Seminar	1
Total	**10**	**Total**	**10**
Third Semester	**Credits**	**Fourth Semester**	**Credits**
CH 560	3	CH 546	3
CH 611 (or CH561)	3	CH 611, 1 cr. (or CH 571, 3 cr.)	1 or 3
CH611 Thesis	4		
Total	**10**	**Total**	**4 or 6**

PhD Prerequisites
A prerequisite of BS (or BE) or MS (or ME) in chemical engineering, materials science, chemistry, or other areas. The following are prerequisite courses for a PhD in chemical engineering: CH 210, 220, 260, 320, 330, 350, 360, 370, 430, 460, or their equivalent.

Students with a BS (or BE) or MS (or ME) in chemical engineering, materials science, chemistry, or other areas may complete the program in 5 calendar years (60 months).

Requirements for PhD in Chemical Engineering:
The following requirements apply exclusively to chemical engineering PhD students. The student must take the 4 courses required for the MS degree program or their equivalent:

1. CH 546 Chemical Reactor Analysis
2. CH 560 Transport Phenomena
3. CH 561 Chemical Engineering Analysis
4. CH 571 Advanced Chemical Engineering Thermodynamics

Additional Program Requirements and Procedures for PhD in Chemical Engineering:

1. The student must obtain a Cumulative Grade Point Average (GPA) of 3.000 or better in the required CH courses
2. Students entering the PhD program should register for a minimum of 10 credit hours each semester until they satisfy the 90 credit hour requirement
3. The student must take a minimum of 15 credit hours in the major field, a minimum of 9 credit hours in the minor field, and a minimum of 6 credit hours taken from a department other than chemical engineering
4. The student must take a qualifying examination and adhere to the guidelines described in the section *"PhD Qualifying Examination and Research Proposal Review"*
5. The student must take the PhD qualifying examination no later than 18 months after completing the MS requirements. Students given direct entry into the PhD program must take the qualifying exam no later than 18 months after being invited into the PhD program. Students entering with a MS degree must take the qualifying exam no later than 18 months from the time when they enter the graduate program.
6. Minimum course work is 30 credit hours (this is equivalent to 4 three-credit courses beyond MS). David D. Reh School of Business courses cannot be taken to satisfy this requirement
7. 6 credit hours of seminar (CH610)
8. 54 credit hours of thesis
9. A maximum of 30 credit hours including research credits may be transferred from a Master's degree towards the PhD requirements (B grade or better). To transfer credits for the required CH courses, student's faculty adviser should determine the eligibility for credit transfer. It is recommended that students take at least 2 of the 4 required CH courses even if they completed all the courses in their previous institutions
10. While in residence, all students are required to attend all seminars

Direct Entry into PhD Program

First-year graduate students whose past academic and first-semester records at Clarkson indicate outstanding research potential will be invited to enter directly into the PhD program. The thesis required in the regular MS program will be bypassed.

The appropriate program administrator will decide which students will be invited into this program at the beginning of the second semester of the student's residence on campus. The MS degree is awarded to the student upon completion of 40 credit hours and after passing the PhD qualifying examination.

Financial Assistance

Financial support for students enrolled in the PhD program is usually in the form of research assistantships, and not teaching assistantships. Continuation of support is based on academic standing and research accomplishments, and may be terminated

after written notification by the Graduate Committee for lack of acceptable progress in either area. Support will continue for no more than 5 years beyond the BS or 3 years beyond the MS. Requests for continued support must be made in writing to the Graduate Committee.

PhD qualifying examination and research proposal review

Within 18 months following completion of requirements for the Master of Science degree or arrival at Clarkson (whichever is later), the student must complete a "Doctoral Research Proposal" and submit this proposal to the Examining Committee. For students with a BS degree who, because of demonstrated exceptional abilities, are permitted to seek direct entry into the PhD program, the proposal must be completed within 18 months of entry into the PhD program. The student must meet with the Examining Committee as early as possible after being admitted to the PhD program to discuss plans for the Research Proposal. No earlier than 1 full week subsequent to submission of the Research Proposal, the committee members and the student will meet to conduct a PhD qualifying examination. The student will formally present the contents of the proposal to the committee in the form of a seminar of approximately 30 minutes duration. The presentation will be followed by an oral defense of the proposed research and related topics.

The Examining Committee, which will also serve as the student's Doctoral Committee, will consist of a minimum of five members, including the student's thesis advisor and at least one faculty member from a department other than Chemical and Biomolecular Engineering. At least three of the committee members must be from Chemical and Biomolecular Engineering. At least four of the committee members must be on the Clarkson faculty. One or more external examiners, holding the PhD degree, may also serve on the Committee. The thesis advisor will recommend the names of prospective committee members to the Graduate Committee. The Graduate Committee, with the approval of the Graduate School, will appoint the Examining Committee. While the thesis advisor will serve as the Chair of the Doctoral Committee, the advisor will not be the Chair of the Examining Committee. Hence, the advisor should also recommend a Chair to the Graduate Committee. The research proposal itself should represent eighteen months effort in defining a problem, reading pertinent literature, specifying plans for theoretical and/or experimental work and writing the report. A Master's Thesis does not constitute a Doctoral Research Proposal, for which a suggested outline can be found in the Chemical & Biomolecular Engineering Program Graduate Handbook. In particular, the proposal should stress the definition, importance and uniqueness of the problem. Based on each committee member's preference, either a hard or an electronic copy of the proposal should be provided to each member at least one week prior to the qualifying exam.

If, subsequent to the qualifying examination and during the course of the doctoral research, the student or thesis advisor decides that a significant change in the direction of the research project is warranted, the student's Doctoral Committee should be so

informed. A re-examination of the student will not be involved. In any event, it is recommended that annual meetings be held with the Doctoral Committee to review the student's progress and to agree on work remaining to be completed.

Chemistry MS & PhD

The Chemistry & Biomolecular Science program offers a graduate program leading to MS and PhD degrees in Chemistry and has provided a first class education to students of chemistry, material science and biomolecular science for more than 50 years. The diverse, yet complementary, research interests of our faculty researchers provide incoming students with a broad variety of research topics to choose from, such as: bio-nanotechnology, smart surfaces and interfaces, functional and stimuli responsive materials, nano-therapeutics, diagnostics and biosensors. Advanced study through coursework and independent research under the guidance of a faculty adviser will prepare students for leading positions in industry or academia. Graduate researchers will work on projects that address many of today's most pressing problems related to the environment, advanced manufacturing, sustainable energy and healthcare. Departmental research is supported by federal grants, primarily from the National Science Foundation (NSF), as well as New York State and private industry.

MS Prerequisites

Applicants must possess a baccalaureate (BS) degree in chemistry or a related major (e.g. material science, biochemistry, biophysics, environmental science) and must have completed the following minimum college course preparation:

1. Introductory chemistry courses including general chemistry as well as specialized classes in organic chemistry, analytical chemistry, physical chemistry, inorganic chemistry, and biochemistry
2. Basic training in mathematics and physics

MS Degree in Chemistry Requirements

1. A minimum of 30 credit hours of graduate coursework, with a minimum of 18 credit hours of graduate chemistry courses.
2. Satisfactory completion of a research project or comparable professional experience.
3. A minimum cumulative GPA of 3.0 in courses used to meet graduate requirements.
4. At least one year of academic study beyond the undergraduate degree. All work must be completed in five calendar years.
5. A thesis must be prepared and orally defended to a committee consisting of a minimum of three committee members.
6. Candidates in chemistry must complete a minimum of two credit hours of seminar (CM900) and present one seminar as part of their degree requirements.

Additional Program Requirements for a MS in Chemistry

1. Placement Exams; Placement exams are administered to permit the evaluation of a student's preparation for graduate work. The results of the placement exams have an advisory function in determining possible remedial coursework to support the student's success in the program and/or will assist the student/advisor team in selecting graduate courses. Every chemistry graduate student must take four out of five placement examinations before registering and attending classes for the first semester as a graduate student. A student is required to show satisfactory preparation for graduate work in at least three areas of examination. These exams are administered prior to the beginning of fall semester, and as needed. The placement examinations will be at a level corresponding to a good undergraduate background in chemistry.
2. The required minimum credit hours (30) are in addition to any undergraduate courses or remedial study required for those students who fail the placement examinations. To successfully complete an MS degree in chemistry a student must take a minimum of 18 credit hours of graduate courses, excluding seminar (CM900). Research credit hours (CM990), Thesis, Dissertation or Special Project credits accepted towards the degree cannot exceed ten. No more than two of the six required courses for the MS degree can be directed study or special topics courses. The student who plans to continue working toward the PhD degree in chemistry after receiving the MS degree should take the PhD regulations into account when planning their MS program. All of the courses used in the fulfillment of course requirements must have catalog numbers of 500 and above.
3. A candidate for the MS degree in chemistry must perform research satisfactory to the advisor and must submit a written report/thesis on the results of their work and orally defend their thesis to a committee of three committee members.

Program Length

All work required for the **master's degree in chemistry** is to be completed within five calendar years, although it is normal to complete this degree in 2 years.

PhD Prerequisites

Applicants must possess a baccalaureate (BS) or a master (MS) degree in chemistry or a related major (e.g., material science, biochemistry, biophysics, environmental science) and must have completed the following minimum college course preparation:

1. Introductory chemistry courses including general chemistry as well as specialized classes in organic chemistry, analytical chemistry, physical chemistry, inorganic chemistry, and biochemistry
2. Basic training in mathematics and physics

PhD Degree in Chemistry Requirements

1. A minimum of 90 credit hours, including at least 24 credit hours coursework and a minimum of six credit hours of seminar.

2. A minimum of three academic years of full-time graduate study or the equivalent in part time study.
3. Satisfactory completion of the PhD comprehensive examination for admission to candidacy ("candidacy procedure") within two years of full-time study after admission to the PhD program. After completion of the candidacy procedure, the student will be identified as a "PhD Candidate."
4. A written dissertation must be submitted by each candidate and defended orally as part of the final examination.
5. Any changes in the student's degree program must be approved by the Division Head and the Academic Dean.

Additional Program Requirements for a PhD in Chemistry

1. Placement Exams; Placement exams are administered to permit the evaluation of a student's preparation for graduate work. The results of the placement exams have an advisory function in determining possible remedial coursework to support the student's success in the program and/or will assist the student/advisor team in selecting graduate courses. Every chemistry graduate student must take four out of five placement examinations before registering and attending classes for the first semester as a graduate student. A student is required to show satisfactory preparation for graduate work in at least three areas of examination. These exams are administered prior to the beginning of every semester, as needed. The placement examinations will be at a level corresponding to a good undergraduate background in chemistry.
2. The required minimum credit hours (90) are in addition to any undergraduate courses or remedial work required for those students who fail the placement examinations. No more than two directed study or special topics courses are acceptable toward the PhD degree. All of the courses used in the fulfillment of course requirements must have catalog numbers of 500 and above and must meet all established requirements. Selection of courses will be made in consultation with the student's advisor and influenced by the student's area of interest.
3. A candidate for the PhD degree in Chemistry must complete all seminar requirements, a minimum of 6 credit hours of seminar (CM900) and presentation of 3 seminars. The candidate can transfer an external oral presentation at a national or regional meeting which has been selected in consultation with the PhD advisor as the equivalent of 1 of the 3 required seminars. The topic of the final seminar for a PhD candidate is expected to be the student's own doctoral research. Students will pass or fail the course (CM900) on the basis of their performance as speakers, participants and assistants, and also on the basis of their attendance. At least 60% seminar attendance during each semester is required.

Program Length

After required comprehensive examinations are passed, all work done for the doctorate

degree in chemistry is to be completed within a period of seven calendar years, although it is normal to complete this degree in 5 years.

Clinical Leadership in Healthcare Management MS

The Master of Science (MS) in Clinical Leadership degree is designed for current and future clinical practitioners: physicians, nurses, pharmacists, therapists, and other healthcare professionals who wish to better understand the healthcare industry and the environment in which it exists, or who aspire to clinically-related leadership roles. The goal of the program is to broaden the horizons of students by providing them with knowledge and skills in health policy and health management.

The MS in Clinical Leadership follows the quarter calendar and can be completed online, in the classroom, or utilizing any mix to meet the individual student's needs. The classroom courses are offered in the evening at the CRC.

The MS in Clinical Leadership is a 36 credit program (a total of 12, 3-credit courses). Like the Healthcare MBA, students with extensive prior academic work in specific subjects may reduce the number of courses required by waiving or transferring courses. Course waivers may be based on undergraduate work and apply only to required courses. Transfers must be graduate courses and may apply to required or elective courses. Program requirements may be reduced by up to 6 credit hours (from 36 to 30) with any combination of course waivers and transfers.

The course numbers and titles for the eleven required courses in the Clinical Leadership MS are:

AC 604	Financial and Managerial Accounting for Decision Making
HC 600	Introduction to Health Systems
HC 605	Healthcare Operations
HC 617	Healthcare Finance
HC 620	Healthcare Economics
HC 651	Health Systems Management
HC 650	Health Policy Dynamics
HC 674	Legal Aspects of Healthcare
HC 680	Managerial Epidemiology
HC 681	Strategic Issues for Healthcare Organizations (Capstone)
HC 647	Statistical Methods for Data Analytics

The one elective may be selected from any elective in the MBA in Healthcare Management program or non-equivalent courses offered as part of the Online MBA program.

Program Length
Full-time students may complete the program in one year. Part-time students may complete the program in 2 to 3 years.

Program Learning Outcomes
The MS in Clinical Leadership prepares graduates to:

- Think Critically — Approach complex healthcare problems analytically, drawing on evidence and data to inform sound decisions.
- Communicate Effectively — Engage professional stakeholders across healthcare environments with clarity and confidence, in both written and oral forms.
- Manage Healthcare Organizations — Apply business planning, monitoring, and control practices to the operational and financial functions of healthcare organizations.
- Lead with Purpose — Exercise leadership that advances organizational goals and supports the people and teams within healthcare settings.
- Collaborate Across Boundaries — Contribute meaningfully to interdisciplinary teams and professional partnerships in pursuit of shared goals.
- Apply Healthcare Management Knowledge — Integrate knowledge of healthcare management, finance, marketing, strategy, economics, and accounting to address real-world organizational challenges.
- Act Ethically and Responsibly — Make principled decisions grounded in ethical frameworks and advance equitable, socially responsible practice in healthcare.

Construction Engineering Management MS

MS in CEM Prerequisites
Bachelor's Degree in the following or allied fields:

- Civil Engineering
- Mechanical Engineering
- Electrical Engineering
- Construction Engineering
- Construction Management
- Engineering Management
- Civil Engineering Technology
- Construction Engineering Technology
- Management
- Business

No minimum grade point average is required for admission; however, a superior record of academic achievement is expected of all applicants.

MS in Construction Engineering Management Requirements
The program requires the completion of 30 credit hours.
The masters core courses include (12 credit hours):

- Three CEM Courses (9 credit hours) that represent core topical areas. The following are presently those courses (subject to change based on current market conditions and/or research):
    - CE 506 Advanced Construction Engineering
    - CE 510 Sustainable Building & Infrastructure
    - CE 591 Special Topics in Construction Engineering Management
- CE590 Graduate Degree Completion Project (3 credit hours) under the oversight of the Director of the CEM Program. The CEM project advisor will be selected through mutual agreement between the Director of CEM, the student, and project advisor. At the completion of the project work, the student will prepare a formal report and submit it to the project advisor. When the report is approved by the advisor, the project credits will be formally granted.

Construction Engineering Management Elective Courses (18 Credit Hours). These include any CE coded course other than CE590, CE595, CE610, CE612, and/or CE684 and courses offered by the Reh School of Business through their MBA or MSEM program(s). An initial list of CEM elective courses includes:

- CE 502 Applications of Geospatial Analysis
- CE 505 Project Controls and Lean Methods in Construction
- CE 508 BIM for Prefab
- CE 541 Bridge Engineering
- EM 660 Financial Analysis & Cost Management
- EM 650 Operations Strategy & International Competitiveness
- OM 680 Strategic Project Management
- EM 640 Leading and Managing Organizations
- OS 657 Leading Organizational Change
- OS 666 Negotiations & Relationship Management
- EM 630 Law for Engineers
- EM 620 Enterprise Sustainability

Length of Program
Full-time students may complete the degree in one calendar year. Part-time students may complete the MSCEM degree in CEM within three years.

Advanced Certificate in Construction Engineering Management (CEM)
The Certificate Program in Construction Engineering Management (CEM) provides a post undergraduate sequence of courses and subjects that deepen understanding in key construction engineering topics. Using a variety of methods, students engage with

professionals, subject matter experts, and practitioners in the field, providing current working knowledge of the state of the industry.

Required courses (9 credits)	
CE 506	Advanced Construction Engineering
CE 510	Sustainable Infrastructure and Building
CE 591	Special topics in Construction Engineering Management

Program Length
Most candidates complete their certificate program in 9 months to 1.5 years.

Civil and Environmental Engineering MS & PhD

Graduate education in civil and environmental engineering concentrates in the following specialties:

1. Environmental Engineering
2. Infrastructure Systems and Materials (ISM)
3. Water Resources Engineering
4. Construction Engineering Management

MS Prerequisites
BS, BE, or equivalent degree from an accredited program in Civil and Environmental Engineering or other engineering discipline is required. Applicants with degrees in disciplines other than engineering may be required to demonstrate proficiency through additional undergraduate coursework as determined by the program Graduate Committee. This may comprise an additional semester of study for which graduate credit cannot be granted.

No minimum grade point average is required for admission; however, a superior record of academic achievement is expected of all applicants.

MS in Civil and Environmental Engineering Program (except Construction Engineering Management) Requirements

1. 30 total credit hours with all coursework approved at the graduate level, which must include:
    a. 18 credit hours of graduate coursework (500-600 level courses)
    b. 2 credit hours of seminar work
    c. Maximum of 10 course credit hours of transfer credit (grade of B or better).
2. Satisfactory completion of one of the following (a or b) for 10 credits.
    a. A written thesis based on independent research;

i. All students must complete a thesis and defend it orally to a committee consisting of a minimum of three faculty members. The committee will be appointed by the student's advisor and approved by the graduate committee and the Division Head. After approval by the examining committee, a thesis requires signature approval by the Dean of the Graduate School and submission following the process defined by The Graduate School.

b. An appropriate, professionally oriented special project and project supporting coursework;
    i. All students must complete 2-3 project related CE-500 or 600 level courses (totaling 6-9 credit hours) from Environmental, ISM, or Water Resources. All students must also complete a Master of Science Project (totaling 1- 4 credit hours of work of CE 590) under a project advisor. The project advisor will be selected through mutual agreement between the student and the project advisor. At the completion of the project work, the student will prepare a formal report and submit it to the project advisor. When the report is approved by the advisor, the project credits will be formally granted.

3. Pass a group of core courses in one of the following professional specialties comprising a minimum of 12 credit hours: Environmental, Infrastructure Systems and Materials (ISM), or Water Resources Engineering.
4. All MS work to be completed within 5 years.

MS in Civil and Environmental Engineering with focus in Construction Engineering Management Requirements

1. 30 credit hours
2. Completion of three (3) core Construction Engineering Management Courses (totaling 9 credit hours):
    a) CE 506 Advanced Construction Engineering Management
    b) CE 510 Sustainable Infrastructure and Building
    c) CE 591 Special Topics in Construction Engineering Management
3. Completion of three (3) Civil Engineering electives (totaling 9 credit hours) from any CE coded course other than CE590, CE595, CE610, CE612, and/or CE684.
4. Completion of three (3) courses (totaling 9 credit hours) offered by the Reh School of Business through their MBA program(s).
5. Completion of a Master's Project (totaling 3 credit hours of work) under the oversight of the Director of the CEM Program. The CEM project advisor will be selected through mutual agreement between the Director of CEM, the student, and project advisor. At the completion of the project work, the student will prepare a formal report and submit it to the project advisor. When the report is approved by the advisor, the project credits will be formally granted.

Length of Program
Full-time students may complete the degree in one year. Part-time students may complete the MS degree in CEM within three years.

PhD prerequisites
A MS degree from a program in Civil and Environmental Engineering or other engineering discipline is required for admission. Applicants with degrees in disciplines other than engineering may be required to demonstrate proficiency through additional undergraduate coursework as determined by the program Graduate Committee. This may comprise an additional semester of study for which graduate credit cannot be granted. No minimum grade point average is required for admission; however, a superior record of academic achievement is expected of all applicants.

PhD in Civil and Environmental Engineering Requirements

1. The following are minimum requirements:
    a. 90 credit hours beyond the B.S.
    b. 39 credit hours of coursework
    c. 15 credit hours in the major field
    d. 9 credit hours in the minor field
    e. 6 credit hours from a department other than the one in which the student is housed (courses double listed in CE and another department do not count in these 6 credit hours)
    f. 6 credit hours of seminar
    g. At least half of the total credit hours (45) used to satisfy degree requirements, including Thesis credit, must be earned (while registered for PhD study) on Clarkson campus where the degree is to be granted.
2. Credit Transfer
    a. A maximum of 30 credit hours of transfer credit is allowed. These can be graduate-level coursework and/or research credits. Up to 10 research credits can be transferred towards a PhD. Transfer credits cannot fulfill the graduate seminar credit requirement.
    b. Only graduate-level courses with a grade of B or better can be transferred towards program degree requirements. With the exception of research credits, pass/fail/satisfactory courses cannot be transferred to satisfy program degree requirements.
    c. All courses/research hours that are being transferred must be verifiable with transcripts and must have credit hours associated with them. An official transcript showing the completion of courses must be on file with the Graduate School. There must be demonstrated credit equivalency between programs, and the transfer evaluator should be able to determine the course content equivalency based on the course description.
    d. The advisor should serve as the official course transfer evaluator with endorsements from the graduate committee chair and the Head of the division, respectively.

3. All work to be completed within 7 years after the candidacy procedure is completed
4. Pass a group of core courses in one of the following professional specialties comprising a minimum of 15 credit hours:
    a. Environmental
    b. Infrastructure Systems and Materials (ISM)
    c. Water Resources

Advisory Committee, Preliminary Exam, Research Proposal, and Dissertation Defense
Additional requirements in CEE for PhD students follow.

PhD Advisory Committee
The Research Advisor recommends the membership of the PhD Advisory Committee using the Graduate Committee Appointment form to go to the Division Head and the Academic Dean for their approval. The committee should be appointed as soon as possible but within twelve months after entry into the PhD program. The Advisory Committee and the Research Advisor will approve the courses required to satisfy the student's minor. This committee must consist of at least five members qualified to sit on such a committee, at least one of whom must be from outside the candidate's department. At least three committee members must have an appointment in Civil and Environmental Engineering. The research advisor will not act as the chair of the committee without the approval of the Division Head. The purpose of the committee is to provide guidance to the student for the coursework and dissertation research.

PhD Comprehensive Examination
Satisfactory completion of this examination must be done within two to three years of full-time study after admission to the PhD program. In CEE, the PhD Comprehensive Examination consists of two parts: (a) a comprehensive examination and (b) a research proposal defense.

The comprehensive examination should be taken within 24-36 months after entry into the PhD program. It will have a written portion consisting of a one-week take-home exam with access to research materials and an oral portion to be administered by the Advisory Committee within one month after the conclusion of the written exam. In the event of failure of the written exam, the Advisory Committee may, at its discretion, elect not to administer the oral portion. The outcome of the exam is determined by a vote of the committee, with no more than one dissenting vote permitted for passage. Failure to pass the comprehensive examination twice is grounds for dismissal from the program.

The second part of the PhD Comprehensive Examination is the Research Proposal Defense Presentation. Within six months after the successful completion of the comprehensive examination and less than 36 months from matriculation, the Ph.D. student must submit and orally present and defend a research proposal to the Ph.D. Advisory Committee. This presentation may be administered simultaneously with the

oral portion of the comprehensive examination. Upon successful completion of the Engineering PhD Candidacy Exam, the student is admitted to Candidacy for the Ph.D. degree.

Core Courses in Professional Specialties
Professional concentrations require a minimum of 12 (M.S.) or 15 (Ph.D.) credit hours of relevant coursework. The following core courses are required for each of the professional concentrations. Additional relevant courses may be necessary to complete the required credit hours:

Environmental Engineering	
CE 579	Water and Wastewater Treatment Design or satisfied by an appropriate course as an undergraduate
CE 580 OR CE 577/CH 576/CM 576	Environmental Chemistry Atmospheric Chemistry
CE 584	Chemodynamics
CE 582 OR CE 586	Environmental Systems Analysis and Design Industrial Ecology
and one of the following:	
CE 681	Environmental Physico-Chemical Processes
CE 682	Environmental Biological Processes

Infrastructure Systems and Materials	
CE 501	Fracture Mechanics of Concrete Structures
CE 511	Applied Machine Learning for Civil Engineers
CE 512	Structural Dynamics
CE 513	Elastic Waves and Non-Destructive Tests
CE 514	Constitutive Modeling for Geomaterials
CE 515	Foundations, Stability, and Retaining Structures

CE 516	Advanced soil Mechanics
CE 517	Foundations and Ground Improvement
CE 518	Soil Structure Interaction
CE 520	Computational Methods of Structural Analysis
CE 521	Advanced Mechanics of Composite Structures
CE/ME 527	Advanced Fluid Mechanics
CE 538	Introduction to Finite Element Method
CE 541	Bridge Engineering
CE 549	Experimental Methods in Structures
CE 551	Theory of Elasticity
CE 552	Advanced Strength of Materials
CE 553	Properties and Performance of Concrete Materials
CE 554	Continuum Mechanics
CE 556	Engineering Analysis
CE 563	Railroad Engineering
CE 622	Uncertainty Quantification and Optimization in Computational Mechanics
CE 631	Cement Chemistry
CE 633	Plasticity
ME 531	Computational Fluid Dynamics

Water Resources Engineering

CE/ME 527		Advanced Fluid Mechanics
CE 554		Continuum Mechanics
CE 569		Watershed Analysis
CE 570		River Restoration

CE 571		Computational River Dynamics
CE 572		Advanced Open Channel Hydraulics
CE 573		Sediment Transport
CE 574		Ecohydraulics
CE 575		Coastal Engineering
CE 576		Hydraulic Engineering in Cold Regions
ME 531		Computational Fluid Dynamics

Computer Science MS

Clarkson Computer Science offers a graduate program leading to the degree of Master of Science (offered interdisciplinary with the Program of Electrical and Computer Engineering) in Computer Science. The program is designed to increase fundamental knowledge in computer science, provide a strong background in programming, prepare students for specialization in industry and research through taking targeted electives, and provide students with end-to-end problem solving through project development or research and thesis writing. The program provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests.

MS Requirements

In addition to the general requirements for the MS degree that are established by the University, a student is required to satisfy the following set of requirements:

1. A minimum of 30 credit hours of graduate level work
2. Each student's program of study must be approved by the Graduate Committee

Those students who are not fully prepared to pursue graduate work in computer science may be required to take the course CS 511, Foundations in Computer Science. In addition, students with very little to no background in computer science may be required to take undergraduate computer science courses, for which graduate credit will not be given.

Two options are offered, the non-thesis option and the thesis option:

Non-thesis option overview

The non-thesis option requires a minimum of 30 credit hours, of which a minimum of 24 must be coursework and a minimum of 6 must be project work, done by taking a two-course project sequence consisting of CS 613 and CS 614, and culminating in a project in computer science with a project report.

Thesis option overview
A minimum of 30 credit hours, of which a minimum of 18 must be coursework, a minimum of 2 must be seminar credits, and 10 must be thesis work, done by taking thesis credits under course number CS 634.

Common Requirements Across the Thesis and Non-thesis Options
The following requirements are common to both options, and provide foundational knowledge and breadth of knowledge in programming:

1. One foundation course: CS 547 Computer Algorithms.
2. Two courses that qualify as requiring a substantial amount of programming. Students are advised to consult the Graduate Committee of the Department of Computer Science to obtain a full listing of courses that qualify as requiring a substantial amount of programming. Under certain circumstances, the Graduate Committee may waive the requirement that the student take one or more of the above courses. Students are recommended to consult the Graduate Committee to determine if and what requirements can be waived. For each course waived, students will be required to take an alternate course in its stead in order to fulfill the requirement for 18 credit hours of coursework.

Additional Program Requirements for the Non-thesis Option for MS in Computer Science

1. At least five restricted elective courses will be taken from the courses offered in the Computer Science or Electrical and Computer Engineering Departments. Of these five courses, one must be a computer engineering course with relevant emphasis on computer science topics. Four are recommended to be courses that focus on attaining specialization in a field of computer science. The department has strengths in theory, artificial intelligence, software, graphics & visualization, security, systems, and network. Students are advised to consult with the Computer Science Graduate Committee to determine appropriate specialization courses for the area of the student's interest.
2. Project work credit will comprise of a minimum of six credit hours, and will involve working on a two-semester project done by taking a two-course sequence (CS 613 and CS 614). Project ideas from all faculty affiliated with the program will be made available to MS students. The student will be responsible for submitting an end-to-end implementation of a project in computer science, together with a project report. The report will be turned in to the Computer Science Graduate Committee for evaluation.

Additional Program Requirements for the Thesis Option for MS in Computer Science

1. At least three restricted elective courses will be taken from the courses offered in the Computer Science or Electrical and Computer Engineering Departments, as

selected by the student and their advisor. Of these three restricted elective courses, one must be a computer engineering course with relevant emphasis on computer science topics. Of the remaining two, one must be a 600-level course that focuses on research topics in computer science, and it is recommended that the courses be in a focused area of specialization. Students should consult with their advisors to identify courses in these categories.

2. Two seminar credits: To earn a seminar credit, students must enroll in a seminar course in Computer Science (CS 707 and CS 708).
3. 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 research advisor will be a faculty member in the program of Computer Science, or affiliated with the program through a courtesy appointment. The program has strengths in theory, artificial intelligence, software, graphics & visualization, security, systems, and networks. An overview of research areas in the program can be found here. 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.

Program Length

All work done for the master's degree in computer science is to be completed within five calendar years, although it is normative to complete the non-thesis option in 1 to 1.5 years, and the thesis option 1.5 to 2 years.

PhD in Computer Science Requirements

1. A minimum of 90 credit hours earned for graduate courses numbered 500 and higher including at least 36 credit hours of classroom and instructional laboratory coursework (this is above the university minimum of 24); a minimum of 6 credit hours of research seminar. A maximum of 30 credit hours of graduate transfer credit from an MS degree with grades of B or higher may be accepted toward the PhD degree.
2. At least three full academic years of study beyond the baccalaureate degree with at least two years in residence in Clarkson.
3. A cumulative GPA of 3.000 in courses used to meet graduation requirements.
4. Graduate students must complete the PhD candidacy procedure within two years of full time study after admission to the PhD program.
5. Doctoral candidates must complete an original research project submitted as a written thesis to be orally presented and approved before a committee of at least five faculty members. At least four members must be Clarkson faculty of assistant professor rank or higher and possessing a doctoral degree. At least one committee member must be from a department other than the candidate's major department. An external examiner with appropriate credentials from outside the

university may serve as one of the five committee members. The thesis must also be approved by the Dean of the Graduate School and submitted following the process defined by The Graduate School.

Additional Program Requirements and Procedures
Students must complete a minimum of 36 credits of computer science related coursework including:

1. Four required courses across 3 areas:
    a) CS 541 (Theory)
    b) CS 547 (Theory)
    c) CS 544 (Systems)
    d) CS 545 (Languages)

A grade of B+ or better is required in each of these courses. A written exam option is offered for students who have taken equivalent courses at other institutions and for students who did not receive a B+ in the Clarkson course. Students who have taken equivalent courses at other institutions and pass the exam with a grade of B+ or better can replace the corresponding course by another CS course. A minimum of four 3-credit research-oriented 600-level CS courses. Research- oriented courses include substantial research literature review and a research project/presentation component.
The Computer Science PhD Committee will maintain a list of acceptable by permission of the Computer Science PhD Committee only when they satisfy the same standards as regular 600- level CS courses and include substantial research literature review and a research project/presentation component. A grade of B+ or higher is required in two 600-level CS courses in order to advance to candidacy and one of these must be a research-oriented 600-level course.

Beyond the 4 required courses listed above, students must take 1 course from each of the following 4 groups:

1. Group A (Theory and Algorithms)
2. Group B (Computer Systems and Networks)
3. Group C (Languages and Software Development)
4. Group D (Artificial Intelligence and Applications)

Students are recommended to consult with the Graduate Committee of the Department of Computer Science as well as their thesis advisor on specific courses that fulfill the requirements for each of the four breadth groups A, B, C, and D. Courses used to satisfy this breadth requirement may also be used to satisfy the requirements in research. The specific lists of courses may change, and students may petition the Computer Science PhD Committee to accept additional courses, including courses outside the department, in these groups.

Additional courses as necessary to reach 36 course credits. Students are expected to take at least one graduate course in computer science or a related field each semester

that they are enrolled in the Computer Science PhD Program. This requirement may be waived if in consultation with the student's advisor, the Computer Science PhD Committee decides it is in the student's best interest to focus on completion of their thesis work.

Students are required to attend and participate in the CS 707 or 708 Seminar in Computer Science (1 credit) series during at least 6 semesters in residence in the PhD program. Participation is recommended during each semester in residence in the PhD program.

The doctoral candidacy procedure for the Computer Science program is portfolio-based.

Before advancing to candidacy, students must have completed the 4 required courses (CS 541, CS 547, CS 544 and CS 545) and two of the 600-level CS courses, at least one of which must be a research-oriented course. A grade of B+ or higher is required in each course. Students prepare a portfolio consisting of a written statement of research interest and representative work from courses and seminar (e.g. exams, research papers, presentation materials). The student appears before the Computer Science PhD Committee for an oral defense of their portfolio. This oral defense and portfolio examination constitutes the comprehensive exam for candidacy in Computer Science.

To advance to candidacy, the student must have also chosen a faculty advisor who believes he or she is prepared to begin original research in a mutually acceptable field of specialization. Students must advance to candidacy within two years of full-time study after admission to the PhD program or be granted an extension by the Computer Science PhD Committee. The doctoral candidacy procedure for the Computer Science program is portfolio-based.

The student must write a thesis proposal outlining his or her research plan and discussing related work and defend this proposal in an oral exam before his or her thesis committee. In addition to the university requirements, at least three members of the committee must be from the Computer Science Department. Students must form their committee and pass the thesis proposal defense exam by the end of their third year of full-time study after admission to the PhD program or be granted an extension by the Computer Science PhD Committee.

The final step in completion of the doctoral program is the submission of a written thesis in conjunction with an oral thesis defense. The candidate will normally present a 50-minute oral presentation of the thesis work at an advertised campus event followed by at least 10 minutes of public questions. After the end of the public session, the candidate and their 5-member thesis committee will gather in closed session for final questions and presentation of corrections to thesis. The candidate will be then asked to leave the room for a final vote of approval. Following approval, the candidate must complete the requested corrections to the written thesis and obtain final signatures.

The candidate must provide all five thesis committee members with a copy of the thesis at least four full weeks before the public defense. The thesis committee for the final defense is the same as for the proposal defense. Any changes must be approved by the Computer Science PhD Committee in advance of the final defense.

Program Length
All work done for the master's degree in computer science is to be completed within 5 calendar years, although it is normative to complete this degree in 2 years. All work for the PhD degree must be completed within 7 years after admission to candidacy.

Dual Applied Data Science (MSADS)/Master of Business Administration (MBA)

Program Description
Clarkson's dual degree program leading to a Master of Science in Applied Data Science (MSADS) degree and a Master of Business Administration (MBA) degree integrates the study of all functional areas of business and aspects of management practice with the with the skills of identifying, acquiring, managing, presenting, analyzing and interpreting large amounts of information for the purpose of data driven strategic and tactical decision making. The degree program is advised by an interdisciplinary committee that will include faculty representatives from the School of Business, School of Engineering and the School of Arts and Sciences.

The MSADS PROGRAM coursework enables students to develop a common set of key critical skills in areas of data management, decision analysis, statistics, data mining and knowledge discovery. Students develop a deep understanding of how to identify and satisfy data requirements of a variety of stakeholders, working closely across organizational boundaries to create, analyze and present valuable information. Their acquired expertise will enable them to manage, review, analyze, and evaluate data at a very advanced level for critical decision making purposes.

The MBA PROGRAM course work emphasizes teamwork, leadership, and managerial skills. Classes, projects, and other opportunities focus on development of effective communication skills, including oral, written, and multimedia methods. There are 18 credits of overlapping coursework between the MSADS and MBA programs, allowing for the 38 credit hour MBA program and 36 credit hour MSADS program to be completed together in a combined 54 credit program of study spanning two years, including an MS capstone course (6 credits) supporting the MSADS degree. Together the MSADS and MBA double degree prepares our graduates to be exceptional leaders in many different functional areas of business with high level of skill and ability to use large amounts of structured and unstructured data for enhanced decision making

Admission Requirements

Applicants must meet the admission requirements for both the MSADS and MBA programs, summarized below:

- No minimum grade point average is required for admission, however in general a GPA > 3.25 is expected in combination with a superior record of academic achievement.
- Submission of official GMAT or Graduate Record Examination (GRE) test scores (Note: This requirement may be waived for any applicant that has previously completed a Master's or Doctoral degree program). The results of this test, together with the academic record and professional recommendations, form the basis for admission decisions and the awarding of financial assistance. Applicants with an MS degree from accredited institutions and/or 5+ years of relevant work experience may request a waiver, to be granted at the discretion of the admission committees
- Applicants are expected to have completed a bachelor's degree, preferably but not limited to a field that relies on quantitative methods (business, economics, engineering, sciences, mathematics)
- Any degree earned internationally must be deemed equivalent to a U.S. bachelor degree.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. All transcripts must be submitted regardless of how many credits were earned.
- Resume (when using our online application tool, you will be required to submit this along with your application).
- Three letters of recommendation.
- Two Essays (when using our online application tool, you will be required to submit this along with your application) that are one page each in length, double spaced:
    - Describe your career progress to date and your future short-term and long-term career goals. How do you expect an MBA from Clarkson University to help you achieve these goals and why now? (NOTE: This is the general MBA application essay; applicants are expected to incorporate their expectations of how the MSADS will facilitate achieving this goal).
    - Describe a personal characteristic or something in your background that will help the Graduate Admission Committee to get to know you better.
    - OPTIONAL: If you feel there are extenuating circumstances of which the Committee should be aware, please explain them here (i.e. gaps in work experience, academic performance, choice of references, significant strengths or weaknesses to your application, etc.).

MSDA Prerequisites

Students are expected to have complete equivalents of the following courses. They can be completed during undergraduate study, or through our summer prerequisites program.

- Elementary Calculus
- Mathematical Statistics
- Programming Fundamentals

MBA Prerequisites

Our prerequisites represent the foundation business coursework that we require all students to have before beginning the MBA program. They can be completed during undergraduate study, our SUMMER BUSINESS CONCEPTS PROGRAM (all courses are offered on our campus at no cost), or over the summer at a different institution. The prerequisites are as follows:

- Microeconomics
- Macroeconomics
- Organizational Behavior/Principles of Management
- Financial Accounting
- Managerial Accounting
- Statistics
- Corporate Finance
- Operations Management
- Marketing
- Business Law
- Information Systems/Computer Science

Application Process

Applicants will complete the MBA APPLICATION, which will be reviewed by both programs' Graduate Admissions Committees. Both programs must independently accept the student for admission.

Notes

The MBA and MSADS schedule do not directly correspond. For example, the MBA program typically begins prior to the start of the MSADS semester and the MBA program has a two week Spring break (to allow for international travel), while the MSADS semester has a one-week break. Students are expected to be available to start with the earliest starting program. Breaks (including the two-week MBA spring break) will be accommodated, however students are expected to communicate with faculty regarding missed course work and make up any work/assignments during missed

class. This policy holds for students traveling to attend conferences or for any-other school-related activity.

IA/IS 510	Database Modeling, Design and Implementation
IA 651	Applied Machine Learning
IA/IS 605	Data Warehousing
IA 530	Probability and Statistics for Analytics
IA 650	Data Minings
IA 630	Modeling for Insight
EC 611	Econometrics
OM 680	Strategic Project Management
MK 696	Marketing Research Methods

Fall Year 1	Spring Year 1
OS 608 Organizational Behavior and Performance Management (2 Credits, MBA)	OM 680 Strategic Project Management (3 Credits MBA and DA)
IA/IS 510 Database Modeling, Design and Implementation (3 Credits, DA and MBA)	IA 626 Big Data Processing and Cloud Services (3 Credits MBA and DA)
EC 604 Applied Economics (2 Credits, MBA)	MK 696 Marketing Research Methods (3 Credits MBA and DA)
MK 609 Marketing Management (2 Credits, MBA)	IA/IS 605 Data Warehousing (3 Credits MBA and DA)
IS 605 Information Systems (2 Credits, MBA)	

Fall Year 2	Spring Year 2
IA 530 - Probability and Statistics for Analytics (3 Credits, DA)	IA 651 Applied Machine Learning

OM 606 Supply Chain Management (2 Credits, MBA)	IA 650 Data Mining (3 Credits, DA)
FN 607 Financial Management (2 Credits, MBA)	OS 610 Strategic Planning (2 Credits, MBA)
IA 530 Probability and Statistics (3 Credits, DA)	EC 611 Econometrics (3 Credits, MBA and DA)
AC 603 Management Accounting (2 Credits, MBA)	
SB 609 Corporate Ethical Decision Making (2 Credits, MBA)	

Summer after year 2: 6 credits of IA690 - Capstone Project

Program Length: Two years

Dual Environmental Policy (MS)/Master of Business Administration (MS)

Program Description

Clarkson's 2-year dual-degree program leading to a Master of Science in Environmental Policy (MSEP) degree and a Master of Business Administration (MBA) degree integrates the study of the function and management of complex environmental systems.

The MSEP course work prepares students to understand and negotiate the complex process of policy making in order to promote science-based environmental policy regulations (e.g., energy policies and decisions). Students learn about strategies to further an interest in a political, social, or economic outcome. They also learn how to develop policy within the public and private sectors.

The MBA program course work emphasizes teamwork, leadership, and managerial skills. Classes, projects, and other opportunities focus on development of effective communication skills, including oral, written, and multimedia methods.

There are 12 credits of overlapping coursework between the MSEP and MBA programs, allowing for the 38 credit hour MBA program and 30 credit hour MSEP program to be completed together in a combined 50-52 credit program of study spanning two years, including an MS thesis (6 credits) or Project (4 credits) supporting the EP degree.

Together the MSEP and MBA double degree prepares our graduates to be exceptional leaders in solving the most challenging environmental issues of today and the future including climate change, access to affordable and clean energy and water, controlling air pollution, and maintaining sustainable habitats and communities.

MS in Environmental Policy Prerequisites

If the students have not taken a course on American Politics or American Society (sociology) and/or introduction to environmental science, they must take, for no graduate credit, POL 220: American Politics, and/or EV 280: Environmental Science or a relevant Environmental Science graduate elective (if permitted enrollment by course instructor).

MBA Prerequisites

Our prerequisites represent the foundation business coursework that we require all students to have before beginning the MBA program. They can be completed during undergraduate study, our **Summer Business Concepts Program** (all courses are offered on our campus at no cost), or over the summer at a different institution. The prerequisites are as follows:

- Microeconomics
- Macroeconomics
- Organizational Behavior/Principles of Management
- Financial Accounting
- Managerial Accounting
- Statistics
- Corporate Finance
- Operations Management
- Marketing
- Business Law
- Information Systems/Computer Science

Required Course List (34 credits)	
EC660 Environmental Economics	3 Credits, EP
POL570 Environmental Policy OR POL571 Energy Policy	3 credits, EP
Research Methods Course	3 credits, EP

EV610 ISE Graduate Seminar	2 credits total, 1 credit each semester, EP
OS608 Organizational Behavior and Performance Management	2 Credits, MBA
OM606 Supply Chain Management	2 Credits, MBA
SB693 Seminar in International Business or SB696 Global Business Strategies	3 credits, MBA
EC604 Applied Economics	2 Credits, MBA
FN607 Financial Management	2 Credits, MBA
OS610 Strategic Planning	2 Credits, MBA
MK609 Marketing Management	2 Credits, MBA
OM602 Decision Analysis and Supply Chain Design	2 Credits, MBA
IS605 Information Systems	2 Credits, MBA
AC603 Management Accounting	2 Credits, MBA
SB609 Corporate Ethics	2 credits, MBA
EV612 MS Project (minimum 4 credits) or MS Thesis (minimum 6 credits)	
Total of 4 electives; 3 of which must have environmental content	12 credits
Elective Courses with Environmental Content	
OM671 Supply Chain Environmental Management	3 Credits, EP and MBA
POL570 Environmental Policy or POL571 Energy Policy	3 Credits, EP and MBA
EV532 Risk Analysis	3 credits, EP and MBA
POL572 Environmental Law	3 credits, EP and MBA
Or other courses as approved by the MSEP/MBA joint graduate committee	

Electrical and Computer Engineering MS & PhD

The Electrical and Computer Engineering program offers programs of study leading to the degree of Master of Science (MS) in Electrical and Computer Engineering and a professional Electrical Engineering Master of Science (MS). A Doctor of Philosophy (PhD) in Electrical and Computer Engineering and an off-campus PhD option designed to assist qualified non-resident candidates is also available.

Research areas in the Electrical and Computer Engineering program are broadly distributed. Our faculty specializations can be categorized into the following tracks:

1. Power Engineering
2. Electronics & Materials
3. Control Engineering
4. Communication and Signal Processing
5. Computer Hardware
6. Computer Software

MS Degree in Electrical and Computer Engineering

Prerequisites

A BS or equivalent degree from an accredited program in Electrical, Computer, or Software Engineering, or another engineering discipline is required. Applicants with degrees in disciplines other than engineering may be required to demonstrate proficiency through additional undergraduate coursework as determined by the departmental Graduate Committee. This may comprise an additional semester of study for which graduate credit cannot be granted. While no minimum grade point average is required for admission, a superior record of academic achievement is expected of all applicants. The MS degree is available in-person or online.

Requirements, *Thesis Track*

The thesis track is best for students interested in pursuing research or passing the PhD comprehensive exam. Students mainly pursue this option in person at our Potsdam, NY, campus**.**

1. 30 credit hours that include:
    a. A minimum of 18 credit hours of graduate coursework (500-600 level courses)
    b. A major portion (more than 50%) of the coursework will be in the chosen research area. The core curriculum consists of four courses, including three from a list spanning the areas of emphasis and EE610, the ECE Seminar. The list of courses is maintained by the Department.
    c. 2 credit hours of seminar work
    d. Maximum of 10 credit hours transfer credit (grade of B or better)
    e. All work must be completed in four calendar years.

2. Satisfactory completion of one of the research components listed below. Please note that not all options may be available in every program.
    a. A written thesis based on independent research
        i. A thesis 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.
    b. Passing a comprehensive examination
        i. Exceptional students who have completed at least 40 credit hours of graduate coursework may take a comprehensive examination in partial fulfillment of the requirements for the Master of Science degree.
    c. An appropriate, professionally-oriented special project
        i. A project submitted in partial fulfillment of the requirements for the Master of Science degree that will be examined by a faculty member, or faculty-member committee, as approved by the appropriate academic administrator.

Requirements, *Project Track*
The project-based track offers a professionally focused curriculum for those looking to utilize their degree to advance their career. This track can be completed either in person or online.

1. 30 credit hours
    a. 24 credit hours of graduate coursework (8 courses at 500-600 level)
    b. Minimum of 3 core courses (9 credit hours)
    c. Minimum of 5 EE courses (15 credit hours)
    d. 2 credit hours of seminar work
    e. 4 credit hours of project work
    f. Maximum of 10 credit hours transfer credit (grade of B or better)
    g. All work must be completed in four calendar years
2. Satisfactory completion of professional experience components listed below.
    a. A professionally oriented project report submitted partially fulfills the requirements for the Master of Science degree that will be examined by a faculty member or faculty member committee, as approved by the appropriate academic administrator

PHD Degree in Electrical and Computer Engineering

Prerequisites
An MS or ME degree from a program in Electrical Engineering or other engineering discipline is required for admission. Applicants with degrees in disciplines other than engineering may be required to demonstrate proficiency through additional undergraduate coursework as determined by the departmental Graduate Committee.

This may comprise an additional semester of study for which graduate credit cannot be granted.

While no minimum grade point average is required for admission, a superior record of academic achievement is expected of all applicants.

Requirements

1. The following are minimum requirements:
    a. 90 credit hours beyond the BS
    b. 39 credit hours of coursework
    c. 15 credit hours in the major field
    d. 9 credit hours in the minor field
    e. 6 credit hours from a department other than the one in which the student is housed (courses double listed in ECE and another department do not count in these 6 credit hours)
    f. 6 credit hours of seminar
    g. 2 years of residency for on-campus students
        i. Students who matriculate in the off-campus PhD program are exempt from this residency requirement (see graduate catalog for details of the off-campus PhD program policy).
2. A maximum of 30 credit hours of transfer credit (grade of B or better).
3. A minimum of 3 academic years of full-time study or the equivalent in part-time study.
4. Must pass a PhD Comprehensive examination.
5. Must pass a Candidacy examination.
6. Must successfully defend a written PhD dissertation in front of the Research Committee.

PhD Research Committee

Each PhD degree student must have a research committee of at least 5 committee members. The student's research advisor acts as the committee chair. At least 3 members must hold primary appointments at the rank of Assistant Professor or higher in the ECE Department, and at least 1 member must be a Clarkson faculty member from outside the ECE Department. Off-campus students may have a co-advisor, who holds a PhD in a relevant area, at the student's place of employment. The co-advisor can serve as the fifth member of the committee. On the recommendation of the faculty advisor, the ECE Graduate Committee, with the approval of the Graduate School, will appoint the Research Committee. The research committee must be appointed before the PhD comprehensive exam (see below) and is responsible for ensuring that the student has sufficient preparation appropriate for the degree.

The research committee members will:

1. Serve as members of the PhD comprehensive exam
2. Serve as members of the dissertation proposal defense committee

3. Serve on the final dissertation committee.

The student's committee is responsible for certifying that the major field, minor field, and overall coursework are appropriate to the student's field of study. This must be done by the time the student's research proposal is approved.

PhD Comprehensive Examination
All students must pass a comprehensive examination within one year of entering the PhD program or after completing 30 graduate credits, whichever comes later.

The comprehensive examination will provide students with an opportunity to demonstrate familiarity with their field of specialization required for the PhD study and their critical thinking skills.

The comprehensive examination will consist of a written research paper and an oral presentation of the research. The research paper must include a comprehensive, pertinent literature review and a broad overview of potential research topics. The student should demonstrate an ability to

1. Identify a number of relevant research papers,
2. Grasp key ideas in the papers, and
3. Replicate important results (derivation of equations, developing computer models, etc.).
4. The research committee will be responsible for organizing and administering the comprehensive examination.

At the conclusion of the comprehensive exam, the research committee renders one of the following decisions: 1. Pass or 2. Fail

The research committee must inform the Graduate Committee Chair, in writing, of the results of the comprehensive exam by completing and submitting the ECE comprehensive Exam Results Form.

In the event of a failure, the student will have a second opportunity to take the examination within six months of the first attempt.

If the student does not complete the comprehensive exam requirements within the specified time limits, the student will be required to withdraw from the program. In this case, the student may be granted the option to pursue a Master of Science degree.

If a student does not wish to take the exam according to the above schedule but wishes to continue in the program, the student must petition the Graduate Committee for permission to take the exam at a later date. Petitions must be received well in advance of the required exam date. There is no guarantee that the Graduate Committee will approve such requests.

Students completing a Master of Science degree in the ECE Department at Clarkson University can combine the MS oral defense with the comprehensive exam.

Transfer of credits
Within one year of entering the PhD program, any transfer of credits from other institutions must be completed, including the transfer of credits resulting from a Master's degree program. Any coursework must be noted as major, minor, or out of the department, as appropriate.

Candidacy Examination
All students must satisfactorily complete the PhD candidacy procedure by defending a PhD research proposal within six months after the successful completion of the comprehensive examination or two years after entering the PhD Program, whichever comes later. Part-time students should complete the candidacy exam before completing 66 credits. Students will have two opportunities to get approval from the research committee.

The research proposal is intended to demonstrate that the student's research topic is suitable for the successful completion of dissertation research, and that there is a reasonable likelihood that the student can successfully complete the research. The research proposal is a written document that is examined by the committee and orally defended in front of the committee. At the conclusion of the oral exam, the committee will determine the exam results, either:

i. Pass
ii. Fail

The committee will inform the Division Head in writing, of the results of the exam. A copy of this memo will be inserted into the student's file.

If this exam is failed, the student will be required to withdraw from the program. In this case, the student can be granted the option of pursuing a Master's of Science degree. If, after passing the candidacy examination, the student or the thesis advisor decides to make a significant change to the research topic, the research committee should be informed in writing.

Exceptions to the departmental requirements must be approved by the Department's graduate committee and the Division Head. This approval must be in writing and inserted into the student's file.

Engineering Management MS

Clarkson University's Master of Science in Engineering Management brings together world-class engineering and technology expertise with best practices in business to deliver an unparalleled education and an exceptional degree, specifically for rising

engineering and technical professionals. Our mission is accomplished by focusing on the three areas key to professional education including curriculum & instruction, people, and learning environment.

Prerequisites

The MS in Engineering and Management (MSEM) program requires an engineering/technical degree OR relevant experience in an engineering/technology based organization.

Requirements

The thirty credits required for the MS in Engineering and Management consists of 10 courses, 7 core and 3 electives. Program courses are illustrated below:

Required core classes
Cost Management and Financial Analysis
Decision Analysis and Risk Management
Strategic Project Management
Operations Strategy and International Competitiveness
Negotiations and Relationship Management
Quality Management and Process Improvement
Capstone Project
Elective classes
Advanced Construction Engineering
Sustainable Infrastructure and Building
Special Topics in Construction Engineering Management
Operations Management and Factory Physics
Law for Engineers
Advanced Topics in Supply Chain Management
Enterprise Sustainability

Introduction to Artificial Intelligence: Principles and Techniques
Leading Organizational Change
Optimization Methods
Marketing Management for Innovation
Database Modeling, Design, and Implementation
Information Visualization
Data Warehousing
Modeling for Insight
Geospatial Systems
Leading and Managing Organizations
Analytics for Decision Making

EM 997 ST: Engineering Management
EM 998 ST: Engineering Management
EM 999 ST: Engineering Management
SB 687: Special Graduate Topics

Additional electives have been added, the total list is here:

Engineering Management	
EM 610	Operations Management & Factory Physics
EM 630	Law for Engineers
EM 640	Leading and Managing Organizations
EM 650	Enterprise Sustainability
Business	
EM/OS 657	Leading Organizational Change

EM/SB 641	Advanced Topics in Supply Chain Management
Interdisciplinary Analytics	
IA 510	Database Modeling, Design & Implementation
IA 530	Probability & Statistics for Analytics
IA 605	Data Warehousing
IA 626	Big Data Processing and Cloud Services
IA 628	Intro to Big Data Architecture and Applications
IA 630	Modeling for Insight
IA 637	Data Driven Application Development
IA 640	Information Visualization
IA 650	Data Mining
IA 651	Applied Machine Learning
Construction Management	
CE 505	Project Controls and Lean Methods in Construction
CE 506	Advanced Construction Engineering
CE 510	Sustainable Building & Infrastructure
CE 591	Special Topics in Construction Engineering Management
Business of Energy	
BOE 610 -Req.	Fundamentals of the Business of Energy
BOE 611	Planning and Operations of Power Systems
BOE 612	Power Markets
BOE 613	Regulation & Restructuring

BOE 614	Electric Power Industry Economics and Finance
BOE 615	Challenges to Upgrading Infrastructure
Digital Transformation	
EM 624	Intro to Digital Transformation
EM 625	Analytics for Decision Making
EM 626	Digital Transformation Industry Applications

Program Length
The program has two models: a 24-month part-time program model designed for working professionals and a 12-month full-time model designed for recent graduates and those in career transition.

More Interdisciplinary Programs
For information on the Interdisciplinary Programs of Environmental Politics and Governance MS and the Environmental Science and Engineering MS and PhD, please refer to the Institute for a Sustainable Environment.

Engineering Science MS & PhD

Clarkson University offers MS and PhD programs in Engineering Science for qualified students who desire interdisciplinary graduate study in engineering that does not fit within any of the four engineering departments shown below:

1. Chemical and Biomolecular Engineering
2. Civil & Environmental Engineering
3. Electrical & Computer Engineering
4. Mechanical & Aerospace Engineering

MS in Engineering Science Requirements
Students must have a BS in Engineering or Science (Chemistry, Computer Science, Math or Physics; other degrees considered on a case-by-case basis). Students must also have the minimum requirements of:

1. 30 credits beyond BS
2. 18 credits of graduate course work (12 credits in engineering)
3. An average grade of B or better by graduation, with an overall cumulative GPA of 3.00

4. 2 credits of seminar work (in engineering or science)
5. 6 credit hours of thesis
6. 20 of the 30 credit hours must be earned in residence
7. 1 academic year of full time study beyond the Baccalaureate

The research advisor must be a member of the Clarkson School of Engineering (CSoE) (may be a courtesy appointment).

MS Thesis Committee will consist of a minimum of 3 faculty members (PhD) with at least 2 from the CSoE.

PhD in Engineering Science Requirements

Students must have a MS in Engineering or Science (Chemistry, Computer Science, Math or Physics; other degrees considered on a case-by-case basis). Students must also have the minimum requirements of:

1. 60 credits beyond MS, 90 credits beyond the BS
2. 30 credits of graduate course work (minimum of 24 credits in engineering)
3. An average grade of B or better by graduation, with an overall cumulative GPA of 3.00
4. PhD Thesis committee must be a minimum of 5 faculty members (PhD) with at least 3 from the CSoE.
5. All work must be completed within 7 years after the candidacy procedure is completed
6. A maximum of 30 credit hours transfer credit (grade of B or better)
7. The research advisor must be a member of the CSoE (can be a courtesy appointment)

Sequence of Examinations

1. Qualifying Examination: A written qualifying exam is required within 1 year of admission to the PhD program. The qualifying exam will be administered by the Chair of the student's PhD Committee or the researcher advisor's departmental graduate committee. The outcome of the exam is determined by a vote of the respective committees, with no more than 1 dissenting vote permitted for passage. Failure to pass the qualifying examination twice is grounds for dismissal from the program
2. Research proposal defense examination: Administered by PhD Thesis Committee within 1 year of passing the qualifying exam
3. Examination on the dissertation: Administered by PhD Thesis Committee at least 1 year after passing the proposal defense

Environmental Policy MS

The interdisciplinary MS Degree in Environmental Policy provides a unique graduate experience in the policy aspects of environmental management. Graduates are prepared to be the next generation of environmental and energy policy analysts and experts who understand the complex socioeconomic and political processes that inform environmental outcomes — including the allocation of federal funding of environmentally-related research and the development of science-based environmental policy while taking into account the actions and interests of private sector firms and non-governmental organizations in the environmental arena.

Prerequisites

Students are expected to have taken a course on American Politics or American Society (sociology) as well as an introductory course in environmental science and have obtained a BS, BE or equivalent degree from an accredited institution.

Required Electives

All students must take:

1. POL 570 (Environmental Policy) or POL 571 (Energy Policy) or POL575 (Environmental Law)
2. EC 660 Environmental Economics
3. A research methods course– check with the ISE office for the current list of suggested courses.
4. Additional elective courses selected by the student and approved by their advisor. At least two of the electives must have an environmental or sustainability focus as defined in the ISE Graduate Handbook.
    a. Students completing a thesis must take at least three additional elective courses for a total of at least 18 course credits.
    b. Students completing a Project must take at least four additional elective courses for a total of at least 21 credits course work.
5. Two credits of seminar credit (EV610 or the equivalent)

All students must complete either a Thesis or a Project. Students choosing to complete a Thesis must defend it orally to a Committee consisting of a minimum of 3 faculty members. Students choosing to complete a project must present their work on campus and have their project and presentation approved by their Advisor and at least one other faculty member affiliated with ISE. Thesis students must complete at least 6 credits of thesis work. Students choosing a Project must complete at least 4 credits towards this project. Projects are expected to be more substantial than a term project, but not necessarily of the depth or breadth such as to be publishable in the academic literature. Projects may be related to a student's work in a professional context.

Dual Degrees Options:
MS-EP and MBA, with 12 credits that count towards both degrees for a total of 50-52 credit hours, MS-EP and MS Data Analytics, for which 9 credits can count towards both degrees for a total of 51 credits.

Program Length
Students are expected to complete their degree in 15-24 months.

Environmental Science and Engineering MS and PhD

Master's and doctoral degrees in Environmental Science and Engineering (ESE) span multiple disciplines to investigate how science and engineering interact with the environment in a broad context. This approach allows for a deeper understanding of the 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 broad background of ESE graduates enables them to better understand how engineering and science impact policy decisions. The research-focused ESE degree programs provide a flexible framework for students to develop coursework and pursue research projects that fit their individual interests.

MS Prerequisites
Students are expected to have obtained a BS, BE or equivalent degree from an engineering or science program.

Pre-requisite course work includes:

- Two semesters of math (University/college level).
- At least 4 relevant science courses from chemistry, biology, physics. Courses must include at least one course in two of these areas.
- At least one course with environmental engineering, environmental science or earth science content (including water resources, microbiology, geology, ecology, etc.).

MS Requirements
Students must take:

- At least one Systems Thinking choice: CE 586 (Industrial Ecology) or CE 582 (Environmental Systems Analysis and Design or EV 532 (Risk Analysis), or BY525 (Biological Systems and Environmental Change)
- At least one Policy choice: POL 570 (Environmental Policy) or POL571 (Energy Policy) or POL575 (Environmental Law) or EC660 (Env. Economics)
- At least one additional class from either the core Systems Thinking or Policy classes
- Two credits of seminar (EV610)

- Additional elective courses that provide a focus for the student' overall degree as determined by the student and advisor.
    - Thesis option – three (3) additional elective courses (9 credits minimum)
    - Project option – four (4) additional elective courses (12 credits minimum)
    - At least two of these electives must have an environmental or sustainability focus, as defined in the ISE Graduate Handbook.

Among all of the courses, at least 3 must be designated as Engineering courses. These are either any course offered by the Coulter School, or other courses with significant engineering content, as determined by the ISE Graduate Committee.

Details are included in the ISE Graduate Handbook.

All students must complete either a Thesis or a Project. Students choosing to complete a Thesis must defend it orally to a Committee consisting of a minimum of 3 faculty members. Students choosing to complete a project must present their work on campus and have their project and presentation approved by their Advisor and at least one other faculty member affiliated with ISE. Thesis students must complete at least 6 credits of thesis work. Students choosing a Project must complete at least 4 credits towards this project. Projects are expected to be more substantial than a term project, but not necessarily of the depth or breadth such as to be publishable in the academic literature. Projects may be related to a student's work in a professional context.

Program Length
MS Students typically complete their degree in 18-24 months (thesis) or 12-18 months (project).

PhD Prerequisites
Students are expected to have completed:

- Two semesters of math (University/College level).
- At least 4 relevant science courses from chemistry, biology, physics. Courses must include at least one course in two of these areas.
- At least one course with environmental engineering, environmental science or earth science content (including water resources, microbiology, geology, ecology, etc.).

Most students enter the PhD program following completion of an MS degree. Exceptional students may be invited to proceed directly to the PhD. Such students will be awarded the MS upon completing 40 credit hours and passing the doctoral qualifying examination with a superior grade.

PhD Requirements
Students must take:

- At least one Systems Thinking choice: CE 586 (Industrial Ecology) or CE 582 (Environmental Systems Analysis and Design or EV 532 (Risk Analysis), or BY525 (Biological Systems and Environmental Change)
- At least one Policy choice: POL 570 (Environmental Policy) or POL571 (Energy Policy) or POL575 (Environmental Law) or EC660 (Env. Economics)
- At least one additional class from either the core Systems Thinking or Policy classes
- Six credits of seminar (EV610)
- At least five additional elective courses that provide a focus for the student' overall degree as determined by the student and advisor.
    - At least two of these electives must have an environmental or sustainability focus, as defined in the ISE Graduate Handbook.
- PhD thesis credits (EV612) to account for the balance of credits needed for the 90 credit PhD degree

Among all of the courses, at least 3 must be designated as Engineering courses. These are either any course offered by the Coulter School, or other courses with significant engineering content, as determined by the ISE Graduate Committee.

Details are included in the ISE Graduate Handbook.

PhD students must pass the candidacy exam within 24 mo. to be classified as a PhD candidate. A research proposal is then required within one year of candidacy. The final dissertation must be presented, reviewed and approved by a committee of at least five members.

Program Length
PhD Students are expected to complete their degree in 3-5 years.

Healthcare Data Analytica MS

The purpose of the Master of Science (MS) degree in Healthcare Data Analytics program is to prepare students with the skills to acquire, interpret and communicate healthcare data to shape the direction of the healthcare industry. Graduates will be prepared to take positions in healthcare organizations that require them to analyze high volumes of clinical, administrative and financial data. The MS in Healthcare Data Analytics program is a 33 credit hour program (a total of 11 3-credit hour courses). The program includes 9 required core courses and 2 electives. As with the Healthcare MBA program, students with extensive prior academic work in specific subjects may reduce the number of courses required by waiving or transferring courses. Course waivers may be based on undergraduate work and apply only to required courses. Transfers must be graduate courses and may apply to required or elective courses. Program requirements may be reduced by up to 6 credit hours (2 courses) with any combination of course waivers and transfers.

The MS in Healthcare Data Analytics is an online program and follows the quarter calendar.

The course numbers and titles for the nine required core courses in the Healthcare Data Analytics MS are:

HC 600	Introduction to Health Systems
HC 605	Health Operations
HC 617	Healthcare Finance
HC 643	Advanced Applications in Healthcare Data Analytics
HC 647	Statistical Foundations of Data Analytics
HC 648	Health Informatics
IA 510	Database Modeling, Design, and Implementation
IA 605	Data Warehousing
IA 640	Information Visualization

The following two courses are strongly suggested electives to be taken for the most complete application of healthcare aspects of data analytics.

HC 604	Hospital Analytics
HC 606	Payer Analytics

In consultation with their advisor, students may select a non-equivalent course in lieu of one of the two elective courses offered from one of the following programs: Online MBA, MBA in healthcare Management, MS in Data Science.

Program Length
Part- time students may complete the program in 1 to 2 years.

Program Learning Outcomes
Upon completion of the MS in Healthcare Data Analytics program, graduates will be able to:

- Acquire and manage healthcare data from clinical, administrative, financial, and public health sources using appropriate data governance, quality, and security practices.

- Apply analytical and statistical techniques to identify patterns, trends, and insights that support evidence-based decision-making in healthcare organizations.
- Evaluate healthcare data critically to assess organizational performance, operational effectiveness, patient outcomes, and financial sustainability.
- Utilize data analytics technologies and tools to collect, analyze, visualize, and communicate healthcare information to diverse stakeholders.
- Translate analytical findings into actionable recommendations that support strategic, operational, and policy decisions within healthcare systems.
- Demonstrate knowledge of healthcare systems, business principles, and organizational environments when interpreting data and recommending solutions.
- Communicate complex healthcare data and analytical results effectively through written, oral, and visual formats for both technical and non-technical audiences.
- Analyze healthcare issues within a global and ethical context, considering the impact of data-driven decisions on patients, organizations, populations, and healthcare systems.

Completing both the MBA in Healthcare Management and the MS in Healthcare Data Analytics

Students may complete both the MBA in Healthcare Management and the MS in Healthcare Data Analytics programs by taking a total of 19- 3 credit courses rather than the aggregate total of 25 courses for the two programs taken separately. This is made possible by shared courses and synergies between the programs.

Joint Business Programs

The Clarkson University David D. Reh School of Business Capital Region Campus has several joint programs. These programs are described in the following sections.

Four-Year JD/MBA Program
(with Albany Law School)

This program is designed to meet the management development goals of students enrolled at Albany Law School (ALS). Students spend their first year in law studies, their second year in management studies, and their third and fourth years in law and management studies. Three designated law courses transfer into the MBA degree. Students are required to complete their MBA the winter term of the year they petition to graduate at ALS. Students may choose either the MBA or the MBA in Healthcare Management degree.

Joint PharmD/MBA in Healthcare Management, or
Joint PharmD/MS in Clinical Leadership
(with Albany College of Pharmacy and Health Sciences, ACPHS)

This program is designed to meet the management development goals of students enrolled at Albany College of Pharmacy and Health Sciences. Designated Pharmacy courses are transferred into the MBA degree, reducing the total number of MBA courses in the PharmD/MBA joint program. Most joint program students complete the MBA course requirements on a part-time basis over a 3 year period (years 4-6 at ACPHS).

Similar to the joint PharmD/MBA, the PharmD/MS program is designed to meet the clinical leadership goals of students enrolled at Albany College of Pharmacy and Health Sciences. Designated courses from the MBA curriculum are waived based on courses taken in the PharmD program at ACPHS.

Joint BS Pharmaceutical Science/MBA in Healthcare Management, or
Joint BS Pharmaceutical Science/MS in Clinical Leadership
(with Albany College of Pharmacy and Health Sciences, ACPHS)

This program is designed to meet the management development goals of students enrolled at the bachelor's level at Albany College of Pharmacy and Health Sciences. The BS/MBA in Healthcare Management joint program reduces the number of MBA courses. Courses from the MBA curriculum are waived based on courses taken in the BS program at ACPHS. The remaining courses are usually completed on a full-time basis the year following graduation from ACPHS. In addition to coursework, all BS/MBA students are required to complete an administrative internship.

Alternatively, in the BS/MS joint program, courses from the MBA curriculum are waived based on courses taken in the BS program at ACPHS. All BS/MS students are required to complete an administrative internship.

Leadership in Medicine (LIM)/MBA in Healthcare Management, or
LIM/MS in Clinical Leadership
(with Union College and Albany Medical College)

Students in the eight-year LIM program jointly offered by Union College, Albany Medical College and Clarkson University earn a BS from Union College, an MBA in Healthcare Management or an MS in Clinical Leadership from Clarkson University, and an MD from Albany Medical College. Students take graduate-level MBA or MS courses while fulfilling all other requirements of their undergraduate degree at Union College. They then go on to pursue their MD at Albany Medical College. During the 4 years in residence at Union College, students pay tuition based on degree requirements for a BS degree from Union College and an MS degree in Clinical Leadership from Clarkson. Students choosing the BS/MBA/MD option pay for four additional MBA courses they take at Clarkson University at the graduate tuition rate in effect in the student's spring term of senior year of undergraduate study. Students in this program must meet admission requirements of Union College, Clarkson University, and Albany Medical College.

Joint MD/MBA in Healthcare Management
(with Albany Medical College)
The MD/MBA is designed to provide students with a business understanding specific to healthcare and move them on to their medical education quickly. Students learn how to manage a medical practice, deliver quality care in a cost-containment environment, market a practice, and lead other healthcare professionals.

Joint degree students are first admitted to Albany Medical College and then apply separately to Clarkson University. Once admitted to both institutions, they defer the start of medical school by one year and spend one year at Clarkson University working on Healthcare MBA courses. The second through fifth years are spent completing the MD degree requirements at Albany Medical College.The combined programs allow students to “double count” courses which reduces the total time and cost associated with completing the two degrees separately. 4 courses taken at Albany Medical College are transferred back to Clarkson University to meet MBA requirements. The combined degree is typically completed in 5 years.

It is possible to join the joint degree program after the start of medical school. Students using this option apply for leave from medical school at the end of their third year and spend 13 months at Clarkson University completing MBA course requirements. They return to medical school for their final year.

Materials Science & Engineering PhD

The Doctor of Philosophy (PhD) degree in Materials Science and Engineering (MSE) focuses on advanced materials and their application across the full spectrum of technical challenges around the world. The objective of this program is to offer students from diverse science and engineering backgrounds the opportunity to develop special competence in one or more of the MSE application areas and to demonstrate their ability to conduct research and add to the body of knowledge in materials science or materials engineering. This MSE program is designed to provide graduate students with an in-depth, fundamental understanding of metals/alloys, polymers, ceramics, composites, and advanced materials, as well, an understanding of the relationships among structure, properties and processing. Applications of advanced materials in areas of biotechnology, electronic devices, alternative energy, and the environment, are at the forefront of technology development. Companies such as Corning, General Electric, IBM, and GLOBALFOUNDRIES (to name only a few) and the Federal Government seek scientists and engineers with MSE degrees to sustain their competitive edge.

The MSE graduate program is administered through its Director , who works closely with the academic administrators (Deans and Division Heads) in the Engineering and Science disciplines. The MSE graduate program is closely associated with Clarkson’s Center for Advanced Materials Processing (CAMP), whose mission is "to perform innovative research and conduct educational efforts on the synthesis and processing of advanced materials of interest to industry." PhD MSE students are advised and

mentored by faculty from appropriate underpinning disciplines and/or faculty with MSE degrees and experience.

Given the complex nature of advanced materials an interdisciplinary program has been developed, underpinned by courses from several academic disciplines, including physics (PH), chemistry (CM), mechanical engineering (ME), chemical engineering (CH), electrical engineering (EE) and engineering science (ES).

Students seeking the MSE PhD must complete:

1. 30 hours of classwork (courses)
2. A comprehensive qualifying examination (usually taken in the 3rd semester of matriculation)
3. 54 hours of research, completing dissertation on an appropriate MSE topic
4. 6 hours of Seminar (ME, CM, PH, or CH)

Students seeking a PhD in MSE may enter the program with either a MS/ME in MSE or one of the supporting disciplines or a BS/BE in MSE or in one of the supporting disciplines (mechanical engineering, chemical engineering, civil engineering, chemistry or physics). Those entering with a MS/ME degree may transfer up to 30 credit hours from the completed courses of their MS/ME program, if the MSE program director deems these courses equivalent to the courses listed below.

Requirements †

The PhD degree requires the following two courses:

- MSE 551 Advanced Characterization of Materials
- MSE 560 Advanced Materials Science & Engineering I

The PhD degree requires eight (8) elective courses. Elective courses can be chosen from the following (non-limiting) list:

- CE 501 Fracture Mechanics of Concrete Structures
- CE 514 Constitutive Modeling for Geomaterials
- CE 552/ME 552 Advanced Strength of Materials
- CE 553 Properties and Performance of Concrete
- CE 554 Continuum Mechanics
- CE 631 Cement Chemistry
- CE 632 Elastic and Inelastic Stress Analysis
- CH 540 Plasma Engineering
- CH 580 Interfacial Engineering
- CM 530 Colloids and Interfaces
- CM 551 Manufacturing Implications of Advanced Materials Processing

- CM 566 Bioelectronics and Bionanotechnology
- CM 569 Implantable and Wearable Bioelectronics
- CM 575/ES 575 Sustainable Nanotechnology
- CM 583 Introduction to Polymer Science
- CM 587/PH 587/ES 587 Applications of Synchrotron and Electron Based Techniques
- EE 539 Dielectrics
- EE 544 Semiconductor Material and Devices for Engineers
- ES 552 Biomaterials and Biomedical Applications
- ES 561 Particle Technology
- ES 564 Corrosion of Metals
- ES 575 Sustainable Nanotechnology
- ES 601 Mechanics of Fracture
- ME 500 Elasticity
- ME 506 Mechanical Behavior of Materials
- ME 508 Fracture Mechanics
- ME 590 Advanced Welding Metallurgy
- ME 557 Advanced Mechanics of Composite Materials
- ME 595 Principles of Physical Metallurgy
- ME 586 Welding
- ME 503 Advanced Manufacturing Processes
- ME 533 Additive Manufacturing: Materials and Applications
- ME 513 Processing and Selection of Engineering Materials
- ME 537 Fluid Mechanics of Aerosol Dispersions
- ME 551/CE 551 Theory of Elasticity
- ME 562 Composites
- ME 621 Computational Mechanics of Materials
- ME 633/CE 633 Plasticity
- PH 541 Solid State Physics I
- PH 584/MSE 584 Introduction to Chemical Mechanical Planarization (CMP) (1 credit)
- PH 586/MSE 586 Chemical Mechanical Planarization for Microelectronics Processing
- PH 590/MSE 590 Semiconductor Physics and Technology

† Other courses not listed here may be credited toward the degree requirements by approval of the thesis advisor and the Director of the MSE program.

Program Length

Students entering with an MS/ME may expect to reach completion of the program within three to five years. Students entering with a BS/BE may expect to complete the program within five years.

Materials Science & Engineering Faculty

The program is multi-disciplinary in its approach and engages faculty in the School of Engineering to offer a diverse perspective on research and study relating to the Materials Science & Engineering curriculum.

Mathematics MS & PhD

The Department of Mathematics offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees in Mathematics. These programs are designed to increase the student's fundamental knowledge and to give the student guidance and experience in research. A graduate student pursues these objectives by taking advanced courses, participating in seminars, and carrying out and reporting on a research project. The department provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests.

Faculty in the Department of Mathematics pursue research across a broad spectrum of areas in the mathematical sciences, with emphasis on applied and computational mathematics. Current areas of activity include computational partial differential equations, applied optimization, applied statistics, and data-driven methods, as well as biomathematics, control theory, dynamical and complex systems, and image processing. Faculty also engage in interdisciplinary research through applications in mathematical biology and complex systems, and contribute to scholarship in mathematics education.

Prerequisites

Applicants must possess an undergraduate BS degree in mathematics, statistics, or a related field, with sufficient preparation to engage with both theoretical and computational mathematics. The admissions committee will select candidates on the basis of aptitude, programmatic needs, research interest fit, and overall excellence of academic qualifications.

MS in Mathematics Requirements

Students entering with a BS degree are required to take a minimum of 18 credit hours of course-work (6 three-credit graduate courses) and 6 to 10 credit hours of thesis. A minimum total of 30 credits is required for the MS degree. The program for research assistants and teaching assistants during each semester of the academic year is a minimum of 9 credit hours, at least 1 credit hour of which is thesis. The thesis advisor will set up the program within this framework and the department will approve it or recommend changes.

The MS thesis is normally written during the summer and orally presented and defended in late summer or fall before a committee of three or four department faculty. In lieu of a thesis, a student may do a special project. The student receives the MS degree at the next commencement after the thesis is accepted.

Additional Program Requirements and Procedures for MS in Mathematics

1. Students must complete 30 credit hours subject to the following restrictions:
    a. At least 20 credit hours of course and seminar work must be earned in residence at Clarkson University
    b. At least 16 hours must be earned in the Department of Mathematics as courses and seminars numbered above MA 505, with at most one of these credits coming from seminar. Among the courses, 1 course must be MA 521 Classical Complex Analysis, MA 522 Classical Real Analysis, or MA 578 Numerical Analysis, and 2 other courses must be at the 500 or 600 level. The remainder of the students' coursework must be approved by their advisor in collaboration with the Graduate Committee Chair
    c. Have a Cumulative Grade Point Average (GPA) of at least 3.000 in their course work
2. Students must fulfill one of the following:
    a. Write a thesis under the guidance of a faculty member. The thesis is to be an original or expository study of some area or problem and shall represent 6 to 10 credit hours (MA810). The topic of the thesis must be approved by the Graduate Committee and thesis advisor in advance. As required by University regulations, the thesis must be examined by a committee of at least 3 Clarkson faculty appointed by the Division Head
    b. Successfully complete any 2 components (GCE, Subject Cat 1, Subject Cat 2) components of the comprehensive exams described under the requirements for the PhD degree. The choices must be approved by the student's advisor and the Graduate Committee.
    c. Successfully complete 1 Subject Exam (described in the PhD requirements below) and complete a special project. A description of the proposed project must be approved in advance by the student's advisor and the Graduate Committee. When the project is completed, it must be approved by the Graduate Committee. Completion will carry 3 to 9 hours of thesis work (MA810) at the discretion of the student's advisor.

PhD in Mathematics Requirements

Students who complete the Ph.D. in Mathematics at Clarkson University will be able to:

1. Advanced Mathematical Mastery: Demonstrate deep, comprehensive understanding of core areas of graduate mathematics—including real analysis, differential equations, linear algebra, numerical analysis, probability, and statistics—and apply this knowledge to advanced theoretical or applied problems.

2. Research Proficiency & Original Contribution: Independently conduct advanced mathematical research, formulate meaningful research questions, apply appropriate theoretical or computational methods, and produce original results contributing new knowledge to the mathematical sciences.
3. Mathematical Reasoning & Proof Construction: Develop and communicate rigorous mathematical proofs, evaluate the validity of complex arguments, and apply high-level reasoning to abstract structures and research problems.
4. Scholarly Communication: Effectively communicate mathematical concepts and research findings through clear, professional written work (including the dissertation), oral presentations, publications, and interactions with both expert and non-expert audiences.
5. Professional & Ethical Practice: Demonstrate ethical and responsible conduct in research, authorship, collaboration, data handling, classroom teaching, and professional engagement within the mathematics community.
6. Specialized Expertise & Interdisciplinary Integration: Demonstrate expert-level knowledge in a chosen mathematical specialization and, where appropriate, integrate mathematics with applications in science, engineering, computing, or interdisciplinary domains.

A minimum of 90 credit hours are required for the PhD. This corresponds to a minimum of 3 academic years of full-time study, of which 2 must be in residence at Clarkson. The MS degree may be accepted in lieu of a maximum of 30 credit hours. Of these 90 credit hours, a *minimum* of 39 credit hours must be in coursework, apportioned as explained below. Prior to advancing to Candidacy, PhD students must complete two subject exams, which should be chosen in consultation with the faculty advisor to align with the student's research topic. There is no foreign language requirement for the PhD. Candidates for the PhD are required to prepare an original dissertation in an advanced research area and defend it in an oral examination.

Additional Program Requirements and Procedures for PhD in Mathematics
The satisfaction of these requirements will be certified by the thesis committee. Students must:

1. Complete at least a total of 90 hours graduate credit, distributed as below.
    a. Complete a minimum of 39 credit hours of approved course work (30 of which may be those taken for the MS degree).
    b. The following courses are required (grade B- or better):
        - MA 522 (Classical Real Analysis)
        - MA 531 (Partial Differential Equations) or MA 533 (Ordinary Differential Equations). Only 1 of MA 531/533 is required, although both are recommended.
        - MA 573 (Matrix Theory and Computation)
        - MA 578 (Numerical Analysis)
        - MA 581 (Probability)

- STAT 582 (Mathematical Statistics I)

Students will need to retake these courses if they do not receive a grade of B- or better.

c. During their first semester at Clarkson, students must register for MA 501 (Advanced Calculus) and either MA 513 or MA 573, whichever is offered that semester.
d. Graduate-level courses from other institutions are acceptable, but are subject to the approval of the Mathematics Department.
e. Students are required to take at least 6 credits hours from graduate non-MA/STAT out-of-department courses with sufficient mathematical contents. Prior to registration, students must obtain approval from the Graduate Committee.
f. Complete at least 6 hours of seminar credit. This is in addition to the minimum of 39 credit hours of approved coursework above.
g. Complete at least 21, but no more than 45, hours of thesis credit (MA810) related to the dissertation topic.

2. Have a Cumulative Grade Point Average (GPA) of at least 3.000 in their course work.
3. Pass one subject exam by the end of their fourth semester, and an additional subject exam must be successfully completed by the end of their sixth semester. Exams can be selected based on the student's research area of interest, and their selection should be coordinated with the student's academic advisor. Three subject exams are offered twice a year by the department (August and January). The topics for the subject exams are as follows:
    a. Real analysis (advanced calculus, measure theory, functional analysis)
    b. Computational mathematics (linear algebra, matrix theory, numerical analysis)
    c. Probability and statistics
4. Students beyond their 2nd year are expected to present their thesis work on a yearly basis in a colloquium. All students must register for the department colloquium.
5. Give an oral presentation of a proposed thesis topic to their Thesis Committee within one year of passing their subject exams. The topic must be acceptable to the committee.
6. Successfully complete the Proposal Examination, consisting of a formal presentation of the proposed thesis topic to their thesis committee within 1 year of passing the subject exams. The thesis committee consists of at least 4 Clarkson faculty in the Department of Mathematics, at least 1 faculty member from another department, and no less than 5 committee members in total. The topic and the breadth of the proposed work must be acceptable to the committee.
7. Complete a doctoral dissertation, present it in a public formal seminar, and defend it to the doctoral thesis committee during an examination period. The dissertation embodies the results of the student's original research.

Program Length

The typical length of the Mathematics MS program is 2 years and between 5 and 6 years for the PhD program for students entering the program with a BS-equivalent degree.

Mechanical Engineering MS & PhD

The graduate program in Mechanical Engineering is structured to provide the student with a series of goals to be attained in an orderly fashion throughout the course of study. The ultimate goal in this sequence is the granting of the Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) degree, following a successful completion of the program. The general requirements of the Graduate School are described in the university catalog. The formal requirements for the M.S. and Ph.D. in Mechanical Engineering are set forth as follows:

MS in Mechanical Engineering

Prerequisites

BS in engineering or equivalent. Students applying from other disciplines will be handled on a case-by-case basis. Those students who are not fully prepared to pursue graduate work in engineering may be required to take additional courses for which graduate credit will not be given. Admission to the M.S. program will be given only after the required prerequisite coursework has been completed.

Requirements

Course work

Students will need to take a minimum of 18 credits of coursework.

1. At least two of the courses must have an ME designation.
2. At least one course must be a mathematics course. The following is a list of suggested courses:
    a. Any 500 level or higher math course (MA designator)
    b. CH561 Chemical Engineering Analysis
    c. ME515 Finite Element Methods
    d. ME529 Stochastic Processes in Engineering
    e. ME554 Continuum Mechanics

A good first class to take is CH561 Chemical Engineering Analysis. Other courses may also be acceptable with the written approval of the MAE Graduate Committee.

1. No more than two courses may be selected from the “Selected Topics” group of classes (listed below)
    a. ME591 Selected Topics in Materials Engineering
    b. ME594 Selected Topics in Manufacturing
    c. ME618 Selected Topics in Heat Transfer
    d. ME628 Special Topics in Fluid Mechanics
    e. ME657 Selected Topics in Solid Mechanics

Clarkson may grant permission to transfer up to 10 graduate credit hours from an undergraduate degree. With approval of the Dean of the Graduate School, a maximum of 12 credit hours may be granted. The student must have passed the graduate course(s) with a minimum grade of B (or equivalent)

Seminar credits
A student needs to take a minimum of two credits of seminar (ME 610)

Research/Project Credits or Direct PhD Progression
Student needs to fulfill one of the three following options:

Either:

A minimum of 10 credits of ME 614 – Thesis/Dissertation with a MAE faculty advisor (One credit of ME614 may be replaced by ES 542 – Fundamentals of Research and Graduate Study). All students must complete a thesis and defend it orally to a committee consisting of a minimum of three Clarkson faculty members. The committee must be approved by the Division Head and the Academic Dean using the CSOE Graduate Committee Appointment form. The committee should be approved before the second semester of graduate study.

OR

A minimum of 4 credits of ME 616 – Special Projects with a MAE faculty advisor (One credit of ME616 may be replaced by ES 542 – Fundamentals of Research and Graduate Study). All students must complete a project with a written report approved by the Chair of the graduate committee.

A minimum of 6 credits of additional course work

With the faculty advisor's approval, students enrolled in industrially sponsored distance learning programs may accomplish 7 credits of project work and 21 credits of course work.

OR

By permission of the graduate committee chair, exceptional students may be allowed to proceed directly to the Ph.D.; such students will be awarded the M.S. upon completing 39 course credit hours, 6 seminar credits, and passing the doctoral candidacy procedure (qualifying exam and proposal defense) without defending a MS thesis or submitting a project report.

Progression to PhD

Upon completing the MS degree requirement, a student has the option of continuing towards a PhD degree if accepted into the PhD program by the MAE Graduate Committee. The student does not need to go through the regular university application process.

PhD in Mechanical Engineering

Prerequisites

MS in engineering or equivalent. Students applying from other disciplines will be handled on a case by case basis.

Requirements

Course work

A minimum of 39 credit hours of course work.

- All coursework must be mutually agreed upon by the student and advisor.
    - At least two courses must be additional ME courses beyond the MS degree course requirements
- No more than two courses may be selected from the following list. Previous Selected Topics courses taken to satisfy the MS degree requirements do not count against this restriction.
    - ME591 Selected Topics in Materials Engineering
    - ME594 Selected Topics in Manufacturing
    - ME618 Selected Topics in Heat Transfer
    - ME628 Special Topics in Fluid Mechanics
    - ME657 Selected Topics in Solid Mechanics
- Students may transfer in up to 30 credits of research and course work from an MS degree, with a grade of B or better. A graduate transfer credit/waiver request form must be approved by the graduate committee chair and Division Head. For instances where no equivalent Clarkson University course exists, but the advisor deems the course worthy of transfer, a Special Graduate Topics course number may be used; e.g., ES 999, CM 999, CH 999, etc.

Seminar credits

A minimum of 6 credits of seminar

Research credits

A minimum of 45 research credits (ME 614 – Thesis/Dissertation) with a MAE faculty advisor (One credit of ME614 may be replaced by ES 542 – Fundamentals of Research and Graduate Study).

1. Degree Committee: In order to provide guidance to PhD students, a Degree Committee must be selected within one year of entry into the PhD program and prior to the student's Research Proposal defense. In consultation with the student, the Committee will be selected by the student's advisor. The Committee will consist of a minimum of five members, of which a minimum of three must be faculty members from Clarkson's MAE Department and at least one must be from a department at Clarkson other than MAE. Approval for the Degree Committee must be obtained from the MAE Division Head and the Dean of the Graduate School. With the approval of the Provost, the fifth member may be any person with appropriate credentials from either inside or outside the University. This Committee will judge the technical competence of the Research Proposal, the dissertation and other oral presentations. With the Provost's approval, additional Committee members may be appointed from outside the faculty as necessary.

Qualifying Examination

A written qualifying examination based on general preparation in the major field must be taken at the first offering after the student completes one semester in the PhD program. MS students may take the exam one time prior to completion of their MS thesis with written permission from their advisor. The exam will be offered in January of each year.

- **Written Examination**: The written examination is mandatory and consists of a mathematics exam and a subject exam. Each exam is 3 hours long. The exams will be conducted on two separate days.

- **Mathematics Exam:** all students must take this exam. Subject areas will include:
    - Integrals of delta/heavyside functions
    - Integration by parts, chain/product rule, Leibniz theorem, limits
    - Line and surface integrals, complex integrals and contour integration
    - Vector identities, indicial notation
    - Divergence/Green's theorem
    - Laplace transforms and applications
    - First order ODEs:
        - linear constant coefficient inhomogeneous systems
        - Separable
        - Dimensionless
    - Second order ODEs:
        - constant coefficient homogeneous
        - Green's functions

- PDEs:
  - Separation of variables for steady and unsteady problems
  - Similarity solution
  - Fourier solution
- Linear algebra, eigenvalues/eigenvectors
- Taylor and Fourier series
- Calculus of variations
- Lagrange multipliers
- Numerical approximation: interpolation, integrals, derivatives

- **Subject Exam:** The subject exam is divided into two categories. The student must choose one category as his major (the other will be considered his minor), and this must be conveyed to the graduate chair one month before the exam.
  - Category A (Fluids)
    1. Fluid Mechanics I
    2. Fluid Mechanics II
    3. Heat Transfer
    4. Thermodynamics
  - Category B (Solids)
    1. Statics and Strength of Materials
    2. Advanced Structural Analysis
    3. Materials and Manufacturing
    4. Vibrations and Dynamics
  - There will be four (4) questions in each category, one from each subtopic. Students must answer two questions from their declared major category and one question from their minor category.
  - The problems could be classical or open-ended type, requiring students to draw upon various aspects of the major area. Grading will focus on the student's ability to formulate a solution by making the necessary assumptions, applying appropriate equations/analysis, and reaching a reasonable answer.
  - Two practice exams will be provided to help candidates familiarize themselves with the exam's format and difficulty level.

- **Oral Examination:** The oral examination is an optional examination offered by the graduate committee to a student who failed the written exam narrowly.
  - If an oral exam is offered to a failed student, it will be administered no less than one week after the written exam is completed.

The student will be given the opportunity to explain their approach and justification for solving the problems in the written portion of the exam. The examiners will also question the student to evaluate their decision-making process on the written portion of the oral exam. This is an opportunity for the examiners to assess the student's level of understanding, and also for the student to rectify any mistakes made in the written portion. As such, students should be prepared to justify their solution approach, explain what they would do differently, and how, if they were to answer the problems again. The student's advisor may attend the oral exam.

- **Research Proposal Defense Examination** (within 24 months, and after passing the qualifying exam): A formal written and oral presentation of a Research Proposal must be made to the Degree Committee within two years after enrollment in the Ph.D. program. It is also required that the written and oral proposal be completed at least one year prior to the completion date of the research work. The primary purpose of the research proposal defense examination is to provide an opportunity for the Degree Committee to evaluate the technical competency of the student and the scientific merit of the proposed research, and to make critical but constructive suggestions regarding the proposed work. The written proposal may be brief, but must clearly describe the justification for the work (i.e., an introduction), the research methods/analysis to be performed (i.e., methods), research performed to date (i.e., preliminary results), and the proposed research plan that will carry the student to completion. It is required that the proposal be distributed to the Degree Committee at least one week prior to the formal presentation. The oral presentation should provide an overview of the written proposal. The Degree Committee must approve the written and oral Research Proposal for successful completion of the proposal defense examination.

  Note: A student is considered a Ph.D. candidate after passing both the Qualifying and Research Proposal Defense Examinations.

PhD Thesis Defense: A final dissertation (thesis) based on independent research must be written, and an examination must be passed.

- The written dissertation must be sent to the Graduate Committee members at least two weeks prior to the examination date. The final dissertation examination will include, as a minimum, an oral examination based on the dissertation. The candidate must give a presentation and

defend his/her dissertation. The Degree Committee and the Dean of the Graduate School must approve the dissertation.

- Before the final dissertation examination can be taken, the candidate must submit at least two peer-reviewed research articles to academic journals. At the time of the examination, these papers must be either under review or accepted by the journal.
- The candidate must submit an announcement flyer to the MAE Graduate Coordinator at least one week prior to the dissertation examination. Prior to submission, the flyer must be approved by the advisor.

Additional Considerations for graduate students: Apart from the above requirements, the student should satisfy/follow the general considerations and guidelines provided below.

- The thesis/project advisor for M.S. Non-Thesis, M.S. Thesis, and Ph.D. students in Mechanical Engineering must be a full time mechanical and aerospace engineering faculty member. A faculty member from another department who has a courtesy/research appointment in the MAE program could co-advise a mechanical engineering student with a full-time departmental faculty.
- New graduate students with TA support will be assigned advisors based on their research interests and those of the faculty that qualify for a TA position. Students should meet with every MAE faculty member and indicate their four choices of faculty. This is done using the Research Meetings with MAE Faculty" form available in the MAE Department (257 CAMP).
- For a graduate student to continue a minimum of B average is required. A graduate student who obtains more than two C or lower grades (although he/she may have a B average) will be subjected to a MAE Graduate Committee review before the student is allowed to continue. The Graduate Committee will request bi annual progress reports from the graduate student regarding his/her performance in course work, seminar and research.
- Teaching Assistantship, Research Assistantship, Fellowship, Instructorship, etc. are awarded on a competitive basis. To receive consideration for TA support, the student must have a B or better average. For M.S. degree students, the departmental support will be limited to a total of four semesters. For Ph.D. degree students the departmental support will be limited to a total of three years. Support for the Ph.D. student during the first year should be from an RA (except for newly hired tenure track faculty). Financial assistance in the form of a partial tuition waiver may be given to M.S. Non-Thesis or M.S. students on a competitive basis.

- Qualifying foreign students with M.S. degrees from foreign countries will be admitted to the Ph.D. program provisionally. Each of these students are required to take the Ph.D. qualifying examination the first time it is given after his/her tentative admission to the Ph.D. program. If the student does not pass this exam, he/she will automatically be required to pursue a M.S. degree before being considered again for admission to the Ph.D. program.
- The Graduate School may grant permission to a graduate student to participate in a Co-op experience. Eligibility for Co-op is limited to those graduate students who have matriculated (i.e., been accepted and enrolled) as a full-time student in residence in one of Clarkson's graduate degree programs for at least one regular semester and have maintained a GPA of at least 3.0 for all graduate coursework. The graduate students' request for permission to participate in the Co-op experience must include (1) a written acknowledgement that she or he has discussed the program with a Career Center counselor; (2) documentation that indicates the Co-op experience is appropriate to the professional and educational objectives of the student, including a statement from the student's graduate program advisor; and (3) a coursework and project/thesis plan that indicates the student's intended path to completing degree requirements.
- Seminar Attendance: Graduate students are expected to attend the MAE seminar series every semester they are in their respective programs. Students should additionally register for one credit of seminar until the seminar credit requirements for the degree have been met.
- After their first year in the Ph.D. program, under special circumstances, Ph.D. students may register for two seminar credits in one semester. The student must obtain written permission from the seminar coordinator to register for two seminar credits, and a copy of the permission memorandum must be presented to the MAE graduate coordinator for inclusion in the student's graduate record. The permission memorandum must include specific activities that the student must accomplish to receive the second credit. Typically, these activities could include attending ten additional seminars from other departments and documenting the attendance using the form, or presenting a full-length seminar. The seminar coordinator will make the final decision concerning what activities will be required to earn the second credit. With prior approval of the seminar coordinator, off-campus students can receive seminar credit by attending ten professional presentations and documenting their attendance.

Occupational Therapy MS

Mission

The Occupational Therapy Program at Clarkson University is committed to:

- Developing professionals with deep cultural sensitivity and innovative problem solving skills who will respond to current and emerging societal needs and improve the health and well-being of diverse individuals, groups, and populations.
- Expanding the knowledge base of the profession through interprofessional scholarship and practice.
- Serving the unique needs of rural and underserved communities.

Program Philosophy

Our curriculum is founded in the philosophical idea that occupations are everyday activities that bring meaning to people's lives and enable individuals, families, communities, and populations to participate fully in society (AOTA 2025). Occupational therapy is guided by the belief that all people have an innate need and right to engage in meaningful occupations throughout their lives (AOTA 2025).

Occupations occur within diverse contexts and the quality of occupational performance is unique in every situation due to the factors intrinsic to the person, group, or population (AOTA 2025). We believe that individuals have the right to live their lives with dignity throughout their lifespans and that barriers to performance can be addressed with innovation. We are committed to the use of occupations as both an intervention and an outcome to promote the health and wellbeing of an ever-changing society.

American Occupational Therapy Association. (2025). The Philosophical Base of Occupational Therapy. American Journal of Occupational Therapy, 2025, Vol. 79 (Supplement 3), 7913410200.

https://doi.org/10.5014/ajot.2025.79S301

Philosophy of Teaching and Learning

The Clarkson University Occupational Therapy Program follows a constructivist philosophy of teaching and learning. Within constructivism, educational knowledge is developed using the construction metaphor. Students obtain knowledge and construct meaning from the discoveries they make during interactions with the instructional environment (i.e., instructional activities), and instructors design active learning experiences and promote discoveries. Several key assumptions provide a basis for our constructivist learning and teaching philosophy:

- Knowledge is constructed upon knowledge. Students integrate new knowledge with previously learned material and their values, beliefs, experiences, and insights.
- Learning is active. In order to construct meaning, learning involves the senses. Students need to engage with material in order to learn.
- Learning is social. Learning is dependent upon students' connection and social interaction with the instructor and their classmates.
- Learning is contextual. Learning takes place in multiple environments and is not limited to the classroom.
- Learning requires continuous self-reflection and commitment to personal and professional growth.
- Learning is lifelong.

Our curriculum is designed to build on prior knowledge and promote interactive learning within and between our cohorts of students. We create safe learning environments and use collaborative and interactive activities that engage students. We embrace the following teaching methods that are congruent with the constructivist teaching and learning philosophy.

- Simulation, role-playing, modeling
- Group work and presentations (e.g., World café; Think-Pair Share [TPS];
- Socratic Circles)
- Interactive lab activities
- Interactive lectures
- Interprofessional education
- Peer to peer mentorship

Curricular Threads and Goals

The Clarkson Occupational Therapy Program has five curricular threads and related goals that are interwoven throughout the curriculum. The threads and goals reflect the values and priorities of our program, as well as the unique philosophy and mission of Clarkson University. Each goal is introduced, applied, and synthesized by the end of the curriculum.

Thread 1: Professional Identity

Goal 1-1: Demonstrate professional behaviors, attitudes, and actions that are reflective of the ethical standards, values, and scope of the profession.

Goal 1-2: Advocate for the profession through participation and membership in community and professional organizations.

Goal 1-3: Develop a plan to ensure lifelong learning.

Thread 2: Innovation and Technology
Goal 2-1: Implement innovative solutions to barriers using technological resources.

Goal 2-2: Educate clients and their families in the safe use and maintenance of assistive technologies and adaptive equipment.

Thread 3: Evidence-informed Practice
Goal 3-1: Critically appraise qualitative and quantitative research.

Goal 3-2: Use a combination of research evidence, professional expertise, and data driven decision making to inform assessment and intervention decisions throughout the continuum of care.

Thread 4: Occupation-based practice
Goal 4-1: Articulate the value of occupation as means and ends, which is integral to the health and well-being of individuals, groups, and populations.

Goal 4-2: Develop and implement occupation-based interventions that support clients' habits, routines, and roles within their contexts.

Goal 4-3: Exercise sound professional judgment and clinical reasoning.

Thread 5: Interprofessional Practice
Goal 5-1: Collaborate skillfully with clients, interprofessional team members, families, and community members to ensure high quality client- and population-centered care.

MS Prerequisites
Students must:

- Complete a baccalaureate degree, with preference given to students with a cumulative GPA of 3.0 or higher.
- Take all the necessary prerequisite courses, preference given to students with a prerequisite grade point average of 3.2 or higher with no grade lower than C.
- Submit documentation of a minimum of 20 hours of observation/volunteer work or work experience under the supervision of an occupational therapist or occupational therapy assistant. If you are unable to complete observation hours,

please contact us for a supplemental essay prompt, and the observation hours requirement will be waived.
- Submit three letters of recommendation. Letters from family or friends will not be accepted.
- Satisfactorily complete the admission process.

Please Note: The OT program is delivered on-site in Potsdam, New York, with up to two courses offered virtually. For virtual courses, students are required to have the ability to use a computer and to access and use software and online platforms to perform all necessary educational functions. It is recommended that all entering students have a computer. Students without a computer can utilize available departmental and university computers.

Prerequisite courses for the MSOT Program at Clarkson University	
General Psychology	3 credits
Abnormal Psychology	3 credits
Development Psychology or Child Development	3 credits
Statistics	3 credits
Biology (in addition to A&P)	3 credits
Human Anatomy	3 credits
Human Physiology	3 credits
English Composition/ Critical Thinking	3 credits
Social Sciences (Anthropology, Humanities, Philosophy, Sociology)	6 credits
Recommended but not required courses	
Communication/ Public Speaking	3 credits
Scientific Writing	3 credits

Please Note:
- Substitutions may be allowed for prerequisite courses upon review and approval by the occupational therapy admission committee.

- We do not offer advanced placement.
- Transfer Credits from other programs, including OT, are not accepted as waivers for the MSOT curriculum.

Application
Applications are made via the Centralized Application Service for Occupational Therapy (OTCAS) https://portal.otcas.org. A rolling acceptance policy is used. The class size is approximately 30 students.

Program Curriculum
A Clarkson education prepares each student for today's world and tomorrow's challenges. Our occupational therapy curriculum provides a sequential progression and follows a cohort model, where students move through the curriculum together. The first semester provides a strong foundation in the basic sciences, research methods, theories and models, clinical reasoning, communication, therapeutic use of self, and the framework that guides the domain and process of occupational therapy practice. Subsequent semesters provide the basis for occupational therapy evaluation and intervention, as students concurrently interact with more advanced content related to the leadership and management of occupational therapy services, evidence-based practice, and professionalism.

Hands-on skills are taught through a series of experiential learning courses designed to provide opportunities to demonstrate competency and clinical reasoning across practice settings and with diverse individuals, groups, and populations. Practicum exams and competency checks are used to ensure safe practice and to identify any areas requiring remediation. Starting in term III and continuing through term V, students start their master's project sequence, where they can develop or contribute to a project related to one of three broad areas: technology, innovative program development, or research. This sequence culminates with a professional presentation and scholarly paper.

To enrich the didactic coursework, level I FW occurs in Spring I (Term II) and again in Fall II (Term IV). After students have completed the first two terms of the program and possess a strong foundation in mental health and pediatric practice, the first level II FW occurs in Summer I (Term III). The second level II FW occurs after two more didactic terms, in Summer II (Term VI). The purpose of the level II FW is to further develop students into competent entry-level occupational therapists.

Fieldwork

All students are required to complete supervised fieldwork experiences as part of the Clarkson Occupational Therapy program. Fieldwork provides an opportunity to complement your academic preparation with the application of theory and course content to practice, to further develop and refine clinical skills, and to establish professional relationships with supervisors and future colleagues.

Students will receive access to the student fieldwork manual during their first semester of coursework. Other fieldwork related documents and resources are available via Moodle and in the fieldwork management system, Exxat. Information regarding fieldwork sites and placements will be available to students through Exxat.

Fieldwork experiences occur in sequence throughout our program and are designed to give the student learning opportunities that connect the classroom to the clinic. Students must participate in the fieldwork experiences in the appropriate sequence (refer to the curriculum chart). Students must complete all Level II fieldwork requirements within one year after completion of the academic coursework. If circumstances arise and a student needs to complete fieldwork outside of the one-year timeline, the student can petition that their case be reviewed by the faculty. Division approval is needed to extend fieldwork placements.

Coursework

YEAR 1			
Fall I	**Credits**	**Spring I**	**Credits**
OT501: Gross Anatomy	4	OT503: Neuroscience	3
OT533: Applied Kinesiology	3	OT537: Evaluating Children and Youth	3
OT521: Clinical Conditions I	2	OT589: Interventions for Children and Youth	4
OT531: Theory and Practice	2	OT579: Group Dynamics	3
OT541: Evidence-Based Practice	2	OT580: Clinical Conditions II	2
OT603: Activity Analysis	3	OT595: Interprofessional	2

		and Emerging Practice	
OT591: Fundamentals of Practice	2	OT700a: Fieldwork Level IA	2
	18		**19**
Summer I			
OT630: Master's Project I	2		
OT705: Fieldwork Level II	9		
	11		
YEAR 2			
Fall II	**Credits**	**Spring II**	**Credits**
OT563: Adult and Aging	2	OT567: Adult Neuro	2
OT583: Adult and Aging Clinical Practice	4	OT587: Adult Neuro Clinical Practice	4
OT605: Assistive Technology	3	OT553: Cognition and Occupational Performance	2
OT557: Upper Extremity Rehabilitation and Orthotics	3	OT597: Specialty Practice	4
OT539: Leadership and Management	3	OT599: The Lifelong Learner	2
OT640: Master's Project II	2	OT650: Master's Project III	2
OT700b: Fieldwork Level I	2		
	19		**16**
Summer II			
OT710: Fieldwork Level II	**9**	**Total Program Credits**	**92**

Program Length

The Clarkson Occupational Therapy Program is a trimester program nested in a 6-semester plan.

Program Sequence

To be eligible for the first semester courses, students must complete all prerequisite courses. To advance within the curriculum, students must pass all didactic coursework. If a student needs to take a leave of absence from level II fieldwork for medical reasons or extenuating circumstances, they can still progress forward with the didactic coursework, but must complete all level II fieldwork experiences prior to graduation.

Graduation Requirements

To graduate from the OT Program, and earn the Master of Science in Occupational Therapy degree (MSOT) candidates must:

1. Achieve a grade of C or better for all courses in the program.
2. Achieve a minimum overall GPA of 3.00 or better at program completion.
3. Successful completion of both levels of fieldwork.
4. Be recommended for graduation by the Program Lead and Clarkson University Faculty.
5. Students must have paid all debts to the school and be in good standing.

Accreditation

The Clarkson University Master of Occupational Therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association. ACOTE awarded a 10-year, full accreditation in August 2024. The next evaluation will be in 2033-2034.

ACOTE is located at 7501 Wisconsin Avenue, Suite 510 E Bethesda, MD 20814. . ACOTE's telephone number is 301-652-6611 x2914, email is accred@aota.org and its website is http://www.acoteonline.org

Clarkson University 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. 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. The Occupational Therapy Program has been registered by the New York State Education Department.

Graduates of the program will be eligible to sit for the National Certification Examination for the Occupational Therapist, administered by the National Board for Certification in Occupational Therapy (NBCOT). After successful completion of this exam, the graduate

will be an occupational therapist, registered (OTR). Graduation from an accredited program is a requirement of NBCOT for certification. It is also required for most states for licensing. For more information on the requirements for certification, see the NBCOT website at http://www.nbcot.org/. For more information on license requirements for New York State, see the New York State Education Department, Office of the Professions website at http://www.op.nysed.gov/prof/ot/ .

A felony conviction may affect a graduate's ability to sit for the NBCOT Certification Examination or attain state licensure.

Physical Therapy Doctorate

Physical Therapy is a health discipline that applies movement science to maintain or enhance quality of life through movement, activity and social participation. Physical therapists evaluate, alleviate and prevent impairments, functional limitations, and disability from injuries, disease and other causes. Physical therapists serve as movement system experts who promote health within a dynamic and comprehensive health care environment while engaging in diagnosis and interventions, consultation, education and research at the individual, community and societal levels.

The mission of the Clarkson Program of Physical Therapy is:

- To educate and empower the next generation of physical therapists to improve health and well-being, especially in rural communities, through leadership, clinical reasoning, and community engagement.
- For graduates to be entry-level physical therapists who emulate the core values of the profession.
- For faculty, graduates and students to contribute to the profession, community, and society through education, scholarship, service, and practice.

Doctor of Physical Therapy Application Requirements

1. Completion of baccalaureate degree (B.S., B.A., etc.) prior to matriculation into the professional curriculum with an overall grade point average greater than or equal to 3.0.
2. Take all the necessary prerequisite courses with a grade point average greater than or equal to 3.0 and no grade lower than a C in these courses.
3. Submit documentation of a minimum of 50 hours of observation, volunteer or work experience in physical therapy and/or another healthcare settings, of which a minimum of 30 hours must be completed under the supervision of a physical therapist.

4. Submit three letters of recommendation. At least one must be from a physical therapist and one must be from a faculty member. None can be from family, friends, or clergy.
5. Meet the technical standards of the Doctorate in Physical Therapy program, with or without reasonable accommodations.

All applications to the doctor of physical therapy program *must* be submitted through the Physical Therapy Centralized Application Service (PTCAS) at www.ptcas.org.

Prerequisite Courses

Three Biology Courses		**Credits**
BY 160/BY 162	Cellular and Molecular Biology and Lab	5
BY 471/BY 473	Human Anatomy and Physiology I and Lab	5
BY 472/BY 474	Human Anatomy & Physiology II and Lab	5
Two Chemistry Courses		**Credits**
CM 131 OR CM 103/105	General Chemistry I with lab Structure and Bonding with lab	4 5
CM 132 OR CM 104/106	General Chemistry II with lab Chemical Equilibrium and Dynamics with lab	4 5
Two Physics Courses		**Credits**
PH 131/PH 141	Physics with lab	4
PH 132/PH 142	Physics II with lab	4
One Statistics Course		**Credits**
STAT 282, 284, 318, 383	Statistics	3
Two Psychology Courses		**Credits**
PY 151	General Psychology	3
PY 370	Developmental Psychology, Life Span (recommended) or any other 3 credit Psychology course	3

Academic Learning Experiences

The DPT curriculum utilizes a case-based experiential learning approach to education, providing students an active, exciting and effective way to learn. The program is student-centered, collaborative, and promotes an active learning process based on patient case studies. Students are prepared for clinical practice and lifelong learning.

Clinical Learning Experiences

Clinical experiences are integrated into the curriculum throughout the educational process. To prepare students optimally for clinical practice in a variety of clinical settings, Clarkson has established over 250 clinical partnerships across the country that offer select rotations to supplement academic learning experiences. Students participate in integrated part time and 3 full time clinical experiences throughout the curriculum in various types of clinical settings across different geographic locations to prepare for the multitude of clinical environments available to physical therapists post graduation.

The DPT Curriculum

The DPT professional curriculum is a full-time program, starting in the fall semester. Each year is divided into three semesters (trimesters). The professional curriculum takes 2 and 2/3 years to complete, finishing in May of the third year.

Course Progression for Graduation

Fall 1		**Credits**
PT500	Foundations of Movement	3
PT501	Examination of Movement	3
PT510	Professional Formation I: The Physical Therapy Profession	2
PT511	Health Systems I: Introduction to Global Health	2
PT512	Critical Inquiry I: Evidence Based Practice	3
PT516	Human Anatomy I	4
	Total	**17**
Spring 1		**Credits**
PT509	Applied Clinical Physiology	**3**
PT521	Health Systems II: Community Health	2
PT523	Musculoskeletal I: Physical Therapy Management of Lower Quadrant Movement Disorders	3
PT524	Neuromuscular Physical Therapy I: Clinical Neuroscience	3
PT526	Human Anatomy II	4
PT529	Cardiopulmonary Physical Therapy I: Health, Wellness, and Exercise Science	2
PT558	Rehab Technology I	1
	Total	**18**

Summer I		Credits
PT530	Professional Formation II: Professional Engagement	2
PT533	Musculoskeletal II: Physical Therapy Management of Upper Quadrant Movement Disorders	2
PT535	Physical Therapy Management of Pediatric Conditions	3
PT539	Cardiopulmonary Physical Therapy II: Management of Cardiopulmonary Disorders	4
	Total	**11**
Fall II		**Credits**
PT640	Professional Formation III: Diversity and Teambuilding	2
PT641	Health Systems III: Health Policy	2
PT642	Critical Inquiry II	1
PT643	Musculoskeletal III: Physical Therapy Management of Spinal Movement Disorders	3
PT646	Clinical Education I	4
	Total	**12**
Spring II		**Credits**
PT651	Health Systems IV: Community Engagement	1
PT652	Critical Inquiry III	1
PT653	Musculoskeletal IV: Comprehensive Physical Therapy Management of Musculoskeletal Conditions	4
PT654	Neuromuscular Physical Therapy II: Management of Degenerative Neuromuscular Conditions	4
PT655	Management of Complex Conditions I	4
PT658	Rehabilitation Technology II	1
	Total	**15**
Summer II		**Credits**
PT660	Professional Formation V: Neurorehabilitation Integrated Clinical Experience	2
PT662	Critical Inquiry IV	1
PT664	Neuromuscular Physical Therapy III: Management of Acquired Neurological Conditions	4
PT665	Management of Complex Conditions II	2
	Total	**9**
Fall III		**Credits**
PT671	Professional Preparation I	3

PT672	Critical Inquiry V: Presenting Research	2
PT675	Management of Complex Conditions III	3
PT676	Clinical Education II	4.5
PT 679	Clinical Competency	0.5
PT698/699	Elective I / II	1
	Total	**14**
Spring III		**Credits**
PT681	Professional Preparation II	1
PT686	Clinical Education III	8
	Total	**9**

Program Length

Students complete the Doctor of Physical Therapy degree in 2 2/3 years or 8 consecutive semesters.

Accreditation Status

The Doctor of Physical Therapy program at Clarkson University is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE). The program was originally accredited on Nov. 16, 2001, reaffirmed on Oct. 28, 2009, and reaffirmed again on April 26, 2017. CAPTE is the sole accreditation agency for physical therapy programs in the nation. It is our policy to maintain accreditation, and our next site visit is scheduled for the spring of 2027. Licensure through the state is required for practice as a physical therapist. Licensure is gained through successful completion of the National Physical Therapy Examination (NPTE) offered by the Federation of State Boards of Physical Therapy (FSBPT) following graduation.

Physician Assistant Studies MS

The mission of the Clarkson University Program of Physician Assistant Studies is to prepare exceptional, highly skilled clinicians who actively demonstrate the University's core values of teamwork, caring, integrity, diversity, service, growth and diligence while compassionately providing for the healthcare needs of their communities.

Program Goals

1. Produce highly skilled and compassionate health care providers licensed to practice medicine as part of a healthcare team.

2. Establish student competence in medical and evidence-based research through scholarly activity.
3. Develop in students the professionalism, medical knowledge, and clinical skills needed to provide comprehensive care to diverse populations in a variety of clinical settings.
4. Instill in students the core values of Clarkson University, while fostering a commitment to community service.

The Program of Physician Assistant Studies will prepare individuals to become valued members of the health care team licensed to practice medicine with physician supervision.

Program motto: a posse ad esse - from possibility to reality.

Application
Applications are made via the Centralized Application Service for Physician Assistants (CASPA) https://portal.caspaonline.org/. Deadline for applications through CASPA is. A rolling acceptance policy is being used. The maximum class size30 students.

The prerequisites for admission are listed below. Be sure that you meet the Clarkson program prerequisites before submitting your CASPA application. Please review the technical standards for the program.

Clarkson PA Prerequisites	Credits
General Biology I (with lab)	4
General Biology II (with lab)	4
General/Inorganic Chemistry I (with lab)	4
General/Inorganic Chemistry II (with lab)	4
Biochemistry/ Organic Chemistry	3
Anatomy & Physiology I/Anatomy (with lab)	4
Anatomy & Physiology II/Physiology (with lab)	4
Microbiology	3
Genetics/ Eukaryotic Genetics	3

General Psychology	3
Statistics (Psychological Statistics/Biostatistics)	3
Social Sciences/Humanities	3

The 12 prerequisites listed above must be completed or in progress at the time of application. Students need to earn a B or higher in all of the prerequisite courses. A minimum overall, prerequisite, and science prerequisite GPA of a or higher on a 4.0 scale is required. All prerequisite coursework must be completed at an accredited institution within the United States or Canada.

Advance placement credit will not be accepted for any prerequisite course

Prerequisite courses with a pass/fail grade will not be accepted.

COVID exception: Prerequisite courses that were changed to a pass/fail format and completed between the start of Spring 2020 and the end of Fall 2021 as a result of the COVID-19 pandemic will be accepted. Pass/Fail courses prior to 2020 or after fall 2021 will not be accepted.

All prerequisite courses must be completed within 10 years of application. Any courses outstanding at the time of application must be successfully completed before matriculation. Applicants may be accepted conditionally and may matriculate only if all required coursework is successfully completed before matriculation.

An applicant cannot have more than two prerequisite courses in progress at time of application.

Three letters of reference. One reference needs to be completed by a MD, DO, PA, NP. It is recommended (but not required) to have a reference from a Professor.

A minimum of 500 hours of patient care experience must be completed, documented and verifiable at the time of application. A minimum of 1,000 hours of documented and verifiable patient care experience is to be completed by the time of matriculation. Patient care experience is considered by two factors, quality and quantity. A heavy emphasis is placed on the quality of the experience. The program defines quality as hands-on responsibility for the patient. Applicants with compensated hours of direct patient care experience will have an advantage. 40 hours of shadowing hours are required by the program verified by the clinician who they shadowed.

Applicants who studied extensively outside of North America will require formal evaluation of those transcripts by the World Education Service (WES). Completion of TOEFL will be required for those for whom English is not the primary language. This requirement may be waived if the applicant has a bachelor's, master's, or doctoral degree from a regionally accredited U.S. college/university. All prerequisite coursework must be completed at an accreditation institution within the United States or Canada.

Ensure the technical standards can be met. Please review the standards below prior to applying.

Simply meeting the prerequisites and submitting an application will not guarantee an interview or acceptance into the program. The admissions committee will decide which applicants are interviewed and which are selected for admission.

Technical Standards Requirements

The abilities and skills which candidates and students *must* possess in order to complete the education and training associated with Physician Assistant education are referred to as "Technical Standards." These same abilities and skills are essential for clinical practice as a Physician Assistant. The Technical Standards listed below reflect five categorical areas: observation, communication, critical reasoning (intellectual), motor and sensory, and behavioral/social and represent minimum competence levels. Students must attest that they meet these Technical Standards prior to or at the time of matriculation to the Clarkson University Program of PA Studies. Students found to be in violation of Technical Standards are at risk for dismissal from the program. Each standard is defined below and is followed by examples of indicators of minimum competence in that area. Reasonable accommodation for persons with documented disabilities will be considered on an individual basis, but a candidate must be able to perform in an independent manner. Candidates will be required to certify that they have read and understand the Technical Standards of the Department of PA Studies at Clarkson University and attest that they have no condition that would interfere, inhibit, compromise or distract from their participation in the program. Please see below description of the Technical Standards.

Observation

Candidates must have sufficient capacity to observe in the lecture hall, the laboratory, the outpatient setting and the patient's bedside. Sensory skills to perform a physical examination are required. Functional vision, hearing and tactile sensation are required to properly observe a patient's condition and to perform procedures regularly required during a physical examination such as inspection, auscultation and palpation.

Communication
Candidates must be able to communicate effectively in both academic and health care settings. Candidates must show evidence of effective written and verbal communication skills. Candidates must be able to communicate with patients in order to elicit information, describe changes in mood, activity and posture and perceive nonverbal communications.

Candidates must be capable of completing, in a thorough and timely manner, appropriate medical records and documents and plans according to protocol.

Motor
The ability to participate in basic diagnostic and therapeutic maneuvers and procedures (e.g., palpation, auscultation) is required. Candidates must have sufficient motor function to execute movements reasonably required to properly care for all patients. Candidates must be able to move freely about patient care environments and must be able to move between settings such as clinics, classroom buildings, and hospitals. In addition, physical stamina sufficient to complete the rigorous course of didactic and clinical study is required. Long periods of sitting, standing, or moving are required in classroom, laboratory and clinical experiences.

Intellectual
Candidates must be able to measure, calculate, reason, analyze and synthesize. Problem solving, one of the critical skills demanded of physician assistants, requires all of these intellectual abilities. Candidates must be able to read and understand medical literature. In order to complete the Physician Assistant Studies program, candidates must be able to demonstrate mastery of these skills and the ability to use them together in a timely fashion in medical problem-solving and patient care.

Behavioral and Social Attributes
Candidates must possess the emotional health and stability required for full utilization of their intellectual abilities, the exercise of good judgment and the prompt completion of all academic and patient care responsibilities. The development of mature, sensitive and effective relationships with patients and other members of the healthcare team is essential. The ability to function in the face of uncertainties inherent in clinical practice, flexibility, compassion, integrity, motivation, interpersonal skills and concern for others, are all required. Candidates must be able to function effectively under stress and have the ability to accept constructive criticism and handle difficult interpersonal relationships during training.

Candidates will be required to certify that they have read and understand the Technical Standards of the Program of PA Studies at Clarkson University and attest that they have no condition -as noted above- that would interfere, inhibit, compromise or distract from their participation in the program.

Program Curriculum

The PA Program at Clarkson University is a professional degree program intended to prepare students academically and professionally for responsibilities and services as a Physician Assistant. This entry level master's degree program consists of 82 credit hours divided into three phases that span 28 consecutive months.

1. The Didactic phase is the preclinical year and spans 13 months.
2. The Clinical phase consists of 14 months of supervised clinical education and coursework
3. The Summative Phase consists of 1 month and consists of evaluation and preparation for the future as a graduate PA

The curriculum is structured so that courses from term two build on courses taken in term one, etc. Therefore, opportunities for transfer of credit into the PA curriculum or advanced placement are not available. Supervised Clinical Practice Experiences are distributed among 9 clinical field experiences or "SCPE's". These experiences form the basis of the clinical and socialization processes for adaptation to the roles and functions of a Physician Assistant. A separate 5-week elective is designed for student research.

Spring I		**Credits**
PA518	Laboratory & Diagnostics	1
PA501	Clinical Medicine I	6
PA504	Basic Science I	2
PA507	Pharmacotherapeutics I	3
PA510	Patient Assessment I	3
PA513	The Patient and the PA I	1
	Total	**16**
Summer I		**Credits**
PA502	Clinical Medicine II	6
PA505	Basic Science Ii	2

PA508	Pharmacotherapeutics II	3
PA511	Patient Assessment II	3
PA514	The Patient and the PA II	1
PA516	Medical Informatics	1
	Total	**16**
Fall I		**Credits**
PA503	Clinical Medicine III	6
PA506	Basic Science III	2
PA509	Pharmacotherapeutics III	3
PA512	Patient Assessment III	3
PA515	The Patient and the PA III	1
	Total	**15**
Spring II		**Credits**
PA517	Clinical Procedures	2
PA600	Supervised Practice- Ambulatory Medicine	3
PA601	Supervised Practice- Internal Medicine	3
	Total	**8**
Summer II		**Credits**
PA602	Supervised Practice – General Surgery	3
PA603	Supervised Practice – Emergency Medicine	3
PA604	Supervised Practice - Pediatrics	6
	Total	**12**
Fall II		**Credits**
PA605	Supervised Practice – Women's Health	3
PA606	Supervised Practice – Behavioral Health	3
PA607	Supervised Practice – Elective I	3
	Total	**9**

Program Length

Students must complete the program in 28 months unless granted a leave of absence for health or personal reasons. Any student that requests and is granted a leave of absence must complete the program in 40 months (28 month program plus 1 year).

Program Sequence and Advance Standing

Students are expected to complete the designated professional curriculum in the sequence specified. Each semester's course work is considered to be a prerequisite for the next semester to the next semester.

1. Students may not enter the program with advanced standing
2. Students are required to successfully complete, in sequence, all course work as full-time students
3. There is no opportunity to progress into an advanced semester
4. There is no opportunity to change the order of pre-clinical course work
5. Elective courses are limited to the clinical year

Students are expected to complete each semester on time as a cohort. Student progression will be a function of successfully passing all required courses in a semester. In the didactic phase of the program, any course failure after attempts at remediation will result in dismissal from the program. In the clinical phase, one rotation may be failed, but with remediation and a repeat of that rotation once only for the clinical phase. In that instance, the student's education may continue 5 more weeks. In the summative phase, the student must pass both the physical assessment exam and the comprehensive written final to pass PA 610 and to be recommended for graduation. If after remediation, a student cannot successfully pass either or both exams, they will not be recommended for graduation and will be released from the program.

Graduation Requirements

To graduate from the PA Program, and earn the Master of Science in Physician Assistant Studies degree (MS) candidates must:

- Achieve a grade of C or better for all courses in the program
- Achieve a minimum overall GPA of 3.00 or better at program completion
- Successful completion of All OSCE/history and physical skills assessments by score
- Successful completion of the comprehensive End of Curriculum written final exam by score
- Be recommended for graduation by the Program Lead and Clarkson University Faculty. This includes an evaluation of student professionalism.
- Student must file the appropriate graduation application
- Student must have paid all debts to the school and be in good standing

Accreditation

The program has been granted continuing accreditation by the ARC-PA as of March 2025. The program has also been registered by the New York State Education Department. Graduation from an accredited program is a requirement of states for licensing and healthcare systems for credentialing. Accreditation-Continued is an accreditation status. The granting of Accreditation-Continued is an accreditation status granted when a currently accredited program is in compliance with ARC-PA Standards. Accreditation remains in effect until the program closes or withdraws from the accreditation process or until accreditation is withdrawn for failure to comply with the *Standards*.

Physics MS & PhD

MS and PhD Prerequisites

A BS degree in physics or closely related subject is required, with undergraduate preparation in the following subjects (at the levels of the textbooks indicated):

1. Classical Mechanics (Taylorr)
2. Quantum Mechanics (Griffiths)
3. Modern Physics (Krane)
4. Thermal Physics (Schroeder, or Kittel)
5. Electricity and Magnetism (Griffiths)
6. Optics (Bennett, or Hecht)

Applicants are expected to have fluency in data analysis and computer programming. A minimum overall undergraduate GPA of 3.0/4.0 is generally required, and an overall GPA of 3.2 or above is recommended for financial aid considerations. An overall GPA of at least 3.4 is recommended for physics and math subjects. All new graduate students in the physics program take a two-part Placement Survey in their first fall semester, which is largely designed in the framework of Physics GRE. This survey provides a basis to determine initial course selections for incoming graduate students

MS in Physics Requirements

1. A cumulative GPA of 3.000 is required for graduation. Students with GPA falling below 3.000 will be placed on academic warning. These students will return to academic good standing if their cumulative GPA is 3.000 or higher at the end of the next term.
2. The Master's program has a non-thesis option and a thesis option. Students must identify a research topic and a research advisor by the end of the second semester of study. This requirement applies to both thesis and non-thesis options.
3. At least 30 credit hours of graduate coursework, with no less than 18 credits of

courses (including the core subjects, PH661, PH663 and PH669), 6 credits of thesis (PH699) and 2 credits of seminar (must include at least 1 credit of PH683 or PH684). Only 500 and upper-level courses are accepted. A maximum of 10 credit hours (B grade or better) may be transferred from a post-baccalaureate certificate program. A minimum of 19 credit hours out of the total 30 must be taken in physics (coursework, seminars and thesis credits).

4. Satisfactory progress toward the degree: Academic progress is evaluated at the end of each term by the Physics Graduate Committee Chair in collaboration with the student's advisor.

Additional Requirements and Procedures for MS in Physics

1. ***Thesis Option:*** Students complete at least one of the core courses, PH661, PH663 or PH669 with no less than a B grade; *AND* defend a submitted thesis written on independent research. The thesis examination committee, composed of at least three Clarkson faculty, is appointed by the student's department. A thesis approved by the examining committee requires signature approval by the Dean of The Graduate School.
2. ***Non-thesis option A:*** Coursework component – Students take all three PH661, PH663 and PH669 courses and obtain a grade of at least a B in each. The student's advisor may authorize, with the approval of the department , replacement of at most one of these courses with another appropriate advanced course for the student's program (the B minimal grade requirement still applies). Project component – The student's research (PH699) will focus on a professionally oriented special project. The written Project Report is examined by a faculty member (usually the student's advisor), or by a faculty committee, as approved by the appropriate academic administrator .
3. The completion of this project will be certified by their academic advisor in a notice to the Division Head, and the student's final report will be submitted to the Graduate School.
4. ***Non-thesis option B:*** Coursework component – same as that of Non-Thesis Option A. The Project Component of Option A will be replaced in Option B by successful completion of the Physics Comprehensive Examination within two years of graduate study. A student enrolled with this option is expected to present a Report of the student's work performed for the required six credits of PH699. This Report will be approved by the student's advisor. Non-thesis option B is reserved for graduate students currently enrolled in Physics PhD program who wish to receive a Master of Science degree while they work on their PhD thesis.

Program Length
While a typical program length is 2 years, all work must be completed in 5 calendar years.

PhD in Physics Requirements

1. A minimum of 90 credit hours beyond BS. Minimum 3 academic years' full-time graduate study (or the part-time equivalent); 2 years in residence at Clarkson. A two-part Physics Survey Test is used to determine initial coursework.
2. A maximum of 30 credits (with B or higher grade) can be transferred from an MS degree. Coursework - no less than 33 credits, including at least 6 credits taken outside the department and at least 6 credits of seminar. Each semester prior to the completion of 78 credits, full-time students in residence at Clarkson must successfully complete PH683 or PH684. Maximum credit hours per year - 30 (12 in fall, 12 in spring and 6 in summer; or, 15 in fall and 15 in spring). Only 500 and upper-level courses are accepted.
3. A full-time student status requires 9 credits per semester until <9 credits remain to complete 90 credits. After completing 90 credits, students will register for 1 credit hour of project/thesis, be in residence, and be actively engaged full-time in completing the project/thesis.
4. A minimum average grade of B, and at least a B grade in each of the core courses (PH661, PH663, PH664, PH670 and PH669). The requirement for PH664 and PH670 can be fulfilled any time during the study, and the student's advisor can approve replacements of these two courses by other advanced graduate courses in the student's chosen research field.
5. Satisfactory progress toward the degree: Academic progress is evaluated at the end of each term by the Physics Graduate Committee Chair in collaboration with the student's advisor.

Additional Program Requirements and Procedures for PhD in Physics

1. Students must select a thesis topic and be assigned to a research advisor no later than the second semester of graduate study. The Department (usually the Program Lead) approves the appointment of a research advisor. Research projects primarily guided by faculty outside the physics department requires a physics co-advisor approved by the Physics Department.
2. Satisfactory completion of the Comprehensive Exam is required within two years of full-time study after admission to the PhD program or, for part-time students, before completing 66 credits (the "candidacy procedure" mentioned in Clarkson Graduate Catalog). If the comprehensive exam is failed twice within the first two years of full-time study, the student will be dropped from the PhD program.
3. The Physics Comprehensive Examination has two (written) parts, each part four hours long, usually given during the first two weeks of each spring semester. The topical coverages are based on those of upper-level undergraduate physics courses offered at Clarkson, and include: Part I: Classical Mechanics, Electricity &

Magnetism (may include Optics topics); Part II: Thermal Physics, Quantum Mechanics, Modern Physics (relativity, nuclear, solid state).

4. By the end of the third year of study, the student writes a PhD research proposal and defends a doctoral topic before a thesis committee composed of at least 5 members. The proposal must be submitted to the thesis committee at least 10 working days before the oral defense. This exam should demonstrate that the thesis topic is of doctoral quality and that the student's background is adequate to carry out the proposed research. A unanimous decision of the committee is required for passing. The thesis committee (selected by the student's advisor and approved by the department and other appropriate authorities) should include no less than 4 Clarkson faculty (at least 3 from physics) of assistant professor rank or higher and possessing an earned doctoral degree. At least one member must be from a department other than physics. With administrative approval, the thesis committee may include an external examiner with appropriate credentials from another university or industry.
5. The final PhD examination involves an oral defense of the written doctoral dissertation before the thesis committee. The exam committee must receive thesis copies at least 10 working days before the oral defense.
6. Each semester of full-time study in residence at Clarkson prior to the completion of 78 credits, the student must register for and obtain a passing grade in PH 683 or PH 684 (Graduate Seminar).

Program Length
Typical program length for a PhD is 5 years. All work for the PhD degree must be completed within 7 years after passing the Physics Comprehensive Examination

CERTIFICATES OF ADVANCED STUDY

The purpose of the Clarkson University Certificate Programs is to allow professionals currently working in a field or wanting to enter a field to conduct intensive study in that field in an efficient and focused manner. Upon completion, students should be able to function more effectively in their specific fields. The Certificate Programs are not designed to provide the broad management background of an MBA. If students wish to expand their management skills they may apply all of the courses taken in any certificate program toward the MBA. All Certificates are approved by the NYS Education Department.

Business of Energy

Program Objectives
The Business of Energy graduate certificate program combines contemporary energy issues and related business principles to produce leaders well-versed in the energy marketplace. Students will gain an understanding of power generation, transmission, distribution and the market functions.

Working professionals and recent graduates seeking to advance their careers in professions associated with the energy industry are encouraged to apply. The program is designed for students from all academic backgrounds – including engineering, geosciences, law, business, policy and related disciplines.

Graduate Certificate Prerequisites
A minimum of a bachelor's degree. Applications will be assessed on a case by case basis.

Graduate Certificate in the Business of Energy Program Requirements
The Online Graduate Certificate in the Business of Energy requires a minimum of 4 courses. The Fundamentals of the Business of Energy course (BOE 610) core course must be taken by all students. The remaining 3 courses must be from the 5 Business of Energy courses. To get the most out of the program, students are recommended to take all 6 BOE courses. Students interested in particular courses, but not the complete certificate, may take those courses with the approval of the program advisor.

Business of Energy Courses	
BOE 610	Fundamentals of the Business of Energy
BOE 611	Planning and Operations of Power Systems
BOE 612	Power Markets
BOE 613	Deregulations and Restructuring
BOE 614	Electric Power Industry Economics and Finance
BOE 615	Challenges to upgrading infrastructure

Program Duration
One– Two years (full time or part-time)

Business of Energy Program MS
Clarkson University is no longer accepting applications for the Business of Energy MS Program. Students may reference historical University Catalogs for prior year degree Requirements.

Business Fundamentals

The Certificate in Business Fundamentals is designed to provide non-business undergraduate majors working in businesses with an opportunity to develop a broad background in the fundamental areas of business without committing to a full MBA. This certificate may be completed entirely online or entirely in classes at the Schenectady campus or students may mix online and on campus evening classes. Students may complete this certificate following the Certificate Pathway to gain automatic admission to the MBA.

Required Courses	
AC 604	Financial and Managerial Accounting for Decision Making
FN 608	Financial Management
IS 606	Business Information Systems
MK 610	Marketing Management
OM 607	Global Supply Chain Management
OS 603	Leadership and Organizational Behavior

Program Length

Most candidates complete their certificate program in 9 months to 1.5 years.

Construction Engineering Management (CEM)

The Certificate Program in Construction Engineering Management (CEM) provides a post undergraduate sequence of courses and subjects that deepen understanding in key construction engineering topics. Using a variety of methods, students engage with professionals, subject matter experts, and practitioners in the field, providing current working knowledge of the state of the industry.

Required courses (9 credits)	
CE 506	Advanced Construction Engineering
CE 510	Sustainable Infrastructure and Building
CE 591	Special topics in Construction Engineering Management

Program Length

Most candidates complete their certificate program in 9 months to 1.5 years.

Global Supply Chain Management

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 Certificate requires 4 courses. Completion of these courses allows individuals to be productive in this important area and can provide a strong concentration should the individual decide to continue on for an MBA.

Required Courses	
OM 607	Global Supply Chain Management
SB 640	Advanced Topics in Supply Chain Management
Specialty Courses	
OM 686	Quality Management and Process Improvement
OS 667	Negotiations and Relationship Management

Healthcare Management

Healthcare has become one of the fastest growing industries in the US economy, characterized by rapid change and a need for management that will extend into the foreseeable future. The Certificate in Healthcare Management prepares individuals to take advantage of the opportunities in this field by introducing them to important business concepts applied to healthcare. Students may complete this certificate following the Certificate Pathway to gain automatic admission to the Healthcare MBA.

Required Courses	
HC 600	Introduction to Health Systems
HC 651	Health Systems Management
Specialty Courses (Select 4)	
HC 605	Health Operations Management
HC 626	Health Systems Marketing

HC 617	Healthcare Finance
HC 620	Health Economics
HC 648	Health Informatics
HC 650	Health Policy Dynamics
HC 674	Legal Aspects of Healthcare
HC 680	Managerial Epidemiology
HC 647	Statistical Methods for Data Analytics
AC 604	Financial and Managerial Accounting for Decision Making

Human Resource Management

The Certificate Program in Human Resource Management will provide the educational background necessary to make informed decisions in management as related to human resource issues. The certificate holder will have the resources for strategic critical thinking necessary to optimize the human resources of an organization.

Required Courses	
OS 603	Leadership and Organizational Behavior
OS 676	Current Issues in Human Resource Management
Specialty Courses (2)	
SB655	Building and Leading Effective Teams
OS 667	Negotiations and Relationship Management

Management and Leadership

The Certificate in Management and Leadership is designed to give entry and middle level managers the core business skills in organizational processes, change management, resource management and leadership. It is focused on assisting managers and executives in enhancing their management and leadership skills in order to positively affect their current organization and provide them career advancement potential.

Required Courses

OS 603	Leadership and Organizational Behavior
OS 651	High Performance Leadership
Specialty Courses (2)	
OS 667	Negotiations and Relationship Management
OS 656	Leading Organizational Change

Pathway to MBA Admission

Qualified students may follow the Certificate Pathway to admission by completing the Business Fundamentals Certificate (for admission to the Online MBA) or the Healthcare Management Certificate (for admission to the Healthcare MBA). The Certificate Pathway provides automatic admission based on performance in Certificate courses and does not require a GMAT or GRE test.

Program Length

1. PhD program students complete up to 7 years after they pass the qualifying exam
2. MS Students complete within 5 years

Power Systems Engineering

The Clarkson Advanced Certificate in Power Systems Engineering is a graduate level program that covers both the equipment and systems aspects of power engineering in its curriculum. The courses are taught by a dedicated set of power engineering faculty.

This certificate program provides practicing power engineers an avenue for advancing their knowledge and technical skills in their discipline. They can complete the certificate in one year by taking one course per quarter.

Students can elect to continue their graduate education and pursue Clarkson's Master of Science in Electrical Engineering as a member of Clarkson’s Distance Part Time MS cohort program.

Curriculum

The Clarkson University Advanced Certificate in Power Systems Engineering requires 12 credits of graduate-level electric power engineering courses. The certificate program is designed to provide practicing engineers with advanced capability in the power system area. The course offerings allow students to select coursework that will best fit their interests and needs. These courses can be applied to a master’s degree program if the student desires to do so.

NON-DEGREE CLOCK-HOUR CERTIFICATE PROGRAM
Paramedic Program

Credential Awarded
Upon successfully completing this course, the student will be eligible to take the New York State Paramedic exam and the National Registry exam.

Program Description
The paramedic certificate program will provide students with the advanced knowledge and skills necessary to care for the sick and injured in the prehospital setting as a paramedic. This course does prepare entry-level paramedics in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains to enter the profession. Through performance of assessments and providing medical care, paramedics are able to recognize and treat a variety of ailments and trauma to the human body from the beginning of the healthcare continuum (outside the hospital). Their goal is to reduce the mortality and morbidity due to illness and injury. Paramedics are responsible and accountable to their patients, the emergency services field, and their peers.After successfully completing this course, the student will be eligible to take the New York State Paramedic exam and the National Registry exam. Once certified, students will be field trained ready to utilize their skills in multiple positions within the healthcare field or help prepare students for future healthcare studies and careers.

Admission Requirements

- Submission of an application and one letter of reference
- At least 18 years of age
- High school diploma, GED, or an unofficial college transcript*
- Ability to read, write, and speak English*
- Be able to meet the minimum requirements for the cognitive and psychomotor components of the examination with reasonable and appropriate accommodations for those persons with documented disabilities, as required by the Americans with Disabilities Act (ADA)*
- Active New York EMT, AEMT or NYS Critical Care Technician certification upon enrollment*
- Copy of a current driver license or government-issued ID
- Submit clinical health requirements to Clarkson University Student Health no later than 30 days prior to the start of class.
- Computer access (with audio and video), with internet access, camera and microphone (capable of working with remote meetings, i.e. Zoom), email, and printer for homework

*All students will need to establish a FEMA student identification to participate in required online learning activities. The FEMA student ID can be obtained by going to https://cdp.dhs.gov/femasid.

Tuition and Fees

- Tuition is $10,600.00
- NREMT Written Exams (Post-course) $152.00
- NREMT Psychomotor Exam (if taken off-site) $250-$350

Program Length and Class Schedule

A 9-month program divided up into two parts. The first 4 ½ months is classroom every Monday, Tuesday, Thursday and Friday from 8:30 am till 4:30 pm. The second half of the program requires good coordination from the student but they should dedicate about 36-40 hours per week to plan for clinical and field time.

Refund Policy for Clock Hour Program

Students who voluntarily withdraw from the program or who are unable to meet the academic requirements of the program and are asked to withdraw are eligible for a refund of tuition according to the following schedule:

- Within the first week of class: 80%
- Within the second week of class: 50%
- Within the third week of class: 30%
- Within the fourth week of class: 10%
- After the fourth week of class: 0%

Enrollment Process

Applicants must submit an application and meet the required deadlines to be eligible for a spot in the class. Deadlines can be found on the website: Paramedic Program | Clarkson University

Licensing or Regulatory Body

New York State Department of Health Bureau of Emergency Medical Services.

Location of Instruction

Clarkson University, Clarkson Hall, Room 3009, 59 Main Street, Potsdam, NY 13699

Didactic Portion

Fourth week of August till 3rd week of December is class from 8:30 am till 4:30 pm on Monday, Tuesday, Thursday and Friday.

Required Courses:

Introduction to Paramedicine - 119 hours
Paramedic Assessments - 77 hours
Paramedicine II - 63 hours with 35 hours of lab
Specialty Populations in Paramedicine - 77 hours
Advanced Trauma & Scene Operations - 119 hours

Clinical/Field Portion
First week of January till 3rd week of May. Good coordination and planning through the clinical coordinator and the student will place the student in a variety of venues to accomplish their skills, see patients and then later work under the guidance of a field training officer/preceptor in their field. These courses include:

Phase II Clinicals - 284 hours
Phase III Field & Capstone - 320 hours

BACHELOR OF SCIENCE DEGREES

Aerospace Engineering

Program Educational Objectives (PEOs):
The PEOs for the Aerospace Engineering program are to produce graduates who:

PEO1: competently apply engineering methods to solve professional problems associated with the design, development, and control of aerospace and related systems and understand the social, ethical, and environmental context of their work.

PEO2: communicate clearly with diverse and international communities, collaborate competently in cross-functional teams, and assume leadership roles while meeting the expectations of their employers.

PEO3: cultivate a sustained commitment to professional growth, lifelong learning, and civic responsibility.

Student Outcomes (SOs):
In order to prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering science, and mathematics.

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3: An ability to communicate effectively with a range of audiences.

SO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The Aerospace Engineering program expects that graduates have a depth of knowledge in aerodynamics, aerospace materials, structures, propulsion, flight mechanics, stability and control, as well as similar depth in at least two of the following topics: orbital mechanics, space environment, attitude determination and control, space structures, telecommunications, and rocket propulsion. It is also expected that graduates have design competence and experience that includes integration of various disciplines within aerospace engineering.

Curriculum Overview: The 120-credit program contains 87 credit hours of required technical courses, 33 credit hours of electives (including one professional elective, one Aerospace professional elective, 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. Aerospace engineering laboratory courses add to this development.

Training in professional problem-solving begins in the fall 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. They may also participate in the Formula SAE, Mini-Baja, Clean Snowmobile, or other team competitions, which are open to any student.

Common Curriculum Requirements: Plans of study must include a total of five Knowledge Area (KA) courses. Students will select these so that at least one is a designated University Course, and so that together these five courses cover four distinct knowledge areas. Communication intensive course requirements 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 elective and aerospace professional elective must meet criteria in the Mechanical and Aerospace Engineering (MAE) Program Student Handbook. One Aerospace Studies or Military Science course (400-level) may be used as the professional elective. 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. Aerospace Studies or Military Science courses (200-level or above) may be used as the undesignated elective.

Aerospace Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering					
First Semester		**Credits**	**Second Semester**		**Credits**
MS/ AS	Military Science/ Aerospace Studies (if elected)	1	MS/ AS	Military Science/ Aerospace Studies (if elected)	1
Total		15	Total		16
Third Semester		**Credits**	**Fourth Semester**		**Credits**
ES 220	Statics	3	AE 201	Intro to Experimental Methods in Mechanical & Aeronautical Engineering	1
ES250	Electrical Science	3	AE342	Intro to Comp Methods	3
ES260	Materials Science	3	ES 222	Strength of Materials	3
MA 232	Elementary Differential Equations	3	ES 223	Rigid Body Dynamics	3
AE 212	Intro to Engineering Design	3	MA 231	Calculus III	3

				KA/ UC Elective	3
Total		15	Total		16
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
AE350	Aerospace Structures I	3	AE425	Aerodynamics	3
AE324	Dynamical Systems	3	AE 429	Aircraft Performance and Flight Mechanics	3
AE 301	Experimental Methods in Mechanical & Aeronautical Engineering	1	AE 401	Advanced Experimental Methods in Mechanical & Aeronautical Engineering	3
ES 330	Fluid Mechanics	3	AE 351	Aerospace Structures II	1
ES 340	Thermodynamics	3	MA 330*	Advanced Engineering Mathematics*	3
	KA/ UC Elective	3		Undesignated Elective	3
Total		16	Total		16
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
AE 430	Stability Control of Aerospace Vehicles	3		Economics Elective	3
AE431	Gas Dynamics	3	AE451	Aircraft Design II	3
AE 450	Aircraft Design I	3		KA/ UC Elective	3
AE 427	Design of Propulsion Systems	3		Aerospace Professional Elective	3
	Professional Elective	3	ES 499	Professional Experience	0
Total		15	Total		12

*Students can alternatively take MA 331 and (STAT 383 or STAT 389)

Applied Mathematics and Statistics

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

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

The applied math and statistics curriculum is designed so that students learn to:

1. Reason clearly, logically, and analytically;
2. Demonstrate a solid understanding of the core material and a deeper understanding of at least one area of mathematics;
3. Work effectively with standard mathematical software packages and write mathematical programs using a high-level computer language;
4. Apply mathematical knowledge to solve real-world, open-ended problems;
5. Read mathematical texts and literature and write mathematical proofs;
6. Communicate effectively, both orally and in writing; and
7. Work effectively both individually and in teams

In addition to the major in Applied Mathematics and Statistics, the Mathematics Program offers separate majors in:

1. Mathematics, with more emphasis on abstract mathematics and proof, including coursework that helps students to prepare for graduate study in math or statistics.
2. Data Science, which combines courses from mathematics, statistics, and computational science to help students develop the interdisciplinary, data-driven skill set needed to tackle real-world problems involving reasoning from vast volumes of data.

Program Requirements	
Area of study	**Credits**
Mathematics and Statistics*	44
Computer Science (CS 141)	4
Physics (PH 131 and PH 132)	8
Science (BY, CM, or PH)	3
First Year Seminar (FY 100)	1
The Clarkson Seminar (UNIV 190)	3
Knowledge Area/ University Courses	15
Application Electives**	15
Free Electives***	27
Total	**120**

*Required courses include MA 131, MA 132, MA 200, MA 211, MA 231, MA 232, MA 339, MA363, MA 377, MA 499, and STAT 383; three courses form the list MA 331, MA 332, STAT 381, STAT 382, STAT 384; plus either MA 451 or MA 453
**Application Electives are chosen from an approved list of courses from other programs; check with the programs for details
***Up to 12 credit hours of advanced (300- or 400- level) coursework in Aerospace Studies or Military Science may count toward graduation requirements. Aerospace Studies or Military Science credits at the 100 and 200 levels do not count toward the required 120 hours. Other restrictions may apply; check with the program offices for details.

Applied Mathematics & Statistics Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
MA 131	Calculus I	3	MA 132	Calculus II	3
PH 131	Physics I	4	PH 132	Physics II	4

CS 141	Computer Science I	4	MA 200	Math Modeling & Software	3
UNIV 190	Clarkson Seminar	3		Knowledge Area Course	3
FY 100	First-Year Seminar	1		Free Elective (CS 142 rec.)	3
Total		15	Total		16
Third Semester		**Credits**	**Fourth Semester**		**Credits**
MA 211	Discrete Math and Proof	3	MA 231	Calculus III	3
MA 232	Differential Equations	3	MA 339	Applied Linear Algebra	3
	Science Elective	3	STAT 383	Probability and Statistics	3
	Knowledge Area Course	3		Knowledge Area Course	3
	Application Elective	3		Application Elective	3
Total		15	Total		15

Applied Mathematics & Statistics Sample Curriculum					
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
MA 377	Numerical Methods	3	MA 363	Mathematical Modeling	3
	MA/ STAT Elective	3		MA/ STAT Elective	3
	Free Elective	3	MA 451/ MA 453	Intro to Math Research or Intro to Math Instruction	2
	KA University Course	3		KA/ University Course	3

	Application Elective	3		Application Elective	3
Total		15	Total		14
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
	MA/ STAT Elective	3		MA/ STAT Elective	3
	Application Elective	3		Free Electives	12
	Free Electives	9	MA 499	Professional Experience	0
Total		15	Total		15

Biochemistry

Science has undergone a remarkable transformation over the last few years, and nowhere has the impact been as 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 an impact on our lives as much as this one, and few offer the opportunities for individuals to make such a broad variety of contributions. Clarkson University's program in Biochemistry is designed to:

1. Develop within the student a solid and comprehensive knowledge base to meet the challenges of professional careers spanning the full range of the chemical and biomolecular sciences.
2. Create an intellectually stimulating and experience rich learning environment, with exposure to open-ended problems frequently encountered in real-world situations, to prepare the student for industry positions, graduate school and professional programs in the health sciences.
3. Support and encourage the development of excellent communication tools and practice in forming professional relationships and skills.

This is an 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 in their own areas of interest 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 an excellent preparation for entrance into professional schools in medicine and dentistry, or for the Doctor of Physical Therapy or Physician Assistant programs at Clarkson. Our alumni have reported they are solidly prepared for the Medical College Admission Test and ready to meet the challenges of medical school.

Required Courses		**Credits**
BY 140	Biology I: Inheritance, Evolution and Diversity	3
BY 160	Biology II: Cellular and Molecular Biology	3
BY 162	Biology II Laboratory	2
BY 214	Genetics	3
BY 412	Molecular Biology Laboratory	4
BY 450	Biochemistry I	3
BY 451	Biochemistry II	3
BY 470	Biochemistry & Biotechnology Laboratory	3
CM 103*	Structure and Bonding	3
CM 104*	Chemical Equilibrium and Dynamics	3
CM 105*	Chemistry Laboratory I	2
CM 106*	Chemistry Laboratory II	2
CM 221	Spectroscopy	3
CM 223	Spectroscopy Laboratory	3
CM 241	Organic Chemistry I	3
CM 242	Organic Chemistry II	3
CM 244	Organic Chemistry Laboratory I	3
CM 371	Physical Chemistry I	3
CM 372	Physical Chemistry II	3

MA 131	Calculus I	3
MA 132	Calculus II	3
PH 131	Physics I	4
PH 132	Physics II	4
* **CM131** and **CM132** may be used to satisfy the first year chemistry requirement for the Biochemistry degree.		

Biochemistry Science Sample Curriculum *					
First Semester		**Credits**	**Second Semester**		**Credits**
CM 103	Structure and Bonding	3	CM 104	Equilibrium and Dynamics	3
CM 105	Chemistry Lab I	2	CM 106	Chemistry Lab II	2
MA 131	Calculus I	3	MA 132	Calculus II	3
BY 140	Biology I	3	BY 160	Biology II	3
UNIV 190	Clarkson Seminar	3	BY 162	Biology II Lab	2
FY 100	First-Year seminar	1		KA Elective	3
Total		15	Total		16
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CM 221	Spectroscopy	3	CM242	Organic Chemistry II	3
CM 223	Spectroscopy Lab	3	CM244	Organic Chemistry Lab	3
CM 241	Organic Chemistry I	3	BY 214	Genetics	3

PH 131	Physics I	4	PH 132	Physics II	4
	KA/UC Elective	3		KA/UC Elective	3
Total		16	Total		16
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CM 371	Physics Chemistry I	3	CM372	Physical Chemistry II	3
BY 450	Biochemistry I	3	BY 451	Biochemistry II	3
	Statistics	3		Professional Elective	3
	Professional Elective	3		Professional Experience	3
	Free Elective	3		Free Elective	3
Total		15	Total		15
Thesis Option					
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
BY 412	Molecular Biology Lab	4	BY 470	Biotechnology Lab	3
	KA/UC Elective	3		Professional Elective	3
CM491	Senior Thesis	6		Senior Thesis	6
	Free Electives	2			
Total		15	Total		12

*Students entering with AP credit or the addition of a minor or a 2nd major will make alternative course choices to meet their needs, therefore the curriculum shown is only an example. The curriculum will be discussed with the student's advisor before courses are selected for each semester.

4+1 Plan for Masters of Basic Science (MBS) & Interdisciplinary Bioscience & Biotechnology (IBB-MS) MS Degree Programs

Objectives
Provide academically-strong Clarkson undergraduates a head-start and rapid track to a bioscience M.S. degree.

Outcomes
4+1 M.S. Degree Students will:

1. Complete all of the requirements and meet the outcomes of the M.S. graduate program in which they matriculate
2. Complete the M.S. degree after one year of additional classwork beyond the B.S. degree

Program prerequisites
Students will apply in the junior year (5^{th} or 6^{th} semester) at Clarkson University.

Program requirements

1. Either a Clarkson University Biology or Biochemistry Major or else another Clarkson University major that has taken the introductory biology core (BY 140, 142, 160, 162) and genetics (BY 214)
2. GPA minimum of 3.25 overall and for Biology courses
3. Likelihood of completing undergraduate degree requirements plus two additional graduate courses during the senior year (7^{th} and 8^{th} semesters)
4. Short essay explaining why the student is motivated to pursue a MS degree
5. Specification of which MS program the student plans to pursue

Program
During the senior year (7^{th} and 8^{th} semesters), a student in the 4+1 MS program will take minimally three-credits (typically one course) graduate-level bioscience coursework each semester (500 or 600 level course with a BY designator). This graduate coursework will not count toward the undergraduate degree; it is in addition to the required 40 credits of BY designated coursework for the undergraduate degree. At the end of the senior year (upon graduation) the student will have completed at least 6 credits of the 30 credits required for a MS degree.

If the student has made adequate progress in the graduate coursework (grades B or better), the student will be immediately matriculated into the MS degree program and be granted graduate student status. During the 5^{th} year (9^{th} and 10^{th} semesters), the student will be expected to complete all additional coursework and research/ project requirements of the graduate program (MBS or MS-IBB). This will require 12 credit hours each of the two semesters to complete the degree requirements.

Biology

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 in the biosphere: molecules, cells, organ systems, species, and

ecosystems. The foundation of the Biology Program is a core curriculum of interactive classroom and laboratory experiences that covers fundamental knowledge in biodiversity, cellular and molecular biology, genetics, microbiology, anatomy, physiology, and ecology. Biology majors typically pursue career paths in biotechnology, ecology and environmental science, or health-related professions. The course curriculum for the Biology Major is designed to realize the following outcomes:

1. Demonstrate proficiency in biology through mastery of the core knowledge of the discipline and specialization in one or more subfields of the life sciences.
2. 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.
3. Develop the ability to think critically and solve problems through exposure to quantitative laboratory- and field-based research, primary research literature, and the history of biological science.
4. Apply appropriate technology, methodology and informational tools that accelerate progress in the workplace such as computer software, bioinformatics, genetic engineering, cell culture, microscopy, etc
5. Master oral and written communication skills essential for work in all fields of biology and the health professions.
6. Develop social skills of interpersonal interaction including an awareness and appreciation of cultural diversity that enhances progress and enriches the pursuit of scientific endeavors
7. Gain strong appreciation of the importance of professional ethical behavior in society and the workplace
8. Convey insight of current issues of bioethical concern ranging from preservation of global biodiversity to the improvement of human health through modern advances in biotechnology
9. 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 program with relevant courses in other basic sciences, mathematics, engineering, business, and humanities. Students may also take advantage of courses offered through the Associated Colleges Program to broaden their educational experience. The large array of choices in biological sciences can be used to tailor a customized career plan leading to graduate school or a professional degree program. Students interested in a more specialized background may consider interdisciplinary studies in chemistry, biomolecular engineering, mathematics, physics, psychology, environmental engineering, environmental science, environmental policy, and environmental health & safety or sustainability.

Specific course requirements of the Biology Major are listed below, along with a suggested schedule. Students are guided throughout the year with personal advising and mentoring by Biology faculty members. Undergraduate participation in basic or applied research is highly encouraged and available through work in faculty laboratories, the senior thesis, summer research programs, and internships.

Required Courses		**Credits**
BY 140	Biology I: Inheritance, Evolution, and Diversity	3
BY 142	Biology I Laboratory	2
BY 160	Biology II: Cellular and Molecular Biology	3
BY 162	Biology II Laboratory	2
BY 214	Genetics	3
BY 401	Professional Assessment	0
Each of the following additional requirements must be satisfied		
	Biology Electives	21-23
	Lab Electives	4-6
	Math and Computer Science Electives	9
	General and Organic Chemistry Electives	116-137
	Physics Electives	8
	Professional Experience	0

Elective Categories:

1. Biology electives are any course under the “BY” subject area
2. Students must take two BY lab courses (200-level or higher), excluding BY 405 and BY 410
3. Three math, statistics, or computer science courses (100-level or higher), including one calculus course and one statistics course
4. Two courses of general chemistry lecture and lab
5. Organic Chemistry I (CM 241)
6. Two courses of physics lecture and lab
7. Professional experience is one of the following courses: BY 405, BY 410, BY 495, BY 498, BY 499

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

Biology Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
BY 140	Biology I	3	BY 160	Biology II	3
BY 142	Biology I Lab	2	BY 162	Biology II Lab	2
CM 131	General Chemistry I	4	CM 132	General Chemistry II	4
MA 180	Intro to College	4	MA 181	Basic Calculus	3
UNIV 190	Clarkson Seminar	3		Knowledge Area Elective	3
FY 100	First-Year Seminar	1			
Total		17	Total		15
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CM 241	Organic Chemistry I	3	BY 214	Genetics	3
PH 141	Physics for Life Sciences I	4		Free Elective	3
	BY Lab Elective	5		Biology elective	3
	Knowledge Area Elective	3	PH 142	Physics for Life Sciences II	4
			STAT 318	Biostatistics	4
Total		15	Total		17
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
	Biology Electives	6		Biology Elective	8
	Knowledge Area Electives	3		Technology Course	3

	Free Elective	6		Free Elective	3
Total		15	Total		14
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
	Biology Elective	5		Biology Elective	6
	Knowledge Area Elective	3		Knowledge Area Elective	3
	Free Elective	6		Free Elective	3
	Professional Experience Elective	1	BY 401	Professional Assessment	0
Total		15	Total		12

Business Administration

The B.S. degree in Business Administration provides students with great flexibility in their choice of electives (both professional electives within and outside of The Reh School of Business). Business is a vitally important part of our society, and every organization requires workers with skills in decision making, activity coordination, motivating people, and performance evaluation. Everyone interfaces with manufacturing, service, and governmental organizations throughout their lives. Thus, it is important that students understand the primary functions involved in managing these organizations. The B.S. in Business Administration combines a general background in business and management that is tailored to meet their areas of interest with the skills and knowledge that prepares them well to face these challenges.

Curriculum

Students earning a degree in Business Administration must meet degree requirements that consist of 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; and 45 elective credits comprised of 18 credits of business/professional electives and 27 credits of free electives to complete 120 hours.

As a result of the flexibility built into the program, many career paths are open to students who pursue the B.S. degree program in Business Administration. These include leadership positions such as managers, production planners, sales managers, information system managers, management consultants, training supervisors, contract

administrators, financial analysts, small business managers and owners, and department managers. Students will also be prepared to take positions in local, state and federal government, as well as in service agencies.

Business Core

AC202	Financial Accounting
AC203	Managerial Accounting
EC150	Principles of Microeconomics
EC151	Principles of Macroeconomics
EC311	Intro to Econometrics
FN361	Financial Management
IS110	Intro to Business Intelligence and Data Analytics
LW270	Law and Society I
MK320	Principles of Marketing
OM331	Operations and Supply Chain Management
OS286	Organizational Behavior
OS352	Strategic Human Resource Management
OS432	Organizational Policy and Strategy
SB113	Entrepreneurship and Business Innovation I

Sample Business Professional Electives

AC305	Cost Accounting
AC311	Intermediate Financial Accounting I
AC312	Intermediate Financial Accounting II
AC407	Taxation
AC421	Accounting Information Systems
AC431	Advanced Accounting

AC436	Auditing
EC360	Environmental Economics
EC451	Industrial & Supply Chain Economics
EC475	Personnel Economics
FN455	Venture Capital
FN462	Investments
FN464	Financial Management II
FN467	International Finance
FN468	Financial Markets
FN470	Strategic Financial Management
FN474	Models for Financial Analysis
IS237	Introduction to Application Development
IS301	Applied Data Analytics
IS314	Database Design and Management
IS400	Applied Machine Learning
IS415	Data Warehousing for Analytics
IS426	Big Data Architecture
IS428	Information Systems for Supply Chain Management
IS437	Data Analytics Project: Planning, Development, and Data Analysis
LW352	Reading for the Law: Legal Issues Through Non-Fiction Literature
LW466	The Law of the Workplace
LW471	Law and Society II
MK321	Consumer Behavior
MK332	Marketing Research
MK436	Creativity, Innovation & New Product Development

OM341	Supply Chain Design & Management
OM371	Strategic Sourcing
OM380	Project Management
OM451	Quality Management & Lean Enterprise
OM476	Management of Technology
OS452	Advanced Human Resource Management
OS466	Negotiations and Relationship Management
SB114	Entrepreneurship & Business Innovation II
SB 322	Designing & Leading Innovative Ventures
SB 381	Logistics Management
SB 437	Commercializing Innovation
SB 440	Innovation & Entrepreneurship Strategy
SB 441	Advanced Topics in Global Supply Chain Management

The following would be a sample third and fourth year plan. There is enough flexibility that students studying abroad during the third year should still be able to complete the degree requirements.

Third Year					
Fall		**Credits**	**Spring**		**Credits**
EC 311	Introduction to Econometrics	3		Free Elective	3
FN 361	Financial Management	3		Free Elective	3
	Professional Elective I	3		Professional Elective II	3
	Non-Business Elective	3		Knowledge Area Requirement	3

	Non-Business Elective	3		Non-Business elective	3
SB 310	Professional Experience		UNIV 399	Global Experience	3
Total		**15**	**Total**		**18**

Fourth Year					
	Fall	**Credits**		**Spring**	**Credits**
	Professional Elective III	3		Professional Elective V	3
	Professional Elective IV	3		Professional Elective VI	3
OS 432	Organizational Policy & Strategy	3		Knowledge Area Requirement	3
	Knowledge Area Requirement	3		Free Elective	3
	Free Elective	3		Free Elective	3
Total		**15**	**Total**		**15**

Business Analytics

Business Analytics involves tools and practices that drive access, analysis, and interpretation of business data. This analysis leads to improved decision making and performance across the value chain. These tools and skills are essential in today's data driven economy. The Bachelor of Science in Business Analytics degree will help create process-oriented information managers with the ability to develop keen data-driven insights into business problems and solutions. Graduates will be able to work effectively with a range of organizational stakeholders with varying knowledge and skill bases - from data scientists to field salespeople. Graduates will be able to identify and use proper data and analysis tools for effective problem solving and importantly, will be able to communicate information effectively across the organization to promote and support clear, balanced, and transparent decision-making. Students graduating with the Business Analytics major will have the following knowledge and skills:

1. An understanding of the components of information systems: Enterprise Resource Planning platforms, Business Intelligence, Database Management Systems, Data Analytics Technologies, and emerging innovations in the field

2. An understanding of, and experience with, the software application design, development, and deployment process
3. The ability to use industry-recognized business systems, such as SAP ERP, and analysis tools, such as Microsoft Excel
4. An understanding of the business requirements underlying all data collection and analysis
5. The ability to work closely with business practitioners across all disciplines to help provide the data and analysis that is necessary and relevant for organizational decision makers
6. A working knowledge of databases, including structure and usage in multiple business contexts across disciplines, industries, and organizations, and fundamental knowledge of tools such as SQL (Structured Query Language)
7. A working knowledge of data collection methods, including structured and unstructured data, and the process by which the data is extracted, transformed, and loaded into the various types of information systems for analysis
8. The ability to perform a variety of data analyses, such as pivot table analysis, optimization, and statistical analysis
9. The ability to communicate the results of data analysis to organizational decision makers and other stakeholders in different forms, including reports, tables, graphs, as well as real-time visualization tools and dashboards

Graduates with a Business Analytics degree will have a great deal of flexibility upon graduation. They may become data acquisition experts or analysts, database administrators, or pursue a graduate degree in the data science field. They may also pursue a career in the more traditional information systems field such as IT project managers or enterprise system consultants.

Students earning a degree in Business Analytics must 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; 21 credits of specialized courses to satisfy the major requirements; and six credit hours of professional electives.

Note that 50% of coursework must be taken outside the School of Business, 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	
IS 237 or CS 141 or EE 261	Introduction to Application Development Introduction to Computer Science Introduction to Programming and Software Design

IS 301	Applied Data Analytics
IS 314	Database Design and Management
IS 400	Applied Machine Learning
IS 415	Data warehousing for Analytics
IS 426	Big Data Architecture
IS 437	Data Analytics Project: Planning, Development, and Data Analysis

Students choose 2 Professional Electives from the following: (not all courses offered every semester)	
DS 392	Ethics in Data Science & Applied Mathematics
CS 460/EE 468	Database Systems
EM 333	Elements of Operations Research (pre-requisite courses include MA 131, MA 132, and STAT 383)
IS 428	Information Systems for Supply Chain Management
OM 380	Project Management
IA 530	Probability & Statistics for Analytics
IA 640	Information Visualization

The following would be the sample 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, students should always consult with their academic advisor prior to studying abroad. Note that for this major, IS237 Introduction to Programming and Application Development, or CS141 Introduction to Computer Science I, or EE261 should be taken prior to the junior year for students wishing to study abroad.

Third Year					
	Fall	**Credits**		**Spring**	**Credits**
FN 361	Financial Management	3	IS 415	Data Warehousing for Analytics	3

IS 314	Database Design and Management	3	IS 237	Introduction to Application Development	3
EC 311	Introduction to Econometrics	3	IS 301	Applied Data Analytics	3
	Non-Business Elective Course	3		Professional Elective Course	3
	Non-Business Elective Course w/Comm Points	3		Non-Business Elective Course w/Comm Points	3
SB 310	Professional Experience	0	UNIV 399	The Global Experience	3
Total		**15**	**Total**		**18**

Fourth Year					
	Fall	**Credits**		**Spring**	**Credits**
IS 400	Applied Machine Learning	3	IS437	Data Analytics Project: Planning, Development, and Data Analysis	3
IS 426	Big Data Architecture	3	OS 432	Organizational Policy and Strategy	3
	Free or Non-Business Elective Course	3		Professional Elective Course	3
	Free or Non-Business Elective Course	3		Free or Non-Business Elective Course	3
	Knowledge Area Course	3		Free or Non-Business Elective Course	3
Total		**15**	**Total**		**15**

Business of Biotechnology

Program Mission

The Business of Biotechnology (BB) BS degree program is an interdisciplinary bioscience and business program that has the mission of preparing students for a successful career in the business of biotechnology. The program is designed to teach the scientific, legal, and regulatory content knowledge needed to understand what biotechnologies are, and how they are developed, commercialized, and produced. It is also designed to teach the content knowledge, applications skills, and applied ethical and economic reasoning required to work as a successful business administrator or leader in biotechnology or a related field.

Program Vision

BB degree holders will become the leaders and entrepreneurs who are instrumental in the development, commercialization, and production of innovative and impactful biotechnology products and services. They will do so while also being models of ethical behaviour and decision-making.

Program Objectives

1. Students are educated in the core concepts and tools of biotechnology and learn how to continuously self-educate to keep up with changes in the commercial biotechnology field.
2. Students learn how different kinds of biotechnology businesses function and learn the content knowledge and skills needed to be employed in the different administrative and managerial roles within biotechnology businesses.
3. Graduates learn to lead a diverse, multi-disciplinary team to success by project management best practices and managing team dynamics.
4. Graduates are educated and prepared to communicate effectively and professionally both orally and in writing.
5. Students learn how to interpret, analyze, and make justified and sound decisions using data.
6. Students learn the legal and regulatory framework around biotechnology R&D and commercialization. They learn the ethical issues around biotechnology and its business applications, and they learn how to make ethical professional decisions.

Program Outcomes

1. Graduates can explain the general concepts and applications of major commercial biotechnologies. They can explain and demonstrate how they keep up with the rapid changes and innovation in the field.
2. Graduates will have the basic science content knowledge to understand the scientific foundations of biotechnology.

3. Graduates can explain and show detailed familiarity with how biotechnology businesses are organized and function, including start-ups and established firms, and including research and development (R&D) or commercialized product and service business.
4. Graduates can explain and demonstrate how to manage a project intended to design a biotechnology product, process or service to meet desired needs within realistic constraints including ethical, health and safety, economic, environmental, social, political, manufacturability, and sustainability.
5. Graduates can explain and demonstrate how to function as a member or lead an effective and diverse multi-disciplinary biotechnology business team.
6. Graduates can assess, analyze, and apply data to make decisions relevant to biotechnology businesses.
7. Graduates can explain and demonstrate how they put into practice professional ethics in the business of biotechnology. They demonstrate an awareness and understanding of the causes and consequences of unethical decisions and practices in the field.
8. Graduates can explain the legal and regulatory framework and constraints on biotechnology R&D and commercialization.
9. Graduates demonstrate effective written and oral professional communication.
10. Graduates are prepared for employment and are hired by biotechnology businesses. They are prepared for and successful in MBA programs.

Degree Requirements

General Clarkson University Undergraduate Degree Requirements
Clarkson University requires that students complete 120 credit hours of coursework with a 2.0 GPA.

All students must complete The Clarkson Seminar (UNIV 190), or equivalent. Students entering Clarkson as First Year students must also complete The First Year Seminar (FY 100). Students must select coursework and possibly extra-curricular activities that carry a total of at least six communications points. Students are also required to take at least five courses that have Knowledge Area designators, and the five courses must cover at least four of the six Knowledge Areas. Additionally, at least one of these five courses must be a University Course that has two Knowledge Area designators. Students must take at least one laboratory course, two science courses, two math courses and coursework in statistics, and be introduced to professional ethics in their field. Students must take one course with a technology designation, and complete a professional experience.

The curriculum is designed to make it easy to acquire a minor in *Project Management* or *New Product Development*. Because of the interdisciplinary nature of this major between business and biology, general minors in Business or Biology are not awarded for BB majors.

BB Degree Program Requirements Overview

Bioscience (15 credits)**:** At least one course in (1) Introductory cell & molecular biology and lab, (2) cell biology, (3) genetics, and (4) microbiology, plus (5) one Biology seminar course.

Biotechnology Science (14-17 credits)**:** At least one course in (1) introductory biotechnology, (2) biotechnology seminar, (3) molecular biology laboratory, (4) advanced biotechnology, (5) bioinformatics, and (6) biotechnology professional experience.

Biotechnology Ethics, Law, Regulations (6-9 credits)**:** At least on course in: (1) law and (2) biotechnology regulations. ***Strongly recommended but not required:*** (3) professional ethics.

Chemistry (11 credits)**:** (1) Two semesters of general chemistry and (2) one semester of biochemistry.

Mathematics and Computer Science (6-10 credits)**:** At least two courses including (1) calculus (including integral calculus) and (2) statistics.

Business (39 credits)**:** At least one course in: (1) organizational behaviour, (2) project management, (3) marketing, (4) finance, (5) quality management, (6) business policy and strategy, (7) management technology, (8) supply chain management, (8) microeconomics, (10) macroeconomics, (11) data analytics, and (12) accounting.

There are four recommended tracks: (1) Project Management, (2) Supply Chain, and (3) Data Analytics, (4) Marketing and & Product Development. Alternatively, a student may opt for a (5) Generalist track that combines coursework from each of the three.

Not required but strongly recommended: **Professional Communication** (3 credits): at least one course in public speaking, professional writing, or data visualization and presentation.

Professional Experience (0-3 credits): A BB student must have a professional experience of at least 120 hours of activity in an area related to the business of biotechnology. This includes a co-op, internship or job at a biotechnology or biomedical business, research involving biotechnology, or working as a teaching assistant in a course with business or biotechnology content. The professional experience can be completed as a co-op during an academic year semester or during the summer of any academic year. As a product, the student will write a paper explaining what they did and reflecting on what they learned from the experience, and have a memo submitted by their supervisor affirming that the student had adequately completed their professional experience. To transcript this, students will enrol in either BY498 Internship in Bioscience (0 credits), BY499 Professional Experience in Bioscience (0 credits), or BY405 Research in Bioscience (variable credit). Students will sign up for the section

number of the BB Program Director (i.e. Langen, section 42), who will approve and verify that the activity meets the requirements of the professional experience. Note that this is not qualitatively different from the professional experience requirement for the Biology-BS degree.

Biotechnology of Business Curriculum

Bioscience (15 credits)
BY160 Biology II - Cellular and Molecular Biology (3)
BY162 Biology II Laboratory (2)
BY214 Genetics (3)
BY218 Cell Biology (3)
BY300 Biology Seminar (1)
BY320 Microbiology **or** BY 480 Medical Microbiology (3)

Biotechnology Science (14 credits)
BY120 Introduction to Biotechnology & Applications (3)
BY200 Business of Biotech Cohort Development (1)
BY314 Bioinformatics (4)
BY486 Molecular Biotechnology (3)
BY412 Molecular Biology Laboratory (3)
Professional Experience Course:
BY498 Internship in Bioscience (0)
BY499 Professional Experience in Bioscience (0)
BY405 Research in Bioscience (variable credit)

Biotechnology Ethics, Law, Regulations (6-9 credits)
BY370 Biotechnology Product Development and Regulatory Affairs (3)
LW270 Law & Society I (3)

***Strongly recommended*:** One professional ethics course, e.g.: HC201 Bioethics Across the Healthcare Industry (3), PHIL241 Medical Ethics (3), PHIL243 Business Ethics (3), POL380 The Law and Bioethics (3), or other professional ethics course

Chemistry (11 credits)
CM131 General Chemistry (4)
CM132 General Chemistry II (4)
CM305 Biochemistry for Health Sciences (3)

Mathematics (8-11 credits)
MA180 Intro to College Mathematics **and** MA182 Basic Calculus (7)
or
MA131 Calculus (4)
STAT318 Biostatistics **or** STAT282 Statistics (4)

Business Core (30 credits)

AC205	Introduction to Financial and Managerial Accounting (3)
EC150	Microeconomics (3, EC) **and** EC151 Macroeconomics (3, EC)
or	
EC 350	Engineering Economics + SB 322 Designing & Leading Innovative Ventures
IS110	Introduction to Business Intelligence and Data Analytics (3)
MK320	Principles of Marketing (3)
FN361	Financial Management (3)
OM331	Operations and Supply Chain Management (3)
OM476	Management of Technology (3)
OS286	Organizational Behavior I (3)
OS432	Organizational Policy & Strategy (3)

Business tracks (9 credits)

Project Management

OM/EM 380	Project Management (3)
OM/EM 451	Quality Mgmt. & Lean Enterprise (3)
OS352	Strategic Human Resource Management (3)
or	
OS466	Negotiations and Relationship Management (3)

Supply Chain Management (9 credits)

OM/EM 341	Supply Chain Design and Management (3)
SB/EM 381	Logistics Management (3)
OM/EM 371	Strategic Sourcing (3)

Data Analytics (9 credits)

IS 301	Applied Data Analytics (3)
IS 314	Database Design & Management (3)
EC 311	Introduction to Econometrics
or	
ES405	Design of Experiments & Analysis of Data (3)

Marketing & Product Development (9 credits)

MK321	Consumer Behavior (3)
MK332	Marketing Research (3)
MK436	Creativity, Innovation, New Product Development (3)

Generalist

Any three courses from the advising business tracks or an alternative business course upon approval of the degree Program Director.

***Strongly recommended*: Professional Communication** (3 credits)

COMM 217	Intro to Public Speaking (3)

or
COMM 313 Professional Communication (3)
or Another COMM designated course

Other courses (4 credits + variable)
FY100 First Year Seminar (1)
UNIV190 University Course (3)
Free electives (around 20 credits) to reach 120 credits

Business of Biotechnology Sample Curriculum

Fall Year 1		**Credits**
AC205	Introduction to Financial and Managerial Accounting (or IS110)	3
EC150	Microeconomics	3
FY100	First Year Seminar	1
UNIV190	University Course	3
BY120	Introduction to Biotechnology & Applications	3
MA180	Intro to College Math (or MA131 Calcl)	4
Total		**17**
Spring Year 1		**Credits**
BY160	Biology II - Cellular and Molecular Biology	3
BY162	Biology II Laboratory	2
IS 110	Introduction to Business Intelligence and Data Analytics (or AC205)	3
EC151	Macroeconomics	3
MA181	Basic Calculus (or elective)	3
BY200	Business of Biotech Cohort Development	1
Total		**15**
Fall Year 2		**Credits**
STAT282/318	Statistics / Biostatistics	4
BY218	Cell Biology	3
CM131	General Chemistry I	4
OS 286	Organizational Behavior I	3
Total		**14**
Spring Year 2		**Credits**
BY214	Genetics	3
OM 331	Operations and supply chain management	3
LW 270	Law & Society I	3
XXxx	Free elective	3

CM 132	General Chemistry II	4
Total		**16**
Fall Year 3		**Credits**
BY 486	Molecular Biotechnology	3
BY 314	Bioinformatics	4
MK320	Principles of Marketing	3
FN 361	Financial Management	3
Total		**13**
Spring Year 3		**Credits**
BY320/448	Microbiology / Medical Microbiology	3
CM 305	Biochemistry for Health Sciences	3
OM 476	Management of Technology	3
BY 370	Biotechnology product development and regulatory affairs	3
XXxx	Professional communication elective (or elective)	3
Total		**15**
Fall Year 4		**Credits**
BY 412	Molecular Biology Laboratory	3
XXxx	Professional Ethics Elective (or elective)	3
OS 432	Organizational Policy & Strategy	3
XXxx	Business Elective	3
XXxx	Free Elective	3
Total		**15**
Spring Year 4		**Credits**
BY 405/498/99	Professional Experience	0-3
XXxx	Business Elective	3
XXxx	Free electives	8-11
BY 300	Biology Seminar	1
Total		**15**
Total credits		**120**

Chemical Engineering

A BS degree in Chemical Engineering is a good foundation for many diverse careers.

Program Educational Objectives (PEOs)

Program graduates are expected to:

PEO1: practice chemical engineering* in continuing and emerging fields and/or

PEO2: be successful in pursuing advanced degrees

PEO3: be motivated to continually develop their knowledge and skills by, for example, taking continuing education or industry training course(s), and acquiring professional engineering certification

PEO4: contribute to society and the engineering profession.

**Here we define chemical engineering as the discipline that requires a thorough grounding in chemistry and a working knowledge of advanced chemistry; material and energy balances applied to chemical processes; thermodynamics of physical and chemical equilibria; heat, mass and momentum transfer; chemical reaction engineering; continuous and stage-wise separation processes; process dynamics and control; process design and appropriate modern experimental and computing techniques.*

Student Outcomes (SOs)
SO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering science, and mathematics.

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3: An ability to communicate effectively with a range of audiences.

SO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Chemical engineers deal with many aspects of an industrial society, especially those challenges involving chemistry. Chemical engineers engage in a spectrum of manufacturing, design 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, biology, 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 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 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 integration. The student is also encouraged to explore special interests in other relevant areas through concentration of elective courses towards a minor or the biomolecular concentration.

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 MS, ME, or PhD degree in chemical engineering, environmental engineering, materials science, and other technical areas. By appropriate selection of electives, the student can also use the chemical engineering program as preparation for graduate work in law, management, or medicine. Personal faculty advising is provided to assist students in the selection of electives that best suit their career goals.

Chemical Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering*					
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CH 210	Molecular Properties	3	BY 160	Biology II: Cellular & Molecular Biology	3
CH 220	Material Balances	3	CH 260	Thermodynamics & Energy Balances	3

CM 241	Organic Chemistry I	3	CM 242	Organic Chemistry II	3
MA 231	Calculus III	3	MA 232	Differential Equations	3
	Engineering Science Elective[+]	3		Knowledge Area Elective[+]	3
Total		**15**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CH 320	Phase Equilibria	3	CH 350	Chemical Engineering Lab I	1
CH 330	Transfer Process Fundamentals	3	CH 360	Chemical Reactor Analysis I	3
CM 244	Organic Chemistry Lab	3	CH 370	Transfer Process Design	3
EC 350	Economic Principles & Eng. Economics[++]	3		Math Elective[+]	3
	Technical Elective[+]	3		Engineering Science Elective[+]	3
				Knowledge Area Elective	3
Total		**15**	**Total**		**16**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
CH 410	Chemical Engineering Lab II	2	CH 430	Chemical Process Safety	3
CH 420	Process Economics & Conceptual Design	3	CH 460	Process Dynamics & Control	3
ES 499	Professional Experience	0		Engineering Electives[+]	6
	Engineering Elective[+]	3		Undesignated Elective[+]	3
	Knowledge Area Elective	3			
	Undesignated Elective[+]	3			
Total		**14**	**Total**		**15**

*First Year students in chemical engineering may substitute CM103, 104, and 105 for CM 131 and 132. This enables them to take chemistry lab with the first year students majoring in chemistry.
[+] The nine elective courses must be approved by the student's faculty advisor and must be distributed as follows: two courses (each from a different field) among materials science, electrical science, and mechanics; one course in mathematics; three courses in engineering, one course in engineering, science, or mathematics; two undesignated electives. An undesignated elective is any course that does not contain a significant amount of material already covered in the student's program. Six credits of advanced (200-level or higher) Aerospace Studies or Military Science Courses may be used to satisfy the requirement for the undesignated electives.
[++]Satisfies the Knowledge Area "Economics and Organizations" requirement

Professional Specializations
Students can develop a specialty by proper selection of electives. One very effective choice is a concentration or a minor in another field such as Biomedical Engineering, Biomolecular Engineering, Chemistry, Environmental Engineering, Environmental Health & Safety, Materials Engineering, Mathematics, Physics, Quality Based Project Management, or Sustainable Energy Systems. Not all courses listed are offered every year. See Professional Concentrations in Engineering and Undergraduate Minors in Engineering.

Chemical Engineering Honors Program
Chemical engineering students with a GPA of 3.5 or better and aiming for an academic or industrial research career may apply to the Honors Program at the end of the sophomore year. Course requirements in addition to the regular curriculum include CH490 Transport Phenomena, 3 credits of CH390 Undergraduate Research Project (or equivalent), and one additional math elective. Math elective suggestions are listed below.

CH 561	Chemical Engineering Analysis
MA 331	Fourier Series and Boundary Value Problems
MA 339	Applied Linear Algebra
MA 363	Mathematical Modeling
MA 377	Numerical Methods
MA 381	Probability
STAT 383	Probability and Statistics

Chemistry

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:

1. Develop within the student a solid and comprehensive knowledge base to meet the challenges of professional careers spanning the full range of the chemical sciences.
2. Create an intellectually stimulating and experience rich learning environment, with exposure to open-ended problems frequently encountered in real-world situations, to prepare the student for industry positions, graduate school and professional programs.
3. Support and encourage the development of professional relationships and excellent communication tools and skills.

It is a rigorous degree program and students completing their requirements may receive a degree 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 regular interaction between students and instructors in the laboratory setting, which offers students research experiences as well as 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 major in chemistry provides an excellent foundation for careers in chemical research & development, forensics, product development, toxicology, environmental health & safety and the health related fields. Pre-health sciences advising programs are available for students interested in medical school or health-care fields. A pre-PT undergraduate concentration is available, preparing students for entry into the Doctor of Physical Therapy degree program. A pre-PA concentration leading to the Masters of Physician Assistant Studies degree program is also available.

Required Courses	
CM 103/ CM 105 *	Structure and Bonding with Lab
CM 104/ CM 106 *	Equilibrium and Dynamics with Lab
CM 121	Freshman Seminar

CM 221/ CM 223	Spectroscopy with Lab
CM 241/ CM 242	Organic Chemistry I and II
CM 244	Organic Chemistry Lab
CM 300	Instrumental Lab
CM 312	Inorganic Chemistry
CM 320	Separations and Electrochemistry
CM 345	Advanced Lab
CM 371/ CM 372	Physical Chemistry I and II
PH 131/ PH 132	Physics I and II
MA 131/ MA 132	Calculus I and II
MA 232	Differential Equations
*CM131 and CM132 may be used to satisfy the first year chemistry requirement for the Chemistry BS degree.	

Chemistry Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
CM 103	Structure and Bonding	3	CM 104	Equilibrium and Dynamics	3
CM 105	Chemistry Lab I	2	CM 106	Chemistry Lab II	2
MA 131	Calculus I	3	MA 132	Calculus II	3
EV 100	Intro to Environmental Sci & Sustainability	1	PH 131	Physics I	4
UNIV 190	Clarkson Seminar	3	CM 121	Freshmen Seminar	1
FY 100	First-Year Seminar	1		KA Elective	3
Total		**13**	**Total**		**16**
Third Semester		**Credits**	**Fourth Semester**		**Credits**

CM 221	Spectroscopy	3	CM 242	Organic Chemistry II	3
CM 223	Spectroscopy Lab	3	CM 244	Organic Chemistry Lab	3
CM 241	Organic Chemistry I	3		KA/UC Elective	3
MA 232	Differential Equations	3	PH132	Physics II	4
	KA/UC Electives	3		Statistics Elective	3
Total		**15**	**Total**		**16**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CM 345	Advanced Laboratory	4	CM 300	Instrumental Laboratory	3
CM 371	Physical Chemistry I	3	CM 312	Survey of Inorganic Chemistry	3
CM 320	Separations and Electrochemistry	3	CM 372	Physical Chemistry II	3
	Professional Experience	3		KA/UC Elective	3
	Free Elective	3		Biology Courses	3
Total		**16**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
	KA/UC Elective	3		Free Electives	14
	Free Electives	12			
Total		**15**	**Total**		**14**
Thesis Option					
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
CM 491	Undergraduate Thesis	6	CM 492	Undergraduate Thesis	6
	KA/UC Elective	3		Free Electives	8
	Free Electives	6			
Total		**12**	**Total**		**14**

*Students entering with AP credit or the addition of a minor or a 2nd major will make alternative course choices to meet their needs, therefore the curriculum shown is only an example. The curriculum will be discussed with the student's advisor before courses are selected for each semester.

Those students wishing to satisfy the requirements for an American Chemical Society (ACS) certified BS degree will need at least six credit hours in advanced chemistry electives, including Biochem I, and at least one credit hour of an elective chemistry laboratory course. Directed research can count for only three such credits.

Civil Engineering

Civil engineers plan, design, and construct our nation's physical infrastructure and take a leadership role in the responsible development and protection of our natural resources. Accordingly, the field of civil engineering encompasses several distinct disciplinary themes, including architectural engineering, construction engineering, environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering, among others.

Civil engineers have always 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 Program, formally stated, is to educate talented and motivated people to become successful professionals through quality undergraduate, graduate, and professional continuing education 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 Program of Civil and Environmental Engineering actively pursues the educational goal of providing talented and motivated people 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).

Program Educational Objectives (PEOs)
The Program Educational Objectives support the mission of the Civil and Environmental Engineering Program, which is to educate talented and motivated people to become successful professionals through quality undergraduate, graduate, and professional continuing education programs that place a high priority on student access and interaction with faculty.

PEO1: Graduates will become civil engineering professionals who apply knowledge to meet the challenges of their field.

PEO2: Graduates will become civil engineering professionals who exhibit effective communication, teamwork, and leadership.

PEO3: Graduates will become well-rounded citizens who utilize their education to serve the public good, with an understanding of their professional and ethical responsibilities.

PEO4: Graduates will become civil engineering professionals who exhibit intellectual growth, continued innovation, and a commitment to lifelong learning.

Student Outcomes (SOs) to Ensure Achievement of PEOs
SO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering science, and mathematics.

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3: An ability to communicate effectively with a range of audiences.

SO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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 maximizes 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 transportation, or can use the elective portion of the curriculum to concentrate in selected areas such as construction engineering (including infrastructure and architectural engineering tracks), structural engineering, water resources engineering, or environmental engineering.

The guiding principle is that the student and faculty advisor together create a program of study that best satisfies the student's individual career objectives.

Civil Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering					
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CE 212	Introduction to Engineering Design	3	CE 305	Construction Planning and Management	3
CE 301	Engineering Geomatics	3	ES 222	Strength of Materials	3
ES 220	Statics	3	ES 330	Fluid Mechanics	3
MA 231	Calculus III	3	MA 232	Elementary Differential Equations	3
	KA/ UC Elective	3		ES Elective[1]	3
Total		**15**	**Total**		**15**

Fifth Semester		Credits	Sixth Semester		Credits
CE 320	Structural Analysis with Lab	3	CE 310	Geotech. Engineering I: Soil Mechanics with Lab	3
CE 330	Water Resources Engineering I with Lab	3	CE 340	Intro to Environmental Engineering	3
STAT 383	Probability and Statistics	3	CE 441 / CE 442	Reinforced Concrete Design / Steel Design	3/3
	ES Elective[1]	3		ES Elective[1]	3
	Professional Elective[3]	3		Science Elective[2]	3
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
EC 350	Economic Principles and Engineering Economics	3	CE 490/ CE 491	Senior Design	3
	Professional Electives[3]	9		KA/ UC Elective	3
ES 499	Professional Experience	0		Professional Electives[3]	9
	KA/ UC Elective	3			
Total		**15**	**Total**		**15**

[1]Eligible ES Electives are: ES 223 Rigid Body Dynamics, ES 250 Electrical Science, ES 260 Materials Science and Engineering I, ES 340 Thermodynamics.
[2]Science Elective: Any 3-credit or greater BY course, CE 315 Geology for Engineers, CE 316 Earth's Dynamic Climate: Science & Impacts, CE 317 Geologic Hazards or per approved CEE science elective list.
[3]A total of 16.5 design credits are required to be accumulated. Required courses provide 13.5 design credits.

Professional Specializations
Through the selection of electives, students can achieve proficiency in particular areas of interest. Elective courses can be selected from those offered by the Civil and Environmental Engineering Program and by other programs. 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 division head. To enroll in a 600-numbered course, undergraduates must have a cumulative grade-point average of at least 3.5 and permission of their advisor, division head and academic dean.

Professional Concentrations in Civil Engineering

Construction Engineering Management

Four required courses including	
CE 411	Construction Materials Engineering
CE 415/ 515	Foundations, Stability, and Retaining Structures
CE 441	Reinforced Concrete Design
CE 442	Steel Design
Choose at least one of the following non-CE courses	
COMM 217	Introduction to Public Speaking
EHS 330	Occupational Safety and Ergonomics
EM/OM 380	Project Management
EM/OM 451	Quality Management and Lean Enterprise
FN 361	Financial Management
OS 286	Organizational Behavior I
LW 270	Law and Society I
LW 466	The Law of the Workplace
Completion of at least one of these two tracks	

1. Construction/ Infrastructure Track:	
Choose at least two of the following	
CE 302	Surveying, Geodetic Control, and Engineering Measurements
CE 304	Introduction to Scheduling and Estimating
CE 315	Geology for Engineers
CE 404	Applications in Scheduling and Estimating
CE 406	Infrastructure Construction
CE 408	Building Information Modeling (BIM) & Integrated Project Delivery (IPD)
CE 410/510	Sustainable Infrastructure and Building
CE 453/553	Properties and Performance of Concrete Materials
CE 461	Transportation Systems Design
2. Architectural Engineering & Building Construction Track	
Choose at least two of the following	
CE 304	Introduction to Scheduling and Estimating
CE 404	Applications in Scheduling and Estimating
CE 408	Building Information Modeling (BIM) & Integrated Project Delivery (IPD)
CE 409	Fundamentals of Building Systems
CE 410/510	Sustainable Infrastructure and Building
CE 448	Introduction to Architectural Engineering
CE 509	Advanced Building Science

Structural Engineering

Five required courses including

CE 420/520	Computational Methods of Structural Analysis
CE 415/515	Foundations, Stability, and Retaining Structures
CE 441	Reinforced Concrete Design
CE 442	Steel Design
CE 490/491	Senior Design with Structures Focus or approved alternate
Choose at least two of the following	
CE 408	Building Information Modeling (BIM) and Integrated Project Delivery (IPD)
CE 411	Construction Materials Engineering
CE 448	Introduction to Architectural Engineering
CE 452/552	Advanced Strength of Materials
CE 453/553	Properties & Performance of Concrete Materials
CE 501	Fracture Mechanics of Concrete Structures
CE 512	Structural Dynamics
CE 538	Finite Element Methods
CE 541	Bridge Engineering
CE 549	Experimental Methods in Structures
CE 555	Structural Damage Assessment, Rehabilitation, and Repair

Water Resources Engineering

Four required courses including	
CE 430	Water Resources Engineering II
CE 470	River Restoration
CE 479	Water and Wastewater Treatment Design

CE 490/ 491	Senior Design with Water Resources Focus or approved alternate
Choose any two from the following	
CE 315	Geology for Engineers
CE 340	Introduction to Environmental Engineering
CE 380	Fundamentals of Environmental Engineering
CE 434	Sustainable Development Engineering
CE 435	Groundwater Hydrology and Geochemistry
CE 478	Solid Waste Management and Landfill Design
CE 481/581	Hazardous Waste Management and Engineering
CE 482/582	Environmental Systems Analysis and Design
And choose at least one from the following	
BY/CE/EV 313	Biogeochemical Earth Systems Science
BY/EV 330	Great Lakes Water Protection
BY 431	Limnology
CE 316	Earth's Dynamic Climate: Science & Impacts
CE 317	Geologic Hazards
ES 436	Global Climate Change: Science, Engineering & Policy
COMM 428	Environmental Communication
EV 305	Sustainability & the Environment
POL 374	Environmental Political Theory
POL 375	Environmental Law
POL 470	Environmental Policy

Civil Engineering majors may also sign up for minors in Architectural and Facilities Engineering and/or Environmental Engineering.

The standard length of BS in Civil Engineering is four years or eight semesters.

Computer Engineering

The objective of the undergraduate program in computer engineering is to prepare students for careers as professional engineers and to provide a base for graduate study and for lifelong learning in new and developing specialties.

Program Educational Objectives (PEOs)

PEO1: Graduates of the Computer Engineering program are expected to have advanced their careers as contributing professionals who apply hardware and software knowledge strengthened with analytical problem-solving skills in a wide variety of practical applications.

PEO2: Graduates of the Computer Engineering program are expected to have become well-rounded citizens who rely on their engineering education to serve society with an understanding of their professional and ethical responsibilities.

PEO3: Graduates of the Computer Engineering program are expected to have become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field.

PEO4: Graduates of the Computer Engineering program are expected to have exhibited intellectual growth and pursue continual innovation in computing systems. Those graduates who are extraordinarily talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

Student Outcomes (SOs)

To prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO3: an ability to communicate effectively with a range of audiences

SO4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

SO6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

We expect that within a few years after completing the program our Graduates will become:

Contributing Professionals
Graduates are expected to have advanced their careers as professionals who apply fundamental engineering knowledge and analytical problem solving skills in a wide variety of practical applications.

Well-Rounded Citizens
Graduates are expected to have become well-rounded citizens who rely on their engineering education to serve society with an understanding of their professional and ethical responsibilities.

Effective and Responsible Collaborators
Graduates are expected to have become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field.

Intellectual Growth
Graduates are expected to have exhibited intellectual growth and pursue continual innovation in their field. Those graduates who are motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

The degree program in computer engineering fosters the achievement of these objectives in two ways. First, the curriculum as a whole is comprised:

1. A coherent program of required courses in basic science, mathematics, and engineering science, including laboratory experience in the use of modern equipment
2. Education in the humanities, social sciences, ethical principles and management, with special attention to the development of effective written and oral communication skills
3. The elective coursework in several of the major sub-disciplines of electrical, computer and software engineering encourages the pursuit of individual interests and provides an opportunity to gain further knowledge in these sub-disciplines
4. Experiences that facilitate the development of problem-solving, teamwork and engineering design skills with the aid of modern analysis and design tools, and

experiences that encourage students to become active alumni and to develop a commitment to lifelong learning

Basic and required courses are taken during the first two years, along with some introductory professional courses, including an engineering laboratory. Laboratory courses are required in both of these years with a strong emphasis on engineering design. The third and fourth years include both required and elective technical courses.

The Clarkson Common Experience is addressed in the first year with the Clarkson Seminar and ES110 Engineering and Society. Five knowledge area courses, including a university course, are required over the four years of study. One of these knowledge area courses must be in economics and one must be ES110. The Clarkson Common Experience is designed, in part, to develop communication, problem-solving, and critical-thinking skills and an understanding of the social, ethical and economic implications of an engineer's work.

Second, the computer engineering program is constructed so that each student develops a working knowledge of engineering design based on a broad spectrum of concepts, principles, and techniques balanced in hardware, software, and systems, along with a strong set of communication and teamwork skills. This is done through a program of study with the following characteristics:

1. In the required courses, students are expected to master the fundamentals of hardware design. Hardware design principles are introduced in courses that treat 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 logic circuits, programmable logic devices and embedded systems. Elements common to hardware and software are stressed and hardware/software tradeoff are addressed in this segment of the curriculum
2. Sound software engineering principles are introduced and reinforced with required courses that treat object-oriented design, data structures, standardized components and system software. Students gain experience working in modern software development environments and using modern design tools. In the required course sequence, students learn C/C++, Python and Java in the context of modern integrated development environments, gain experience in embedded and FPGA system design and industry-standard simulation, synthesis, debugging and verification tools in their design projects.
3. Students develop their teamwork and communication skills. They do so in part through coursework that requires them to communicate effectively in written form and in part through coursework 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 sizes, collaborating with others on teams whose composition is determined by their instructors. By participating in team-based problem solving of this kind, with

individuals they did not choose as teammates, students learn to work with individuals in multiple situations, thereby developing their teamwork skills

4. 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 a digital system's hardware and software components. 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.
5. Students engage in activities that foster 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 also to take advantage of the close interpersonal environment that the program fosters. We require our students to obtain professional 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.

Computer Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering*					
Third Semester		**Credits**	**Fourth Semester**		**Credits**
ES 250	Electrical Science	3	EE 211	ECE Lab I	3
EE 262	Intro to Digital Design	3	MA 211	Discrete Mathematics & Proof	3
ES 264	Intro to Object Oriented Programming and Software Design	3	EE 260	Embedded Systems	3
MA 232	Differential Equations	3	EE 321	Systems and Signal Processing	3
	KA/ UC Elective	3	MA 231	Calculus III	3
Total		**15**	**Total**		**15**

Fifth Semester		Credits	Sixth Semester		Credits
	KA/UC Elective (EC)	3	EE 316	Computer Engineering Junior Lab	3
EE 341	Microelectronics	3	EE 466	Computer Architecture	3
EE 363	Software Components and Generic Programming	3		KA/UC Elective	3
EE 365	Advanced Digital Circuit Design	3		Professional Elective[3]	3
STAT 383	Probability and Statistics	3	EE361	Fundamentals of Software Engineering	3
ES 499	Professional Experience	0			
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
EE 416	Computer Engineering Senior Lab or Professional Elective[3]	3	EE 416	Professional Electives[3] or Computer Engineering Senior Lab	3
	ES or Science Elective	3		Professional Elective	3
	EE/CS Elective[2]	3		Undesignated Elective[4]	3
	CS Elective	3		EE/CS[2]/MA[2] Elective	3
	KA/ UC Elective[1]	3		Undesignated Elective[4]	3
Total		**15**	**Total**		**15**

*Computer Engineering students must select CS 141 from the available list of Second Semester Science/CS elective courses numbered CM 132/ BY 160/ CS 141.
[1]There are a total of five courses which must be taken to cover at least four knowledge areas. At least one of these courses must be a University Course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the knowledge area electives must be an economics course, EC 350 is recommended, and one must be ES 110.
[2]The Computer Science Elective must be selected from computer science courses numbered 300 or higher or CS 242. *Math Electives should be listed in the section on Minor in Mathematics*.
[3]The Professional Electives are ECE courses numbering 300 or higher, or other engineering courses if approved by the ECE Program.
[4]The Undesignated Electives are fulfilled by college level courses that do not contain a significant amount of material already covered elsewhere in the student's program.
[5]The Engineering Science Elective is satisfied by the selection of an ES course approved by the ECE Program.

See Academic Requirements for details of the Clarkson Common Experience, including the First-Year seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements and professional experience.

Professional Specializations
The courses offered by the Electrical and Computer Engineering Program can be grouped into sub-disciplines, with each sub-discipline including a combination of required and elective courses at the undergraduate level. Note that a number of these courses cross sub-discipline boundaries. Examples of the specializations are shown in the table below. A complete description of currently available courses is available online on the ECE intranet webpage.

Biomedical Engineering	
BR 400	Introduction to Biomedical Rehabilitation Engineering and Science
EE 465	Computer Graphics
EE 466	Computer Architecture
EE 468	Database Systems
EE 485	Neural Engineering
Communication Systems and Signal Processing	
EE 401	Digital Signal Processing

EE 404	Wireless Networks
EE 407	Computer Networks
EE 427	Introduction to Digital Image Processing
EE 470	Coding and Information Transmission
EE 471	Principles of Digital Data Communications
Control Systems	
EE 450	Control Systems
EE 451	Digital Control
EE 452	Optimization Techniques in Engineering
Electronics and Circuits	
EE 441	Electronic Devices
EE 442	CMOS IC Design
Computer Engineering	
EE 368	Software Engineering
EE 407	Computer Networks
EE 408	Software Design for Visual Environments
EE 410	Computer and Network Security
EE 461	Many-Core Architecture and Programming Model
Power Engineering	
EE478	Power System Engineering
EE 430	High-Voltage Techniques and Measurements
EE 431	Power Distribution and Utilization
EE 432	Control and Management of Modern Electric Power Distribution Systems
EE 438	Alternate Energy Systems
EE 439	Dielectrics

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 the permission of their advisor and their division head. To enroll in a 600-numbered course, undergraduates must have a cumulative grade-point average of at least 3.5 and must have the permission of their advisor, division head, and the dean.

Computer Science

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 arts and entertainment are centered on computer technology. Computer scientists are professionals who understand the technology and have the skills to develop or apply it.

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

The Computer Science major is organized into four options. The General option is the most flexible. It allows students to tailor their program of study to a wide variety of professional and personal goals. The other three options prepare students for the specific career paths mentioned above: Software Design and Development, Information Technology and Research. The requirements of the General option are shown below. The first five semesters of the sample schedule shown below are common to all options of the CS major.

The Computer Science major is designed so that by the time they graduate, students should be able to:

1. Demonstrate a solid understanding of the core concepts of computer science and some advanced topics in computer science;
2. Reason clearly and analytically about software and computing systems;
3. Work effectively with a variety of programming languages, software tools, and computing environments;
4. Solve substantial real-world problems;
5. Communicate effectively orally and in writing;
6. Work effectively in teams; and
7. Use computer science literature and other similar resources for independent study or to research the solution to a computing problem

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

Required Courses		Credits
CS 141*	Introduction to Computer Science I	4
CS 142*	Introduction to Computer Science II	3
CS 241*	Computer Organization	3
CS 242*	Advanced Programming Concepts in Java	3
CS 341	Programming Languages	3
CS 344	Algorithms and Data Structures	3
CS 345	Automate Theory and Formal Languages	3
CS 350	Software Design & Developments	3
CS 444	Operating Systems	3
CS 499	Professional Experience	0
MA 131	Calculus I	3
MA 132	Calculus II	3
MA 211	Discrete Mathematics and Proof	3
MA 339 OR MA 239	Applied Linear Algebra Elementary Linear Algebra	3
STAT 383 OR MA 381	Probability and Statistics Probability	3
Science Electives	One 2-course lecture/ lab sequence in CM or PH, plus 4 additional credits in CM, PH, or BY	12
CS Electives I	Three advanced CS courses** (9 credits)	9
CS Electives II	Two advanced courses in CS or related disciplines**	6

*Or equivalent
**Chosen from a list maintained by the program.

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

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

Computer Science Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
CS 141	Intro to Comp Sci I	4	CS 142	Intro to Comp Sci II	3
MA 131	Calculus I	3	MA 132	Calculus II	3
	Science Sequence Course I	4		Science Sequence Course II	4
UNIV 190	The Clarkson Seminar	3		Knowledge Area Course	3
FY 100	First-Year Seminar	1		Free Elective	3
Total		**15**	**Total**		**16**
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CS 242	Advanced Programming Concepts	3	CS 241	Computer Organization	3
CS 341	Programming Languages	3	CS 344	Algorithms and Data Structures	3
MA 211	Discrete Math and Proof	3	CS 350	Software Design and Development	3
	Science Elective	4	MA 339	Applied Linear Algebra	3
	Knowledge Area Course	3		Knowledge Area Course	3
Total		**16**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CS 345	Automata Theory	3	CS 444	Operating Systems	3
	CS Elective	3		CS Elective	3

STAT 383	Probability and Statistics	3		Knowledge Area Course	3
	Knowledge Area Course	3		Free Elective	3
	Free Elective	3		Free Elective	3
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
	CS Electives	3		CS Electives	6
	Free Electives	12		Free Electives	9
CS 499	Professional Experience	0			
Total		**15**	**Total**		**15**

Data Science

Across business, industry, government, and nearly all scientific efforts, the explosion of data and data collection drives a growing need to manage, analyze, and extract insight and knowledge from the data produced. Not only must scientists and engineers grapple with Political Science vast volumes of data, but throughout business and industry, from entry-level technician to executive, the ability to reason effectively using data continues to grow in importance. The skillset required to excel in that environment lies at the intersection of mathematics, statistics, and computational science. The emerging discipline of *Data Science* addresses that interdisciplinary space, and the National Academy of Science, Engineering, and Medicine (NASEM) has identified this discipline as a critical enabler for tackling many real-world problems.

The BS in Data Science provides students the opportunity to develop an interdisciplinary, data-focused skillset and then apply those skills to real-world challenges. The program provides strong preparation in critical aspects of working with data by thorough grounding in mathematics and statistics and the foundations of computer science as related to data and data processing. The program provides an early focus on foundational competencies across the spectrum of the science of data. Once that baseline is established, students are expected to apply those skills in specific domains of interest to them, with a significant component of the curriculum based on team projects and experiential learning.

The data science curriculum prepares students to:

1. Apply analytic thinking and quantitative reasoning skills to relevant problems;

2. Demonstrate the ability to communicate technical results with clarity and precision;
3. Understand a number of computer programming constructs and develop the ability to quickly assimilate the skills required to use new and emerging programming languages;
4. Solve real-world, open-ended problems;
5. Explore at least one area of application-specific domain knowledge;
6. Work effectively both individually and in teams;
7. Understand the ethical implications of data-driven methods in the modern, data-enabled society

In addition to the major in Data Science, the Mathematics Program offers separate majors in:

1. Mathematics, with more emphasis on abstract mathematics and proof, including coursework that helps students to prepare for graduate study in math or statistics.
2. Applied Mathematics and Statistics, which provides a broader range of courses applicable to many business, engineering, and industrial math applications.

The courses from these other majors are available to the Data Science major. Interested students can leverage these other offerings to prepare themselves across the full spectrum of opportunities in the mathematical sciences.

Required Courses	**Credits**
Mathematics and Statistics*	35
Data Science (DS 241, DS 392)	6
Computer Science (CS 141, CS 142, CS 344, CS 449)	13
Science** (BY, CM or PH)	8
Information Systems (IS 314, IS 415, IS 426)	9
First-Year Seminar (FY 100)	1
The Clarkson Seminar (UNIV 190)	3
Knowledge Area/ University Courses	15
Application Electives***	6
Free Electives****	24

*Required courses are: MA 131, MA 132, MA 200, MA 211, MA 231, MA 339, MA 499, and STAT 381, STAT 382, STAT 383, STAT 384, STAT 385, STAT 488 (2 credits).

**Science requirements must include at least two courses with labs

***Application Electives are courses from outside the MA, STAT, CS, and IS course designations that provide depth of knowledge in some domain. Students must take two 3-credit courses at the 200 level or higher, both from the same subject area, with the particular pairing approved by the Mathematics Program.

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

Data Science Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
CS 141	Intro to Comp Sci I	4	CS 142	Intro to Comp Sci II	3
MA 131	Calculus I	3	MA 132	Calculus II	3
UNIV 190	Clarkson Seminar	3	MA 200	Math Modelling and Software	3
FY 100	First-Year Seminar	1		Knowledge Area Course	3
	Science Elective	4		Science Elective	4
Total		**15**	**Total**		**16**
Third Semester		**Credits**	**Fourth Semester**		**Credits**
DS 241	Intro to Data Science	3	CS 344	Algorithm and Data Structure	3
IS 314	Database Design and Management	3	IS 415	Data Warehousing for Analytics	3
MA 211	Discrete Math and Proof	3	MA 231	Calculus III	3
STAT 383	Probability and Statistics	3	MA 339	Applied Linear Algebra	3

	Knowledge Area Course	3		Knowledge Area Course	3
Total		**15**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CS 449	Computational Learning	3	DS 392	Ethics of Data Analytics	3
IS 426	Big Data Architecture	3	STAT 382	Mathematical Statistics*	3
STAT 381	Probability	3		Knowledge Area/ University Courses	3
	Knowledge Area/ University Course	3		Free Electives	6
	Free Elective	3			
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
MA 499	Professional Experience	0	STAT 384	Advanced Applied Statistics	3
STAT 385	Bayesian Data Analysis	3	STAT 488	Statistics Projects	2
	Application Elective	3		Application Electives	3
	Free Electives	9		Free Electives	6
Total		**15**	**Total**		**14**

*STAT 382 and STAT 384 are offered alternating years; third and fourth year students take whichever course is offered during that particular semester.

Electrical Engineering

The objective of the undergraduate program in electrical engineering is to prepare students for careers as professional engineers and to provide a base for graduate study and lifelong learning in new and developing specialties.

Program Educational Objectives (PEOs)

PEO1: Electrical engineering graduates are expected to apply fundamental electrical engineering knowledge and analytical problem-solving skills in a wide variety of practical applications.

PEO2: Electrical engineering graduates are expected to become well-rounded citizens who rely on their electrical engineering education to serve society with an understanding of their professional and ethical responsibilities.

PEO3: Electrical engineering graduates are expected to contribute their Electrical Engineering expertise effectively as members of engineering teams in diverse environments through communications, teamwork, and leadership.

PEO4: Electrical engineering graduates are expected to continuously engage in professional development, to exhibit intellectual growth, and to pursue life-long learning through educational endeavors and participation in professional societies and organizations.

Student Outcomes (SOs)
To prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO3: an ability to communicate effectively with a range of audiences

SO4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

SO6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

We expect that within a few years after completing the program, our graduates will become:

Contributing Professionals
Graduates are expected to have advanced their careers as professionals who apply fundamental engineering knowledge and analytical problem-solving skills in a wide variety of practical applications.

Well-Rounded Citizens
Graduates are expected to have become well-rounded citizens who rely on their engineering education to serve society with an understanding of their professional and ethical responsibilities.

Effective and Responsible Collaborators
Graduates are expected to have become effective and responsible collaborators who function well in diverse team environments. Some graduates will have emerged as leaders in their field.

Intellectual Growth
Graduates are expected to have exhibited intellectual growth and pursue continual innovation in their field. Those graduates who are motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

The degree program in electrical engineering fosters the achievement of these objectives in two ways. First, the curriculum as a whole is comprised of:

1. A coherent program of required courses in basic science, mathematics, and engineering science, including laboratory experience in the use of modern equipment
2. Education in the humanities, social sciences, ethical principles and management, with special attention given to the development of effective written and oral communication skills
3. The elective coursework in several of the major subdisciplines of electrical and computer engineering encourages the pursuit of individual interests and provides an opportunity to gain further knowledge in these subdisciplines
4. Experiences that facilitate the development of problem solving, teamwork, and engineering design skills with the aid of modern analysis and design tools
5. 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 introductory professional courses, including an engineering laboratory. The third and fourth years include both required and elective technical courses.

The Clarkson Common Experience is addressed in the first year with the Clarkson Seminar and ES110 Engineering and Society. Five knowledge area courses, including a university course, are required over the four years of study. One of these knowledge area courses must be in economics and one must be ES110. The Clarkson Common Experience is designed, in part, to develop communication, problem-solving, and critical-thinking skills and an understanding of the social, ethical and economic implications of an engineer's work.

Second, the electrical engineering program is constructed so that each student develops a depth of knowledge in the discipline that is built upon mastery of the 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 as a member of an engineering team. This is done through a program of study with the following characteristics:

1. In the required courses, students are expected to master the essential topics that are needed in the courses that follow. In these courses, students are expected to gain a firm grounding in basic electrical and computer engineering (reinforced with laboratory experience) and then take a set of intermediate courses that treat topics in systems and signal processing energy conversion, electromagnetic fields, and microelectronics. Each student then develops their own interests further by taking a pair of advanced courses in a chosen area of the discipline to gain depth in that area while also taking courses in other areas of the discipline to ensure breadth of coverage.
2. Students gain experience in using state-of-the-art software and engineering tools. They encounter C/C++ programming, MATLAB, PSpice, FPGA and embedded system design early in their program of study and continue to use these methods throughout many of their required courses. Students develop their teamwork and communication skills. They do so in part through coursework 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 sizes. By participating in team-based problem solving of this kind, with individuals they may not have chosen as teammates, students learn to work with individuals in multiple situations, thereby developing their teamwork skills.
3. 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.

4. Students engage in activities that foster 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 also to take advantage of the close interpersonal environment that the program fosters. We require our students to obtain professional experience before 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 US First Robotics competition.

Electrical Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering*					
Third Semester		**Credits**	**Fourth Semester**		**Credits**
EE 262	Intro to Object Oriented Programming and Software Design	3	EE 211	ECE Lab I	3
EE 264	Intro to Digital Design	3	EE 321	Systems and Signal Processing	3
ES 250	Electrical Science	3	EE 260	Embedded Systems	3
MA 232	Differential Equations	3	EE 324	Dynamical Systems	3
	KA/ UC Elective[1]	3	MA 231	Calculus III	3
Total		**15**	**Total**		**15**

Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
EE 311	EE Junior Lab	3	EE 381	Electromagnetic Fields and Waves	3
	KA/UC Elective	3		Area elective[2]	3
EE 331	Energy Conversion	3		Math Elective[3]	3

EE 341	Microelectronics	3		ES or Science Elective[4]	3
STAT 383	Probability and Statistics	3		KA/ UC Elective (EC)	3
ES 499	Professional Experience	0			
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
EE 412	EE Senior Design/ Area Elective	3	EE 412	Senior Design/ Area Elective	3
	Area Electives	3		Area Elective	3
	ES Elective	3		KA/ UC Elective	3
	EE[6]/MA[3]/ES[4] Elective	3		Undesignated Elective	3
	Area Electives	6		Undesignated Elective	3
Total		**15**	**Total**		**15**

*Electrical Engineering students must select CS 141 from the available list of Second Semester Science/ CS elective courses numbered CM 132/ BY 160/ CS 141.

[1] There are a total of five courses which must be taken to cover at least four knowledge areas. At least one of these courses must be a University Course. University Courses are interdisciplinary courses that cover two or more knowledge areas. One of the knowledge area electives must be an Economics course, EC 350 is recommended and one should be ES 110.

[2] There are five Area Electives which must be selected as follows: At least two from a single area of concentration within the electrical and computer engineering discipline, and one from a different area of electrical and computer engineering. The remainder may be chosen in any combination from any of the areas of electrical and computer engineering. A list of appropriate courses within those areas is available from the ECE Program Office and is contained in the ECE Undergraduate Student Handbook.

[3] The Mathematics Elective may be MA 211 or numbered 300 level or higher and must include a significant amount of mathematical theory.

[4] The Engineering Science Electives are satisfied by ES courses approved by the ECE Department.

[5]The undesignated electives are fulfilled by college-level courses that do not contain a significant amount of material already covered elsewhere in the student's program.
[6]EE Elective numbered 300 level or higher

See Academic Requirements for details of the Clarkson Common Experience, including the First-Year Seminar, The Clarkson Seminar, Knowledge Area (KA) courses, University Courses (US), Professional Experience, and related requirements.

Professional Specializations
The courses offered by the Electrical and Computer Engineering Program can be grouped into sub-disciplines, with each sub-discipline including a combination of required and elective courses at the undergraduate level. Examples of these specializations are shown in the table below. A complete description of currently available courses can be found online on the ECE intranet webpage. Undergraduate students enrolled in 500-level courses must have a cumulative grade-point average of at least 3.0, and the permission of their advisor and their division head. To enroll in a 600-numbered course, undergraduates must have senior standing, a grade-point average of at least 3.5, and must have the permission of their advisor, division head, and the Academic Dean. See Professional Concentrations in Engineering.

Biomedical Engineering	
BR 400	Introduction to Biomedical Rehabilitation Engineering and Science
EE 465	Computer Graphics
EE 466	Computer Architecture
EE 468	Database Systems
EE 485	Neural Engineering
Communication Systems and Signal Processing	
EE 401	Digital Signal Processing
EE 407	Computer Networks
EE 470	Coding and Information Transmission
EE 471	Principles of Digital Data Communications
Control Systems	
EE 450	Control Systems
EE 451	Digital Control

EE 452	Optimization Techniques in Engineering
Electronics and Circuits	
EE 441	Electronic Devices
EE 442	CMOS IC Design
Computer Engineering	
EE 361	Fundamentals of Software Engineering
EE 363	Software Components and Generic Programming
EE 365	Advanced Digital Circuit Design
EE 368	Software Engineering
EE 407	Computer Networks
EE 408	Software Design for Visual Environments
EE 410	Computer and Network Security
EE 461	Many-Core Architecture and Programming Model
Power Engineering	
EE 478	Power System Engineering
EE 430	High-Voltage Techniques and Measurements
EE 431	Power Distribution and Utilization
EE 432	Control and Management of Modern Electric Power Distribution Systems
EE 438	Alternate Energy Systems
EE 439	Dielectrics

Engineering & Management

Clarkson's Engineering & Management (E&M) program is ideal for those who desire breadth and flexibility in a career centered on leadership and technology. The major meets the growing needs of industry for individuals with strong skill sets in both engineering and business. Graduates are prepared to integrate the rapidly changing technical and managerial aspects of an organization.

The E&M program utilizes Clarkson's traditional strengths, stressing engineering principles and technical problem solving in conjunction with quantitative and qualitative managerial decision making. Students receive a balanced education involving course requirements from each of the major disciplines of engineering, business, and science. The carefully planned curriculum is taught by faculty within their respective areas of expertise.

The E&M program prepares students to:

1. Apply technical problem solving skills to develop innovative, effective, and sustainable solutions to complex problems
2. Lead multi-disciplinary teams to success by managing team dynamics
3. Effectively communicate information for decision-making both orally and in writing to both technical and non-technical audiences
4. Continuously balance simultaneous demands of today's global environment through multi-tasking capabilities of planning, organizing, managing and controlling resources
5. Combine engineering and business core knowledge and apply quantitative and qualitative methods to process analysis in business systems
6. Make timely, ethical and useful decisions in response to organizational challenges

Upon completion of the program , students will be able to:

1. Have the ability to apply calculus-based math, laboratory science, and engineering principles to technical problem-solving.
2. Gain the knowledge and abilities to lead multi-disciplinary teams.
3. Understand development and maintenance of relationships among people within and across organizations.
4. Build a skill set in written and oral communication through coursework, projects, and extracurricular activities.
5. Balance academic disciplines in science, engineering, business, and humanities to prepare for the changing workplace.
6. Understand financial and information flows within and across organizations.
7. Learn both quantitative and qualitative analysis methods.
8. Apply a foundation of business and management principles to making timely, ethical, and useful decisions.
9. Learn to lead and manage organizational change.

Curriculum

The Engineering & Management program confers the Bachelor of Science (BS) degree upon completion of the 120 credit-hour program requirements. A candidate for the bachelor's degree must not only pass all prescribed courses in the E&M curriculum, but

must also meet all other graduation requirements and Clarkson Common Experience requirements stated in the Academic Requirements section of this catalog.

Students work closely with their advisor to select electives that best suit these objectives and are encouraged to use program professional electives to focus on specific career objectives.

Engineering & Management Curriculum					
First Year Fall		**Credits**	**First Year Spring**		**Credits**
CM 131	Chemistry I	4	CM132	Chemistry II	4
EM 120	Team-Based Design & Innovation [1,3]	3	EM121	Technological Entrepreneurship [1, 3]	2
IS 110	Intro to Business Intelligence & Data Analytics [2, 3]	3	EM 205	Intro to Financial & Managerial Accounting	3
MA 131	Calculus I	4		Free Elective or Knowledge Area	3
UNIV190	The Clarkson Seminar	3	MA132	Calculus II	3
FY 100	First-Year Seminar	1			
Total		**18**	**Total**		**15** [5]

Second Year Fall		**Credits**	**Second Year Spring**		**Credits**
EC 350	Economic Principles & Engineering Economics [5]	3	LW 270	Law and Society I	3
EM 286	Organizational Behavior	3	ES 220	Statics	3
EM 380	Project Management	3	PH 132	Physics II	4

STAT 383	Applied Statistics [I, 6]	3	MA232	Differential Equations	3
PH 131	Physics I	4	EM 331	Operations & Supply Chain Management	3
Total		**16**	**Total**		**16**

Third Year Fall		**Credits**	**Third Year Spring**		**Credits**
EM 333	Operations Research	3	UNIV 399	Global Experience	3
ES 260 Or ES 222 Or EE 264	Materials Science Or Strength of Materials Or Digital Design1	3	EM 451	Quality Management & Lean Enterprise	3
ES 330	Fluid Mechanics	3	ES 250	Electrical Science	3
MA 231	Calculus III	3	FN 361	Financial Management	3
MK 320	Principles of Marketing	3		Professional Elective	3
EM 310	Professional Experience	0			
Total		**15**	**Total**		**15**

Fourth Year Fall		**Credits**	**Fourth Year Spring**		**Credits**
COMM 217	Public Speaking [1]	3	EM 456	Process Engineering & Design [1,3,4]	3
EM 432	Organizational Policy & Strategy [1]	3	EM 313	Professional Communication	3

ES 340	Thermodynamics	3		Professional Elective	3
	Knowledge Area	3		Free Elective	3
	Professional Elective	3			
Total		**15**	**Total**		**12**

[1] Communications intensive (CI) – Students must earn a minimum of six (6) CI points to meet graduation requirements.
[2] Information technology-based courses
[3] Technology course that meets CCE requirement
[4] Students must take EM 456 or another senior capstone design course approved by the Director of E&M or the appropriate Division Head.

[5] Students who submit transfer credit for EC 150 or EC 151 prior to matriculation can complete their EC 350 requirement by taking EC 200 for one credit
[6] Students who have taken MA 330 are exempt from taking STAT 383

See Academic Requirements for details of the Clarkson Common Experience, including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements. Students are required to take five courses, which cover four of the six specified CCE knowledge areas; one University course (UC) must span two Knowledge Areas. All students will participate in a project-based professional experience such as co-op, internship, directed research, or community project related to the student's professional goals.

3+1 B.S./M.B.A. Degree Program

The 3+1 B.S./M.B.A. degree program is designed for highly motivated students seeking to accelerate their education and enter the workforce with both a Bachelor of Science (B.S.) and a Master of Business Administration (M.B.A.) in just four years. This program combines the foundational knowledge and skills of an undergraduate business education with the advanced leadership, strategic, and analytical expertise gained through graduate-level study.

Curriculum

- Completion of both degrees in an accelerated timeframe.
- Development of advanced business competencies in leadership, strategy, and decision-making.
- Structured advising to ensure timely and successful program completion.

Students in the 3+1 BS/MBA program will complete all requirements for their bachelor's degree by the end of the third academic year and all requirements for their master's degree by the end of the fourth year. To meet this schedule, students will take 18 credits each fall and spring semester and 6 credits each summer semester during the first three years of study. While completing the bachelor's degree, students may earn waivers for up to three graduate courses, as approved by the program. During the spring semester of the third year, students will complete two approved graduate-level courses; these courses apply concurrently to the bachelor's degree and the M.B.A. In the fourth year, students will complete all remaining graduate coursework.

Students must maintain a minimum cumulative undergraduate GPA of 3.3 to remain in the program. All undergraduate majors within the Reh School of Business are eligible for the 3+1 program; refer to each major description for specific degree requirements. Students will work closely with their academic advisor to develop and follow an individualized plan of study.

Minors and Concentrations in Business

Business Minor
The minor in business is designed for students with a major outside of the Reh 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:

AC 205	**Introduction to Accounting for Decision Analysis**
EC 150 or EC 350*	Principles of Microeconomics Economic Principles and Engineering Economics
EC 151 or EC 350*	Principles of Macroeconomics Economic Principles and Engineering Economics
FN 361	Financial Management I
LW 270	Law and Society I
MK 320	Principles of Marketing
OM 331	Operations and Supply Chain Management
OS 286	Organizational Behavior

*Students who complete EC 350 – Economic Principles and Engineering Economics are exempt from taking EC 150 and EC 151. EC 350 covers material from both EC 150 and EC 151. EC 350 will satisfy one course towards the minor. Students must then choose their remaining five classes from AC 205, LW 270, OS 286, FN 361, OM 331, or MK 320.

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. All students choosing to minor in Economics must complete 18-credit hours, or six courses which include three required courses and any three 300 level or higher Economics or Finance courses offered at Clarkson or those which have received formal transfer approval.

Required Courses

- EC 150 Principles of Microeconomics (every fall) or EC 350
- EC 151 Principles of Macroeconomics (each spring)
- EC 311 Econometrics

*Students who complete EC350 - Economic Principles and Engineering Economics are exempt from taking EC150 and EC151. EC350 covers material from both EC150 and EC151. EC350 will satisfy one course toward the minor. Students must then take EC311 and four upper level (300 or higher)

Electives: Choose THREE or FOUR (if you have taken EC 350 or STAT 383) 300 level or higher Economics or Finance Courses

Minor in Product Development & Marketing
This minor is for students interested in exploring concepts and tools associated with the design and marketing of new products. Courses support four dimensions of product development: a) new product planning - plan and develop the entire lifecycle of a product, b) understanding the social and environmental impact of technical solutions, c) establishing functional, technical, and aesthetic components of product design, and d) generating virtual and physical prototypes.

Coursework in this minor also supports learning about marketing new products, including crafting a clear message, identifying appropriate distribution channels,

customer acquisition and engagement, customer co-innovation, and using social media and analytics to manage messaging. All students choosing to minor in Product Development and Marketing must complete 15 credit hours (five courses), maintain a 2.0 cumulative average in minor courses, and satisfy the requirements indicated below.

Students must take five of the following six courses:

SB322	Designing and Leading Innovative Ventures
MK320	Principles of Marketing
MK/PY321	Consumer Behavior (Prereq: MK320)
MK332	Marketing Research (Prereq: MK321 & STAT282 or STAT283)
MK436	Creativity, Innovation, and New Product Development
COMM416/516	Placemaking, Marketing, and Promotion

Required: New Product Development and Marketing Portfolio (MK419 – 0 credit P/F)*.

NOTE: Students majoring in Innovation and Entrepreneurship are ineligible for the Product Development and Marketing Minor.

*Students must complete a 0-credit new product development and marketing portfolio (MK 419) to maintain a repository of work from the minor classes related to work during their time at Clarkson.

The portfolio will include material from four design projects completed by the student during their Clarkson experience.

Minor in 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 the 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 Quality Management 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 "Project Management," students must maintain a 2.0 average in the five (5) three-credit courses, distributed in the following fashion:

Students must take the following courses:

OS/EM/PY286	Organizational Behavior
OM/EM380	Project Management
OM/EM451	Quality Management and Lean Enterprise
OM/EM331	Operations and Supply Chain Management

Students must take at least two of the following courses:

PY151	Introduction to Psychology
OS352	Strategic Human Resource Management
OS466	Negotiations and Relationship Management
OM/EM476	Management of Technology

Minor in Law Studies

The minor in Law Studies is designed for students with an interest in studying law. The minor is beneficial for students who wish to structure their academic program to help prepare for law school. The minor will also serve the needs of students such as those who have an interest in human resource management, political science, construction management and supply chain management who want to learn more about the field of law and its many diverse issues and perspectives. All students choosing a minor in Law Studies must complete 18 credits hours (six courses), maintain a 2.0 average in minor courses and satisfy the requirements indicated below.

Required Courses

LW270	Law and Society I
POL400	Constitutional Law (CGI) - intended to be the last class taken in the minor

Areas of Law (take <u>TWO</u> of the following)

LW466	The Law of the Workplace
LW471	Law and Society II
POL375	Environmental Law (CGI)
LW352	Reading of the Law: Legal Issues in Non-Fiction (CGI/C1)
POL380	Law and Bioethics (STS)
POL362	Human Rights Law and Politics
OS466	Negotiations & Relationship Management
LW490	Internship (subject to availability)

Policy/Social Issues

Take one COMM, LIT, POL, PHIL, or SOC course focused on issues in politics, policy, and/or society, or PY151 (Introduction to Psychology), or any additional areas of law courses.

Communication
These courses focus on issues regarding the type of argumentative/persuasive communication in which lawyers engage. Take one COMM or PHIL course in Communications, preferably COMM217 (Introduction to Public Speaking) if available.

Law Studies Minor Portfolio, Required, 0 credits
LW499 Law Studies Minor Portfolio

Concentration in Global Supply Chain Management for E&M Majors
The principles behind supply chain management focus on developing seamless flows of raw materials, products/services, information, and financial capital. The supply chain starts at the initial design process and includes raw material sourcing, logistics and continues through the delivery of that product or service to the end customer, with a goal of creating customer satisfaction at optimal cost.

A concentration in Global Supply Chain Management offered through the School of Business is available to E&M students. It requires 15 or more credit hours of specified coursework. Students will receive a department certificate upon successful completion of the concentration. There will be no notation on the student's transcript.

Three required courses	
EM 341	Supply Chain Design & Management
EM 381	Logistics Management
EM 371	Strategic Sourcing
Students must choose two courses from the following	
OS 466	Negotiations and Relationship Management
IS 428	Information Systems for Supply Chain Management
EM 451	Quality Management & Lean Enterprises

E&M Track in Construction Management
The Construction Management Track provides another way for E&M students to concentrate their upper-level electives around a specific field or career path. For most students, the courses in their E&M track replace the free electives and professional electives in the regular E&M curriculum. In many cases completion of the track will require a student to take more than the 120 credits required for the E&M degree. The track is recognized by a certificate from the E&M program.

Application
Construction projects - Estimators, Assistant Project Managers, Schedulers, Expediters, Auditors

Required Classes

EM380	Project Management
ES222*	Strength of Materials
EHS330*	Occupational Safety and Ergonomics
OR	
EHS309	Introduction to Environmental and Occupational Health

Two of the following

CE304*	Introduction to Scheduling and Estimating
CE305*	Construction Planning and Management
CE404*	Applications in Scheduling and Planning
CE406*	Infrastructure Construction
CE408*	BIM and IPD (Building Information Mgmt and Integrated Project Mgmt)
CE409*	Fundamentals of Building Systems
CE410*	Sustainable Infrastructure and Building
CE411*	Construction Materials Engineering

*Course can count as an E&M Professional Elective

Co-ops, Internships, and Professional Experience Requirement
Students are required to gain a minimum of 150 hours of professional work experience and are encouraged to participate in a Co-op or Internship Program. Please refer to the Career Center for more details on these programs and tools to aid students in securing these positions.

Global Study Requirement
All business majors are required to complete a global experience requirement. Students interested in cultural and trade relations between the United States and other countries may participate in the University International Student Exchange Program. Qualified students will typically complete a study exchange for at least one semester at a partner institution. Please refer to the International Center for more details on this program. Other options available for the student to fulfill the global study requirement include participation in a two or three week faculty led trip (UNIV 399 Global Business Experience or UNIV 267 Into to Canada) Students should speak with their academic advisor early in their academic career to explore all options for this requirement.

Environmental Engineering
Environmental engineers provide the knowledge, leadership, and guidance needed to improve the quality and ensure 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 Program, formally stated, is to educate talented and motivated people to become successful professionals through quality undergraduate, graduate and professional continuing education 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 maximizes the development of design skills.

Program Educational Objectives (PEOs)
The Program Educational Objectives support the mission of the Civil and Environmental Engineering Department which is to educate talented and motivated people to become successful professionals through quality undergraduate and graduate and professional continuing education programs that place a high priority on student access and interaction with faculty.

PEO1: Graduates will become environmental engineering professionals who apply knowledge to meet the challenges of their field.

PEO2: Graduates will become environmental engineering professionals who exhibit effective communication, teamwork, and leadership.

PEO3: Graduates will become well-rounded citizens who utilize their education to serve the public good, with an understanding of their professional and ethical responsibilities.

PEO4: Graduates will become environmental engineering professionals who exhibit intellectual growth, continued innovation, and a commitment to lifelong learning.

Student Outcomes (SOs) to Ensure Achievement of PEOs

SO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering science, and mathematics.

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3: An ability to communicate effectively with a range of audiences.

SO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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. The Environmental Engineering curriculum provides for six professional electives. These elective 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 maximizes the development of design skills that were first introduced in the sophomore year and enhanced in subsequent courses. The guiding principle is that the student and faculty advisor together create a program of study that best satisfies the student's individual career objectives.

Environmental Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering					
Third Semester		**Credits**	**Fourth Semester**		**Credits**
CH 210	Molecular Properties	3	CE 301	Engineering Geomatics	3
CE 212	Introduction to Engineering Design	3	CE 340	Introduction to Environmental Engineering	3
ES 220	Statics	3	CE 380	Fundamentals of Environmental Engineering with Lab	3
MA 231	Calculus III	3	ES 330	Fluid Mechanics	3
	KA/ UC Elective	3	MA 232	Elementary Differential Equations	3
Total		**15**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
CE 330	Water Resources Engineering I with Lab	3	BY 320	Microbiology	3
CE487	Environmental Engineering Laboratory	3	EC 350	Economic Principles and Engineering Economics	3
CE 479	Water & Wastewater Treatment Design	3	ES 340	Thermodynamics	3
	Core Professional Course[2]	3		Core Professional Course[2]	3
	Earth Science Elective[1]	3		KA / UC Elective	3
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
STAT 383	Probability and Statistics	3	CE 491	Senior Design	3
	Core Professional Course[2]	3		KA / UC Elective	3
	Professional Electives[3]	9		Professional Electives[3]	9
Total		**15**	**Total**		**15**

[1]Earth Science Elective must be one of these: CE 315 Geology for Engineers, CE 316 Earth's Dynamic Climate: Science & Impacts, CE 317 Geologic Hazards, CE 477 Atmospheric Chemistry, ES 436 Global Climate Change: Science, Engineering and Policy, BY/EV 312 Adirondack Ecology and Environmental Science, BY/CE/EV 313 Biogeochemical Earth Systems Science
[2]Core Professional Courses must include three of these courses: CE 433/533 Human Exposure Analysis, CE 434/534 Sustainable Development Engineering, CE 481/581 Hazardous Waste Management Engineering, CE 482/582 Environmental Systems Analysis and Design, CE 486/586 Industrial Ecology, ES 432 Risk Analysis, ES436 Global Climate Change: Science, Engineering & Policy.
[3]A total of 16.5 design credits are required to be accumulated. Required courses provide 11.5 design credits.

Environmental Science & Sustainability

Concerns about environmental issues and how sustainable our natural and human resources will be in the future are increasingly at the forefront of governmental policy, corporate planning, and the day-to-day choices of families like yours. Researchers focus on understanding and addressing important topics such as climate change, depletion of the ozone layer, habitat destruction, and air and water pollution. Corporations seek new production methods and materials to decrease industrial emissions and improve processes to minimize risk to employees and communities from exposure to environmental hazards. At home, we minimize our carbon footprint, reduce our water use and attempt to reduce our solid waste through recycling, and purchase products with less packaging.

Confronting contemporary environmental and broader sustainability challenges require creative and interdisciplinary solutions. Successful environmental problem-solvers understand the fundamental principles of science and how they apply to real-life issues, while also grasping the historical, social, and political contexts that influence environmental policy and action. Clarkson University's Environmental Science & Sustainability (ES&S) program prepares graduates to become effective leaders in this field by providing a broad, interdisciplinary education that integrates science, policy, and hands-on experience. Students engage in project-based and laboratory courses, collaborate on research with faculty and graduate students, and complete a capstone project that addresses a real-world sustainability challenge. The coursework is challenging but flexible, allowing students significant freedom in choosing their emphasis, through selection of one of four concentrations and options for minors or double majors. The curriculum is also well suited as a preparatory degree for students interested in graduate degrees in environmental science, law or policy, business or health science.

The four concentrations within the ES&S degree include:

Environmental Health & Safety	Environmental Policy
Environmental Science	Sustainable Solutions

These concentrations are also available as stand-alone minors, and many ES&S students enhance their studies with minors in biology, project management, environmental engineering, political science, or chemistry.

Environmental Science, Environmental Policy, Environmental Health and Safety and Sustainability are interconnected disciplines crucial for addressing contemporary environmental challenges and ensuring the well-being of both ecosystems and human populations. While each field has its distinct focus, they intersect in various ways, contributing to a holistic approach to minimizing and managing risk to environmental systems and human communities

Environmental Science is a multidisciplinary field that studies the interactions between the environment and various natural and human systems. It encompasses the study of ecosystems, biodiversity, pollution, climate change, and other environmental phenomena. Environmental scientists conduct research and field investigations to understand the underlying processes driving environmental change and to develop solutions for mitigating negative impacts.

Environmental Policy plays a pivotal role in guiding actions and decisions aimed at preserving and enhancing the quality of our environment and public health. It encompasses a set of principles, regulations, and directives established by governments, organizations, and communities to address pressing environmental issues effectively. Environmental policies are crafted based on scientific evidence, societal values, and economic considerations, with the overarching goal of achieving sustainable development while minimizing adverse environmental and associated social/public health impacts.

Environmental Health and Safety primarily addresses safeguarding human health and well-being in the context of exposure to stressors that impact health. It encompasses assessing and managing risks associated with environmental pollutants, occupational hazards, and public health concerns.

Sustainability serves as a guiding principle that underpins efforts to preserve our planet in a manner to support healthy and prosperous societies. Sustainability initiatives aim to promote efficient and appropriate use of natural resources, minimize environmental degradation, and foster just and equitable societies. The United Nations Sustainable Development goals provide a perspective on the breadth of across all aspects of life.

Program Learning Outcomes

Core knowledge and application of key concepts, scientific principles, and overarching themes in ES&S

- Effectively apply basic principles of the natural, physical and social sciences with a systems perspective to analyze and understand interactions between social and environmental processes
- Identify significant cultural and ethical issues related to human and natural systems and be able to address these issues in an informed, just and equitable manner.

- Techniques and approaches in scientific inquiry, problem solving and critical thinking
- Gather, interpret, and evaluate quantitative and qualitative sets of information from a variety of credible scientific and non-scientific sources.
- Utilize the appropriate methodological tools necessary to analyze significant issues and propose solutions related to environmental science, sustainability and their concentration of study.
- Design solutions to real world problems in collaboration with external partners.

Professional skills

- Communicate orally, visually, and in writing, to a variety of audiences, the essential elements of environmental inquiry and design.
- Work collaboratively across disciplines to address significant issues in environmental science and sustainability.
- Develop skills for lifelong learning and standards of professional behavior that include ethics, equity, diversity and justice sustainability challenges.

Students can complete their BS ES&S degree within four years and 120 credit hours by following the 8-semester plans below. The first year classes are the same with the exception of one choice that helps the student to explore their potential concentration. Otherwise, the concentrations can be decided before the 3rd or 4th semester without any consequence. Please see the ISE Undergraduate Handbook for advising sheets and lists of elective courses that meet the various restricted elective categories.

ES&S with Concentration - Environmental Health & Safety					
First Year Fall		**Credits**	**First Year Spring**		**Credits**
BY140	Biology I	3	BY160	Cellular& Molecular Biology	3
BY142	Biology Lab (1)	2	CM 131	General Chemistry I with Lab (3)	4
MA180	Intro to College Math (2)	4	MA181	Basic Calculus (2)	3
EV100	Intro to Env. Science & Policy	1		Knowledge Area #1	3
UNIV190	The Clarkson Seminar	3		Free Elective	3
FY100	Freshman Seminar	1			
Total		**14**	**Total**		**16**

Second Year Fall		Credits	Second Year Spring		Credits
EV305	Sustainability & Environment	3	CM132	General Chemistry II w/Lab	4
EV280	Environmental Science	3	STAT318	Biostatistics (or STAT 282)	4
PH141	Physics for Life Science I (4)	3	EHS309	Environ & Occup. Health	3
BY222	General Ecology	3	EHS310	Intro to IH Lab	2
	Knowledge Area #2 (DEI)	3		Knowledge Area #3	3
Total		**16**	**Total**		**16**
Third Year Fall or ADK Sem		**Credits**	**Third Year Spring**		**Credits**
CE301	GIS*	3	PH142	Physics for Life Science II (4)	4
	EnvSci/Earth Sci elective*	3		Core science (5)	3
	KA #4 (soc/comm)*	3		EHS Elective	3
	Pol/Econ elective*	3		Prof Prep Elective	3
	Free Elective*	3		Free Elective	3
Total		**15**	**Total**		**16**
Fourth Year Fall		**Credits**	**Fourth Year Spring**		**Credits**
	EHS Elective	3	ES 432	Risk Analysis	3
EV400	Capstone Project	2	EV401	Capstone Project	1
	Core science (5)	3		EHS elective	3
POL 470	Environmental Policy (KA#5)	3		Free Elective	
	Free Elective	3		Free Elective	3
Total		**14**	**Total**		**13**

* satisfied with the ADK semester courses

(1) BY142 recommended, not required. Or Chem I could be taken first semester for a total of 16 credits
(2) CALC I and CALC II could be substituted for the MA180 / 181 math sequence
(3) CM103+105 can be used as an acceptable substitute for CM131
(4) PH 131 and 132 can be substituted for PH141 and 142
(5) Need 2 from this list (OChem, Spec, A&P, Anal. Chem, Microbio)
Among these courses, students must achieve the following:

Correct distribution of Clarkson KAs
1 DEI focus
1 project designated course* (other than the capstone)

ES&S with Concentration - Environmental Science					
FIRST YEAR FALL			**FIRST YEAR SPRING**		
BY140	Biology I	3	BY160	Cellular & Molecular Biology	3
BY142	Biology Lab (1)	2	CM 131	General Chemistry I with Lab (3)	4
MA180	Intro to College Math (2)	4	MA181	Basic Calculus (2)	3
EV100	Intro to Env. Science & Policy	1		Knowledge Area #1	3
UNIV190	The Clarkson Seminar	3		Free Elective	3
FY100	Freshman Seminar	1			
	Total Credits	**14**		**Total Credits**	**16**
SECOND YEAR FALL			**SECOND YEAR SPRING**		
EV305	Sustainability & Environment	3	CM132	General Chemistry II w/Lab	4
EV280	Environmental Science	3	STAT318	Biostatistics (or STAT 282)	4
PH141	Physics for Life Science I (4)	4	EHS309	Environ & Occup. Health	3
BY222	General Ecology	3	EHS310	Intro to IH Lab (5)	2
	Knowledge Area #2 (5)	3	BY328	Conservation Biology (KA #3)	3
	Total Credits	**16**		**Total Credits**	**16**
THIRD YEAR FALL <or ADK Semester>			**THIRD YEAR SPRING**		
CE301	GIS*	3	PH142	Physics for Life Science II (4)	4
	EnvSci elective*	3		Earth science elective	3
	KA #4 (soc/comm)*	3	BY320	Microbiology	3
	Pol/Econ elective*	3		Prof Prep Elective	3
	Free Elective*	3		Free Elective	3
	Total Credits	**15**		**Total Credits**	**16**
FOURTH YEAR FALL			**FOURTH YEAR SPRING**		
POL 470	Environmental Policy (KA#5)	3		Env Science elective	3
EV400	Capstone Project	2	EV401	Capstone Project	1
	Earth science elective	3		Soc/Comm elective (DEI)	3
	Free Elective	3		Free Elective	3
	Free Elective	3		Free Elective	3

	Total Credits	**14**		**Total Credits**	**13**

*satisfied with the ADK semester courses
(1) BY142 recommended, not required. Or Chem I could be taken first semester for a total of 16 credits
(2) Calc I and Calc II could be substituted for the MA180 / 181 math sequence
(3) CM103+105 can be used as an acceptable substitute for CM131
(4) PH 131 and 132 can be substituted for PH141 and 142
(5) BY224 (fall) or EHS310 (spring) required. KA#2 fills the other slot
Among these courses, students must achieve the following:

Correct distribution of Clarkson KAs
1 DEI focus
1 project designated course* (other than the capstone)

ES&S with Concentration – Sustainable Solutions					
FIRST YEAR FALL			**FIRST YEAR SPRING**		
BY140	Biology I	3	ES238	Intro to Energy Systems (KA#1)	3
BY142	Biology Lab (1)	2	CM 131	General Chemistry I with Lab (3)	4
MA180	Intro to College Math (2)	4	MA181	Basic Calculus (2)	3
EV100	Intro to Env. Science & Policy	1		Soc/Comm elec. (KA#2, DEI)	3
UNIV190	The Clarkson Seminar	3		Free Elective	3
FY100	Freshman Seminar	1			
	Total Credits	**14**		**Total Credits**	**16**
SECOND YEAR FALL			**SECOND YEAR SPRING**		
EV305	Sustainability & Environment	3	STAT282	Statistics	3
EV280	Environmental Science	3		Env.Sci, Earth Sci or EHS elec	3
BY222	General Ecology	3		Soc/Comm elective (KA#3)	3
BY224	Ecology Lab	2		Free Elective	3
PH141	Physics for Life Science I (4)	4		Free Elective	3
	Total Credits	**15**		**Total Credits**	**15**
THIRD YEAR FALL <or ADK Semester>			**THIRD YEAR SPRING**		
CE301	GIS*	3		Sust. Business choice	3
	EnvSci/Earth Sci elective*	3		Climate Change choice	3
	Sust SocSci choice (KA #4)*	3		Pol/Econ elec	3
	Pol/Econ elective*	3		Prof Prep Elective	3
	Free Elective*	3		Free Elective	3
	Total Credits	**15**		**Total Credits**	**15**
FOURTH YEAR FALL			**FOURTH YEAR SPRING**		
POL 470	Environmental Policy (KA#5)	3		EnvSci elective	3
EV400	Capstone Project	3		Sust. Solutions Choice	3

	Sust. Solutions Choice	3		Free Elective	3
	Free Elective	3		Free Elective	3
	Free Elective	3		Free Elective	3
	Total Credits	**15**		**Total Credits**	**15**

* satisfied with the ADK semester courses
(1) BY142 recommended, not required. Or Chem I could be taken first semester for a total of 16 credits
(2) Calc I and Calc II could be substituted for the MA180 / 181 math sequence
(3) CM103+105 can be used as an acceptable substitute for CM131
(4) PH 131 and 132 can be substituted for PH141 and 142
Among these courses, students must achieve the following:

Correct distribution of Clarkson KAs
1 DEI focus
1 project designated course* (other than the capstone)

ES&S with Concentration – Environmental Policy

FIRST YEAR FALL			**FIRST YEAR SPRING**		
BY140	Biology I	3	POL222 or 260	Am Pol OR Intro Public Pol. (KA#1)	3
BY142	Biology Lab (1)	2	CM 131	General Chemistry I with Lab (3)	4
MA180	Intro to College Math (2)	4	MA181	Basic Calculus (2)	3
EV100	Intro to Env. Science & Policy	1		Soc/Comm elec. (KA#2, DEI)	3
UNIV190	The Clarkson Seminar	3		Free Elective	3
FY100	Freshman Seminar	1			
	Total Credits	**14**		**Total Credits**	**16**
SECOND YEAR FALL			**SECOND YEAR SPRING**		
EV305	Sustainability & Environment	3		KA#4	3
EV280	Environmental Science	3		Env.Sci, Earth Sci or EHS elec	3
BY222	General Ecology	3		Pol/Econ elec	3
BY224	Ecology Lab	2		Free Elective	3
EC150	Microeconomics	3		Free Elective	3
	Total Credits	**14**		**Total Credits**	**15**
THIRD YEAR FALL			**THIRD YEAR SPRING**		
CE301	GIS*	3	STAT282	Statistics	3
	EnvSci/Earth Sci elective*	3		Soc/Com elec. (ideally Comm 428)	3
	KA #4 (soc/comm)*	3	EC360	Env. Economics	3
	Pol/Econ elective*	3		Prof Prep Elective	3
	Free Elective*	3		Free Elective	3
	Total Credits	**15**		**Total Credits**	**15**

FOURTH YEAR FALL			FOURTH YEAR SPRING		
POL 470	Environmental Policy (KA#5)	3		Pol/Econ elective	3
EV400	Capstone Project	3		Soc/Comm elective	3
PH141	Physics for Life Science I (4)	4		Free Elective	3
	Free Elective	3		Free Elective	3
	Free Elective	3		Free Elective	3
	Total Credits	**16**		**Total Credits**	**15**

* satisfied with the ADK semester courses
(1) BY142 recommended, not required. Or Chem I could be taken first semester for a total of 16 credits
(2) Calc I and Calc II could be substituted for the MA180 / 181 math sequence
(3) CM103+105 can be used as an acceptable substitute for CM131
(4) PH 131 and 132 can be substituted for PH141 and 142
Among these courses, students must achieve the following:

Correct distribution of Clarkson KAs
1 DEI focus
1 project designated course* (other than the capstone)

Financial Information and Analysis

The field of Financial Information and Analysis (FIA) provides students with expertise in a 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 ability to succeed in the workplace through the integration of the traditional functions of finance and accounting.

The FIA curriculum gives each student a fundamental knowledge of managerial and cost accounting and financial statement analysis. Career opportunities for graduates in FIA can be found in the fields of 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 120 credits including the following: 33 credits of Clarkson Common Experience requirements (including the Clarkson Seminar, two mathematics courses (calculus and statistics), two science courses (one of which must include a lab), five knowledge area courses, and a technology course); 42 credits of foundation coursework in business; 27 credits of specialized business courses to satisfy the major requirements; and 18 credit hours of electives. Since 50% of coursework must be taken outside the School of Business , most of the electives, depending on courses chosen for the Clarkson Common Experience, will need to be taken outside the School of Business.

Required Courses	
AC 305	Cost Accounting
AC 311	Intermediate Financial Accounting I
AC 312	Intermediate Financial Accounting II
FN 462	Investments
FN 464	Financial Management II
FN 470	Strategic Financial Management
Students choose 3 Professional Electives from the following (not all courses offered every semester)	
AC 436	Auditing
FN/EC 468	Financial Markets and Institutions
FN 455	Venture Capital and Private Equity
FN 467	International Finance
FN 474	Models for Financial Analysis
FN 575 and/ or FN 576*	Professional Fund Management I Professional Fund Management II (must total at least 3 credits)
IS 301	Applied Data Analytics
LW 471	Law and Society II

*FN 575/ FN 576 may be used for only one professional elective. This course is by permission of the instructor only.

The following would be the sample 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					
Fall		**Credits**	**Spring**		**Credits**
FN 361	Financial Management I	3	AC 311	Intermediate Financial Accounting I	3

EC 311	Strategic Human Resource Management	3	AC 305	Cost Accounting	3
	Non-Business Elective w/Comm Points	3	FN 462	Investments	3
	Free Elective	3		Professional Elective	3
	Non-Business Elective	3		Non-Business Elective w/Comm Points	3
SB 310	Professional Experience	0	UNIV 399	The Global Experience	3
Total		**15**	**Total**		**18**

Fourth Year					
Fall		**Credits**	**Spring**		**Credits**
AC 312	Financial Reporting and Analysis II	3	FN 470	Strategic Financial Management	3
FN 464	Financial Management II	3	OS 432	Organizational Policy and Strategy	3
	Non-Business Elective	3		Professional Elective	3
	Knowledge Area	3		Free Elective Course	3
	Professional Elective Course	3		Non-Business Elective Course	3
Total		**15**	**Total**		**15**

Global Supply Chain Management

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 phase and includes raw material sourcing and 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:

1. Integration through ERP (Enterprise Resource Planning)
2. A process management approach to quality
3. A global orientation
4. E-commerce-based strategies
5. Employing IT as a decision-making tool
6. People and organizational skills for implementing GSCM solutions
7. Incorporating environmental sustainability perspectives

Students earning a degree in Global Supply Chain Management must 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. 50% of coursework must be taken outside the School of Business.

Required Courses	
EC 451	Industrial and Supply Chain Economics
IS 428	Information Systems for Supply Chain Management
OM 341	Supply Chain Design and Management
OM 371	Strategic Sourcing Management
OM 451	Quality Management and Lean Enterprises
OS 466	Negotiations and Relationship Management
SB 441	Advanced Topics in Global Supply Chain Management
Professional Electives (choose two, not all courses offered every semester)	
AC 305	Cost Accounting
IS 301	Applied Data Analytics
IS 314	Database Design and Management
LW 471	Law and Society II
MK 332	Marketing Research

MK 436	Creativity, Innovation & New Product Development
OM 380	Project Management
OM 450	Artificial Intelligence in Manufacturing
OM 476	Management of Technology
SB 381	Logistics Management

The following would be a sample third and fourth year plan. There is enough flexibility that students studying abroad during the third year should still be able to complete the degree requirements. A student wishing to study abroad should consult their academic advisor when selecting courses abroad to make sure that they will satisfy degree requirements.

Third Year					
Fall		**Credits**	**Spring**		**Credits**
FN 361	Financial Management	3	OS 466	Negotiations & Relationship Management	3
EC 311	Introduction to Econometrics	3	OM 341	Supply Chain Design and Management	3
OM 371	Strategic Sourcing	3	OM 451	Quality Management & Lean Enterprise	3
	Free or Non-Business Elective	3		Professional Elective	3
	Non-Business Elective w/Comm Points	3		Non-Business Elective w/Comm Points	3
SB 310	Professional Experience	0	UNIV 399	The Global Experience	3
Total		**15**	**Total**		**15**

Fourth Year			
Fall	**Credits**	**Spring**	**Credits**

SB 441	Advanced Topics in Global Supply Chain Management	3	OS 432	Organizational Policy & Strategy	3
EC451	Industrial Supply Chain Economics	3		Professional Elective	3
	Free or Non-Business Elective	3	IS 428	Information Systems for Supply Chain Management	3
	Non-Business Elective	3		Non-Business Elective	3
	Non-Business Elective	3		Free or Non-Business Elective	3
Total		**15**	**Total**		**15**

Healthcare

The Healthcare degree is designed for future clinicians. From medical conditions to evidence-based practice, courses prepare students to begin postgraduate work in a range of healthcare programs, including our own graduate programs in Occupational Therapy, Physical Therapy, and Physician Assistant Studies. The curriculum is steeped in the sciences, including biology courses that provide a foundation for understanding how nature affects human health. On the nurture side, psychology and other social science courses focus on human development, cognition, and social determinants of health. The degree is designed with various clinical career paths in mind, allowing students flexibility to fulfill the prerequisites in their intended fields of study. No matter their clinical ambitions, the Healthcare degree provides students with a strong foundation to work in the healthcare industry.

Students in Healthcare will develop the Core Competencies for Entering Medical Students, endorsed by the Association of American Medical Colleges Group on Students Affairs (GSA) and Committee on Admissions (COA). In addition to soft-skill preprofessional competencies, these include 1) Critical Thinking, 2) Quantitative Reasoning, 3) Scientific Inquiry, 4) Written Communication, 5) Living Systems, and 6) Human Behavior.

First Year Fall		**Credits**	**First Year Spring**		**Credits**
FY100	First Year Seminar (Required)	1	BY160	Biology II – Cellular & Molecular Biology	3

PY151	Introduction to Psychology (IG)	3		HC Elective (Communications)	3
BY140	Biology I – Inheritance, Evolution, and Diversity	3		Free Elective	3
BY142	Biology I Laboratory	2		Free Elective	3
UNIV190	Clarkson Seminar (Required)	3		Free Elective	3
	Math Course	4			
Total		**16**	**Total**		**15**

Second Year Fall		**Credits**	**Second Year Spring**		**Credits**
HC207	Medical Anthropology	3	HC205	Medical Conditions	3
BY471	Human Anatomy & Physiology I	3		Science Elective I	3
BY473	Human Anatomy & Physiology I Lab	2		Statistics Course (STAT)	4
	Math Course	3		HC Elective (Ethics)	3
	Free Elective	3		HC Elective (Diversity)	3
	HC Elective (Communications)	1			
Total		**15**	**Total**		**16**
Third Year Fall		**Credits**	**Third Year Spring**		**Credits**

HC301	Evidence-Based Practice	3	OS286	Organizational Behavior I (IG)	3
	Science Elective II	3	HC307	Rural Healthcare	3
PY/HC370	Developmental Psychology	3		Knowledge Area Elective (C1)	3
	Free Elective	3		Free Elective	3
	Knowledge Area Elective (UNIV)	3		Knowledge Area Elective (C1)	3
Total		**15**	**Total**		**15**
Fourth Year Fall		**Credits**	**Fourth Year Spring**		**Credits**
PY/HC463	Health Psychology (C1)	3	HC499	Professional Experience	1
	HC Elective (BY)	3		HC Elective (PY)	3
	Knowledge Area Elective	3		HC Elective (HC)	3
	Free Elective	3		Free Elective	3
	Free Elective	3		Free Elective	3
Total		**15**	**Total**		**13**

Healthcare Business

The Healthcare Business degree prepares students for careers on the business side of the healthcare industry, from real-world evidence specialists to pharmaceutical sales. While the degree leads seamlessly to our Master of Business Administration in Healthcare Management program, it also provides an impressive foundation for healthcare careers right after graduation, many with high salary ceilings and potential for advancement. The curriculum starts with core business offerings in accounting, organizational behavior, marketing, economic principles, and supply chain management. On the healthcare side, the curriculum includes medical terminology, healthcare communication, rural healthcare, and health behavior. Finally, several core courses are designed to immerse students in the business of healthcare – a field at the forefront of innovation, technology, diagnostics, and patient-centered care. Graduates will understand how clinicians think, and they will have the business acumen to pursue a range of nonclinical healthcare careers.

Students in Healthcare Business will:

1) Understand the core features of the U.S. healthcare system, including patient care settings, the pharmaceutical and medical technology industries, insurance markets, and state and federal funding mechanisms.

2) Apply fundamental business principles from marketing, economics, finance, and organizational studies to real-world healthcare challenges.

3) Learn how data-driven decision making can enhance both patient outcomes and operational efficiency in healthcare organizations.

4) Use evidence-based tactics to locate, evaluate, communicate, and apply scientific literature in regard to various health outcomes.

5) Explore how organizational practices, ethical decision-making, and patient care are informed by healthcare policies, laws, and regulations.

6) Understand the unique characteristics of rural healthcare and their implications for healthcare administration, delivery, and management.

7) Cultivate communication and leadership skills to participate in and manage multidisciplinary teams convened to support patient health and organizational outcomes.

8) Learn about trends and advancements in health information technology and data analytics to drive healthcare delivery, support quality improvement, and ensure patient safety.

First Year Fall		**Credits**	**First Year Spring**		**Credits**
FY100	First Year Seminar (Required)	1	BY160	Biology II – Cellular & Molecular Biology	3
	Math Course	4	BY162	Biology II Laboratory	2
IS110	Introduction to Financial and Managerial Accounting	3	OS286	Organizational Behavior I (IG)	3

BY140	Biology I – Inheritance, Evolution, Diversity	3		HC Elective (Communications)	3
BY142	Biology I Laboratory	2	PY151	Introduction to Psychology (IG)	3
UNIV190	Clarkson Seminar	3			
Total		**16**	**Total**		**14**
Second Year Fall		**Credits**	**Second Year Spring**		**Credits**
	Science Elective I	4		Statistics course	3
HC102	Medical Terminology and Communication in Healthcare	2		Science Elective II	3
AC205	Introduction to Financial and Managerial Accounting	3		Knowledge Area Elective	3
	Free Elective	3		HC Elective (Communications)	1
	COMM 2 course	3		HC Elective (Ethics)	3
				HC Elective (Diversity)	3
Total		**15**	**Total**		**16**
Third Year Fall		**Credits**	**Third Year Spring**		**Credits**
HC301	Evidence-Based Practice	3	HC307	Rural Healthcare	3
HC316	Health Communication	3	EC350	Economic Principles & Engineering Economics	3
MK320	Principles of Marketing	3		HC Elective (PY)	3
HC325	Healthcare Finance	3		HC Elective (BY)	3

OM331	Operations & Supply Chain Management	3		Free Elective	3
Total		**15**	**Total**		**15**
Fourth Year Fall		**Credits**	**Fourth Year Spring**		**Credits**
HC365	Healthcare Systems and Policy	3	HC405	Health Behavior	3
	HC Elective (SB)	3	HC465	Healthcare Quality and Improvement	3
	Knowledge Area Elective/UC	3		Knowledge Area Elective	3
	COMM 1 course	3		Free Elective	3
	Free Elective	3	HC499	Professional Experience	2
Total		**15**	**Total**		**14**

Innovation and Entrepreneurship

The Innovation and Entrepreneurship (I&E) major is designed to leverage existing strengths in innovation and entrepreneurship by offering students a cross-disciplinary, flexible major that provides them with the knowledge and skills to:

1. Develop and manage the innovation process
2. Plan and commercialize innovations
3. Evaluate and manage innovation opportunities
4. Participate in and manage ideation and the new product development process
5. Understand the legal and policy issues associated with new ventures
6. Stimulate and manage the creation of new business enterprises both within an 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 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 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. 50% of coursework must be taken outside the School of Business.

Required Courses	
EC 370	Economics of Innovation
SB 322	Designing and Leading Innovation Ventures
SB 440	Innovation and Entrepreneurship Strategy
SB 437	Commercializing Innovation
MK 321	Consumer Behavior
MK 332	Marketing Research
MK 436	Creativity, Innovation & New Product Development
Students choose Two Professional Electives	
AC 305	Cost Accounting
AC 407	Taxation of Business Entities
FN 455	Venture Capital and Private Equity
IS 301	Applied Data Analytics
LW 471	Law and Society II
LW 466	Law of the Workplace
OM 380	Project Management
OM 476	Management of Technology
OM 452	Advanced Human Resource 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. Students are encouraged to meet with their advisors prior to going abroad to make sure that all courses taken while abroad will meet degree requirements.

Third Year					
Fall		**Credits**	**Spring**		**Credits**
EC 311	Introduction to Econometrics	3	MK 322	Marketing Research	3
FN 361	Financial Management I	3	SB 322	Designing & Leading Innovative Ventures	3
MK 321	Consumer Behavior	3		Professional Elective	3
	Free Elective	3		Non-Business Elective w/Comm Points	3
	Non-Business Elective w/Comm Points	3		Free or Non-Business Elective	3
SB 310	Professional Experience	0	UNIV 399	The Global Experience	3
Total		**15**	**Total**		**18**

Fourth Year					
Fall		**Credits**	**Spring**		**Credits**
MK 436	Creativity, Innovation, & New Product Development	3	OS 432	Organizational Policy & Strategy	3
EC 370	Economics of Innovation	3	SB 440	Commercializing Innovation	3
	Professional Elective	3	SB 437	Innovation & Entrepreneurship Strategy	3
	Knowledge Area	3		Non-Business	3
	Free or Non-Business Elective	3		Free Elective	3
Total		**15**	**Total**		**15**

Mathematics

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

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

The mathematics curriculum is designed so that students learn to:

1. Research clearly, logically, and analytically
2. Demonstrate a solid understanding of the core material and a deeper understanding of at least one area of mathematics
3. Work effectively with standard mathematical software packages and write mathematical programs using a high level computer language
4. Apply mathematical knowledge to solve real-world, open ended problems
5. Read mathematical texts and literature and write mathematical proofs
6. Communicate effectively, both orally and in writing
7. Work effectively both individually and in teams

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

In addition to the major in Mathematics, the Mathematics Department offers separate majors in:

1. Applied Mathematics and Statistics, which provides a broader range of courses applicable to many business, engineering, and industrial math applications.
2. Data Science, which combines courses from mathematics, statistics, and computational science to help students develop the interdisciplinary, data-driven skillset needed to tackle real-world problems involving reasoning from vast volumes of data.

A student may not major in Mathematics and Applied Mathematics and Statistics.

Required Courses	Credits
Mathematics and Statistics*	44
Computer Science (CS 141)	4
Physics (PH 131, and PH 132)	8
Science (BY, CM, or PH)	3
First-Year Seminar (FY 100)	1
The Clarkson Seminar (UNIV 190)	3
Knowledge Area/ University Courses	15
Free Electives**	42

*Required courses are: MA131, MA132, MA200, MA211, MA231, MA232, MA321, MA339, MA499, and STAT383, plus either MA451 or MA453. A student must also complete either the Math Option, which requires two of MA311, MA312, MA313, MA314, and MA322, or the Statistics Option, which requires STAT381, STAT382, STAT384, and STAT488

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

The following is the curriculum for the Mathematics major with the Math Option; with the Statistics Option some courses in the last four semesters will be different than shown here

Mathematics Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
MA 131	Calculus I	3	MA 132	Calculus	3
PH 131	Physics I	4	PH 132	Physics II	4
CS 141	Computer Science I	4	MA 200	Math Modelling & Software	3

UNIV 190	The Clarkson Seminar	3		Knowledge Area Course	3
FY 100	First-Year Seminar	1		Free Elective	3
Total		**15**	**Total**		**16**
Third Semester		**Credits**	**Fourth Semester**		**Credits**
MA 211	Discrete Math and Proof	3	MA 231	Calculus III	3
MA 232	Differential Equations	3	MA 339	Applied Linear Algebra	3
	Science Elective	3	STAT 383	Probability and Statistics	3
	Knowledge Area Course	3		Knowledge Area Course	3
	Free Elective	3		Free Elective	3
Total		**15**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
MA 311/ MA 313	Abstract Algebra/ Abstract Linear Algebra	3	MA 322/ MA 312/ MA 314	Advanced Calculus II/ Number Theory	3
MA 321	Advanced Calculus I	3	MA 451/ MA 453	Intro To Math Research/ Intro to Math Instruction	2
	Knowledge Area/ University Course	3		MA/ STAT Elective	3
	Free Elective	3		Knowledge Area/ University Course	3
	Free Elective	3		Free Elective	3
Total		**15**	**Total**		**14**

Seventh Semester		Credits	Eighth Semester		Credits
MA 499	Professional Experience	0		MA/ STAT Elective	3
	MA/ STAT Elective	3		Free Electives	12
	Free Electives	12			
Total		**15**	**Total**		**15**

Mechanical Engineering

Program Educational Objectives (PEOs)
The educational objectives for the ME program are to produce graduates who:
PEO1: competently apply engineering methods to solve professional problems associated with the design, development, and manufacture of mechanical systems and understand the social, ethical, and environmental context of their work.

PEO2: communicate clearly with diverse and international communities, collaborate competently in cross-functional teams, and assume leadership roles while meeting the expectations of their employers.

PEO3: cultivate a sustained commitment to professional growth, lifelong learning, and civic responsibility.

Student Outcomes (SOs)
In order to prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering science, and mathematics.

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO3: An ability to communicate effectively with a range of audiences.

SO4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO7: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

The Mechanical engineering program expects the student to graduate with the ability to: apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) to model, analyze, design, and realize physical systems, components or processes; and work professionally in both thermal and mechanical systems.

Curriculum Overview
The 120-credit program contains 84 credit hours of required technical courses, 36 credit hours of electives (including four 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 at least four distinct knowledge areas. Communication intensive course requirements 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 or 400-level courses required in the major.

Professional and Undesignated Electives
The professional electives must be advanced-level courses chosen according to criteria in the Mechanical & Aeronautical Engineering (MAE) Department Student Handbook. Up to two 400-level Aerospace Studies or Military Science courses may be used as professional electives. 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. Aerospace Studies or Military Science courses (200-level or higher) may be used as undesignated electives.

Mechanical Engineering Curriculum					
First Year see Common First-Year Curriculum in Engineering					
First Semester		**Credits**	**Second Semester**		**Credits**
MS/ AS	Military Science/ Aerospace Studies (if elected)	1	MS/ AS	Military Science/ Aerospace Studies (if elected)	1
Third Semester		**Credits**	**Fourth Semester**		**Credits**
ES 220	Statics	3	ES 222	Strength of Materials	3
ES 250	Electrical Science	3	ES 223	Rigid Body Dynamics	3
ES 260	Materials Science	3	ME 212	Into. To Engineering Design	3
MA 232	Elem. Differ Equations	3	ME 201	Mech. Engineer Lab I	1
	KA/ UC Elective	3	MA 231	Calculus III	3
				KA Elective	3
Total		**15**	**Total**		**16**

Fifth Semester		Credits	Sixth Semester		Credits
ES 330	Fluid Mechanics	3	ME 310/ ME 455	Thermodynamics Sys. Eng Mechanical Vibration and Control	3
ES 340	Thermodynamics	3	ME 326	Intermediate Fluid Mechanics	3
MA 330*	Adv. Engineer. Math*	3	ME 341	Mech. Of Machine Elements	3
ME 301	Mech. Engineer. Lab II	1	ME 401	Mech. Engineer. Lab III	1
ME 342	Intro. Numerical Methods	3	ME 445	Integrated Design I	3
	KA/ UC Elective	3		Professional 1 Elective	3
Total		**16**	**Total**		**16**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
ME 411	Intro. to Heat Transfer	3		Professional Elective	3
ME 446	Integrated Design II	3		Professional Elective	3
ME 324	Dynamical Systems	3		Economic Elective	3
	Professional Elective	3		Undesignated Elective	3
	Undesignated Elective	3	ES 499	Professional Experience	
Total		**15**	**Total**		**12**

*Students can alternatively take MA 331 and (STAT 383 or STAT 389)

Neuroscience

The Neuroscience BS Degree at Clarkson will provide students with a rigorous and interdisciplinary foundation in the biological, psychological, and computational principles associated with brain function and behavior. Graduates will be capable of understanding and hypothesizing about the brain in a scientific fashion, equipped with conceptual and methodological frameworks to study this highly complex system. The program prepares students to investigate neural processes across multiple levels of analysis—from molecules and cells to cognition and behavior—while fostering critical thinking, ethical responsibility, and evidence-based reasoning. Through research-based

and experiential learning opportunities, the program will equip students to contribute meaningfully to scientific, clinical, and technological advancements.

Program Objectives

The program will endeavor to:

- Develop strong scientific literacy across neurobiology, cognition, behavior, chemistry, and quantitative methods
- Equip students with core research competencies, including experimental design, data analysis, and interpretation of empirical evidence
- Integrate multiple levels of analysis, spanning molecular and cellular processes, neural systems, cognition, and behavior
- Prepare students for advanced study and professional pathways, including graduate education, health and medical professions, research careers, biotechnology, data science, and related fields
- Cultivate critical thinking and problem-solving skills grounded in rigorous, evidence-based reasoning

Program Outcomes

Graduates of the Neuroscience BS will be able to:

1. Explain core principles of neuroscience across biological and psychological domains.
2. Design, conduct, and analyze neuroscientific experiments using appropriate statistical and methodological tools.
3. Integrate knowledge across disciplines to explain neural mechanisms underlying cognition and behavior.
4. Critically evaluate scientific literature and communicate findings effectively in written and oral formats.
5. Apply quantitative reasoning to interpret neural and behavioral data.
6. Demonstrate readiness for competitive graduate study, professional school, or neuroscience-related careers.

Neuroscience Curriculum

Required Foundational Coursework (31 credits)		**Credits**
PY151	Introduction to Psychology	3
BY160	Biology II: Cellular and Molecular Biology	3
BY162	Biology II Laboratory	2
CM131	General Chemistry I	4
CM132	General Chemistry II	4
PH141	Physics for Life Sciences I **or** PH131 Physics I	4
PH142	Physics for Life Sciences II **or** PH132 Physics II	4
MA180 (or equivalent)	Introduction to College Math *(MA131 Calculus 1 for computational track)*	4
MA181	Basic Calculus *(MA132 Calculus 2* ***or*** *MA239 for computational track only)*	3

Computational Science Requirements (6 credits)*		**Credits**
STAT282	General Statistics or STAT 318 Biostatistics **or** STAT 383 Probability and Statistics (computational track only)	3
MA200	Introduction to Mathematical Modeling and Software **or** PY 456 Research Methods in Psychology	3

Core Neuroscience Requirements (9 credits)		**Credits**
BY/PY458	Cognitive Neuroscience	3
BY/PY454	Biological Psychology **or** BY/PY 359 Perception	3
BY/PY460	Neurobiology	3

Research Requirement
One semester (minimum) of directed lab research (PY492 Directed Research in Psychophysiology or PY493 Directed Research in Cognitive Psychology or PY495 Directed Research in Developmental Science or PY497 Directed Research in Neuroscience or PY400 (thesis)

**For computational neuroscience track, linear algebra (MA 339 or 330) is also recommended. For cognitive track, PY 456 is recommended over MA 200.*

Specialization Tracks (6 credits)

Students select one of the following tracks (6 credits minimum unless otherwise noted):

Cognitive Science Track (choose 2)

- BY/PY358 Animal Learning & Cognition
- PY/BY357 Human Cognitive Evolution
- BY/PY359 Perception
- PY360 Learning & Memory
- PY462 Abnormal Psychology
- PY463 Health Psychology
- PY377 Prenatal, Infancy, and Child Development
- PY459 Neuroscience & Society
- PY461 Judgment and Decision Making

Neurobiology Track (choose 2)

- BY471 Anatomy & Physiology I
- BY472 Anatomy & Physiology II
- BY480 Advanced Cell Biology
- BY350 Comparative Anatomy
- BY360 Comparative Physiology
- BY214 Genetics
- BY430 Developmental Biology
- BY/PY359 Perception

Computational Neuroscience Track (choose 2)

- CS141 Computer Science 1 or IS237 Applied Machine Learning
- EE402 Machine Learning on Biomedical Signals
- EE404 Deep Learning
- EE428 Machine Learning (Mathematical Approach)

General Neuroscience Track

- Any two approved neuroscience electives from the above lists.

Total Credits 58

Sample Curriculum Map, 120 credits total
(Draft 4-Year Plan)

Foundational Sciences & Quantitative Skills		
Fall Year 1		**Credits**
PY151	Introduction to Psychology	3
UNIV190	The Clarkson Seminar	3
CM131	General Chemistry I	4
MA180	Introduction to College Math (or equivalent) **or** MA 131 Calculus	4
FY100	First Year Seminar	1
Spring Year 1		**Credits**
BY160	Biology II: Cellular & Molecular Biology	3
BY162	Biology II Laboratory	2
CM132	General Chemistry II	4
MA181	Basic Calculus (or equivalent) **or** MA132 Calculus 2	3
Knowledge Area or Communication Point Elective		3

Milestone: Develop foundational knowledge in biology, chemistry, physics, and statistics.

Core Science Integration & Computational Foundations		
Fall Year 2		**Credits**
PH141	Physics for Life Sciences I **or** PH131 Physics I	4
STAT282	General Statistics **or** STAT 318 Biostatistics **or** STAT 383 (*computational track only*)	3
MA200	Introduction to Mathematical Modeling & Software	3
BY/PY454	Biological Psychology **or** BY/PY359 Perception	3

Knowledge Area **or** Communication Point Elective; PY 456 recommended for those on *cognitive science track*		3
Spring Year 2		**Credits**
PH142	Physics for Life Sciences II **or** PH132 Physics II	4
BY/PY458	Cognitive Neuroscience	3
	Knowledge Area **or** Communication Point Elective	3
	Free Electives	6

Milestone: Integration of biological and psychological approaches to brain and behavior; introduction to computational tools.

Core Neuroscience & Specialization		
Fall Year 3		**Credits**
BY/PY460	Neurobiology	3
	Specialization Course 1	3
	Specialization Course 2	3
	Knowledge Area **or** Communication Point Elective	3
	Free Elective	2
Spring Year 3		**Credits**
	Knowledge Area **or** Communication Point Elective	3
	Free Elective	3
	Free Elective	3
	Free Elective	3
	Free Elective	3

Milestone: Students declare a specialization track and begin hands-on laboratory research.

Advanced Application & Research Integration		
Fall Year 4		**Credits**
	Free Elective	3
	Free Elective	3
	Free Elective	3
	Free Elective	3
	Knowledge Area **or** Communication Point Elective	3
Spring Year 4		**Credits**
	Free Elective	3
	Directed Research in Neuroscience **or** Senior Thesis	3
	Free Electives	6
	Knowledge Area **or** Communication Point Elective	3

Milestone: Completion of independent research experience; preparation for graduate or professional pathways.

Curriculum Design Features

- Early integration of psychology and biology
- Required statistics and modeling
- Optional machine learning exposure
- Laboratory research experience
- Flexible specialization
- Preparation for medical, graduate, and industry pathways

Physics

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:

1. Present the fundamental knowledge needed for professional work in industry or graduate school, while including many free electives
2. Offer a flexible curriculum to satisfy diverse career objectives and make it possible to double major in Physics and other fields
3. 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. In addition to providing a flexible double major program, the Physics curriculum strongly emphasizes undergraduate research. Student research frequently leads to publication in internationally recognized scientific journals. The typical length of the Physics BS is eight semesters (four years).

The physics major requires a total of 35 credits of physics courses and must meet the University requirements for graduation with a Bachelor's degree.

Required Courses	**Credits**
First-Year Seminar	1
The Clarkson Seminar	3
Physics*	35
Mathematics**	18
Chemistry	8
Biology Elective	3
Knowledge Area and University Course Electives	15
Programming intensive course***	3
Technology Elective	3
Free Electives****	31

*For students considering attending graduate school in physics a total of 45 credits in physics is recommended including PH 435, two additional 300 level PH elective courses and one additional 400 level elective course.

The 35 credits of physics courses, include:
1. Core Courses: PH 121, PH 131, PH 132, PH 221, PH 231, PH 232, PH 325, PH 327, PH 331, and PH 380. Students adding the physics major after their first semester may replace PH 121 (First Year Seminar) with PH 435 (Senior Seminar). 100/200 level PH

elective courses (i.e. courses outside PH 121, PH 131, PH 132, PH 221, PH 231, and PH 232) do not count towards the major in physics.

2. One 3-credit 300 level PH elective course. Teaching methods in physics, directed study, directed research and senior thesis courses do not count towards this requirement.

3. One 3-credit 400 level PH elective course. Teaching methods in physics, directed study, directed research and senior thesis courses do not count towards this requirement.

4. One credit from any of the following professional experience courses PH 445 (Senior Thesis), PH 478 (Directed Research Experimental), PH 479 (Directed Research Theoretical) or PH 480 (Internship/Co-Op). PH 463 (Computer Simulation Methods in Physics, 3 credits, 2 communication points) also counts towards meeting the Professional Experience requirement in Physics.

** 18 credits of Mathematics include MA 131, MA 132, MA 231, and MA 232 plus any two 300 level or higher math courses.

***A minimum of two credits from a programming intensive course (CS 141 recommended, but also ES 100, MA 200, PH 320, PH 463. Honors students may count HP 102 or HP 103 towards this requirement). Where a PH course is used to satisfy the requirement it does not count towards the 35 credits of physics required for the physics major.

****Free electives should include C1/C2 courses to meet the minimum 6 Communication points requirement. PH 435 is included in Free Electives.

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

Physics Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
PH 131	Physics I	4	PH 132	Physics II	4
MA 131	Calculus I	3	MA132	Calculus II	3
CM 131	Chemistry I	4	CM 132	Chemistry II	4

PH 121	Physics Freshman Seminar	1		Free Elective (recommended PH157)	3
UNIV190	The Clarkson Seminar	3			
FY 100	First-Year Seminar	1			
Total		**16**	**Total**		**14**
Third Semester		**Credits**	**Fourth Semester**		**Credits**
PH 231	Modern Physics	3	PH 221	Theoretical Mechanics	3
PH 232	Modern Physics Lab	1	MA231	Calculus III	3
MA 232	Differential Equations	3		Free Elective (C1)	3
	Biology Elective (Recommended BY 110)	3		KA Elective	3
	KA Elective	3		Free Elective	3
	Programming Elective	3			
Total		**16**	**Total**		**15**

Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
PH 325	Thermal Physics	3		Free Elective	3
PH 380	Electromagnetic Theory	3	PH 331	Quantum Physics I	3
MA 381	Probability	3	MA 331	Fourier Series and Boundary Value Problems	3
	Free Elective	3	PH327	Experimental Phys I	3

	KA Elective	3		Free Elective (C2)	3
Total		**15**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
PH435	Senior Seminar	1		400 Level PH Elective	3
	300 Level PH Elective	3		Technology Elective	3
	Univ Elective	3		Free Elective (3 courses)	9
	Free or Bio Elective	3			
	Free Elective	1			
	PH Elective/Prof Exp.	3			
Total		**14**	**Total**		**15**

Psychology

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

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

psychologists in business settings. Students graduating with a BS degree in psychology from Clarkson will:

1. Be able to critically evaluate information and apply it to a problem or question.
2. Be able to apply psychological principles to real-world problems.
3. Have content expertise in the areas of psychology represented by the psychology faculty.
4. Be able to write clearly and effectively.

In addition to satisfying the Clarkson Common Experience, the BS in Psychology degree program requires:

Required Mathematics Courses	
Three (3) college level math courses to include at least one calculus course and one statistics course.	
Required Psychology Courses	
PY 151	Introduction to Psychology
PY 253	Social Psychology
PY 255	Cognitive Psychology
PY 456	Research Methods in Psychology
PY 457	Data Analysis in Psychology
PY 496 or PY 400-403	Directed Research or Internship (one course from this group)
Choose one of the following physiological requirements	
PY 454	Biological Psychology
PY 458	Cognitive Neuroscience
PY 460	Neurobiology
PY 359	Perception
Choose one of the following cognitive requirements	
PY 357	Human Cognitive Evolution
PY 358	Animal Learning and Cognition

PY 360	Learning and Memory
PY 461	Judgment and Decision Making
Choose one of the following health and well-being requirements	
PY 372	Community Psychology
PY 462	Abnormal Psychology
PY 463	Health Psychology
PY 464	Clinical Psychology
Choose one of the following social and cultural requirements	
PY 311	Cyberpsychology
PY 355	Personality Psychology
PY 361	Motivation and Emotion
PY 365	Psychology of Trauma and Violence
PY 366	Cultural Psychology
PY 453	Advanced Topics in Social Psychology
Choose three of the following Psychology courses (or from unchosen requirement courses above)*	
PY 246	Educational Psychology
PY 268	Diversity Science
PY 286	Organizational Behavior I
PY 310	Human Sexuality
PY 315	Personal Relationships
PY 317	Psychology of Psychoactive Drugs
PY 319	Current Readings in Animal Behavior
PY 321	Consumer Behavior
PY 340	Behavioral Ecology and Sociobiology

PY 363	Judgment and Decision Making for the Biomedical Sciences
PY 370	Developmental Psychology
PY 377	Prenatal, Infancy, and Child Development
PY 411	Counseling Psychology
PY 412	Psychiatric Center Professional Experience
PY 360	Learning and Memory
PY 459	Neuroscience & Society
PY 480	Directed Study in Psychology.
PY 481	Directed Study in Social Psychology
PY 482	Directed Study in Physiological Psychology
PY 483	Directed Study in Cognitive Psychology
PY 491	Directed Research in Health Psychology
PY 492	Directed Research and Psychophysiology
PY 493	Directed Research in Cognitive Psychology
PY 494	Directed Research in Social Psychology
PY 495	Directed Research in Clinical Psychology
PY 498-499	Senior Thesis

*This list of courses was current when the Catalog was published. Contact the Department of Psychology for updated information.

The Professional and Professional Experience and Information Technology requirements are distributed throughout the Psychology Curriculum. PY 456 satisfies the Technology Serving Humanity requirement.

Psychology Sample Curriculum					
First Semester		**Credits**	**Second Semester**		**Credits**
PY 151	Intro to Psychology	3	PY 253	Social Psychology	3

FY 100	First-Year Seminar	1	PY 255	Cognitive Psychology	3
UNIV 190	The Clarkson Seminar	3		Mathematics Course	3
	Mathematics Course	3		Science Course	3
	Science Course	5		Science Course Lab	2
Total		**15**	**Total**		**14**
Third Semester		**Credits**	**Fourth Semester**		**Credits**
	Cognitive Elective	3	STAT 318	Biostatistics	3
	Psychology Electives	6		Psychology Electives	3
	KA/UC Electives	3		KA/UC Elective	3
	Free Electives	3		Free Electives	6
Total		**15**	**Total**		**15**
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
PY 456/457	Research Methods and Data Analysis	6		Physiological Elective	3
	KA/UC Elective	3		Technology Elective	3
	Social and Cultural Elective	3		KA/UC Elective	3
	Free Electives	5		Free Electives	6
Total		**17**	**Total**		**15**
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
	Directed Research/ Internship	3		Health and Well-Being Elective	3
	KA/UC Elective	3		Free Electives	12
	Free Electives	9			
Total		**15**	**Total**		**15**

Software Engineering

The discipline of software engineering is concerned with applying 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 for execution, 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, security, 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 manage the project so that it is produced in an economical, timely manner.

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 our graduates to be contributing professionals and effective, responsible collaborators. They should also have continued to grow intellectually and as well-rounded citizens.

Program Educational Objectives (PEOs)

PEO1: Graduates of the Software Engineering Program are expected to have advanced their careers as contributing professionals in the software industry who apply fundamental software engineering knowledge and analytical problem-solving skills in a wide variety of practical applications.

PEO2: Graduates of the Software Engineering Program are expected to have become well-rounded citizens who rely on their education to serve society with an understanding of their professional and ethical responsibilities.

PEO3: Graduates of the Software Engineering Program are expected to have become effective and responsible collaborators who function well in diverse team environments in the software industry. Some graduates will have emerged as leaders.

PEO4: Graduates of the Software Engineering Program are expected to have exhibited intellectual growth and pursue continual innovation in software engineering. Those graduates who are especially talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

Student Outcomes (SOs)

In order to prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO3: an ability to communicate effectively with a range of audiences

SO4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

SO6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

In the context of the software engineering discipline, this means that graduates of the program will:

1. Have a fundamental understanding of computer systems
2. Be able to apply engineering principles to software design and construction, having developed the ability 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 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
3. Have experience with issues encountered at every stage in the software life-cycle
4. Understand how to manage the development of software intensive systems
5. Be able to work on an interdisciplinary team of software components of a system
6. Have good interpersonal and communication skills
7. Be able to readily assimilate new technologies
8. Understand the impact their discipline has on society

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.

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 Department and the Computer Science Department. That benefits the students because they master the application of theory, develop knowledge and understanding of software processes, and 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.

Requirements for the BS in Software Engineering:

1. Complete at least 120 credit hours of coursework with at least a 2.000 GPA, both overall and in the Software Engineering major courses.
2. Complete the course requirements listed in the table below.

Software Engineering Curriculum					
First Semester*		**Credits**	**Second Semester***		**Credits**
CM131	Chemistry I	4	CS141	Intro to Computer Science I	4

PH131	Physics I	4	PH132	Physics II	4
MA131	Calculus I	3	MA132	Calculus II	3
UNIV190	Clarkson Seminar	3	ES110	Engineering & Society, or Equivalent Course[1]	3
FY100	First-Year Seminar	1	ES100	Introduction to Engineering Use of the Computer	2
Total		15			16
Third Semester		**Credits**	**Fourth Semester**		**Credits**
EE 262	Intro to Object Oriented Programming and Software Design	3	EE 321	Syst & Signals or ES or Sci. Elective	3
EE 264	Digital Design	3	EE 260	Embedded Systems	3
ES 250	Electrical Science	3	MA 211	Foundations	3
MA 232	Differential Equations	3	MA 231	Calculus III	3
	KA/UC Elective[1]	3		KA/ UC Elective (EC)	3
Total		15	Total		15
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
EE 363	Generic Programming and Software Components	3	CS 344	Algorithms and Data Structures	3

EE 407	Computer Networks	3	EE 361	Fundamentals of Software Engineering	3
EE 408	Software Design for Visual Environment	3	EE 368	Software Engineering	3
MA 381/ STAT 383	Probability/ Probability and Statistics	3		Undesignated Elective	3
	KA/ UC Elective[1]	3	EE 468	Database Systems	3
ES 499	Professional Experience	0			
Total		15	Total		15
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
CS 341	Programming Languages	3	CS 444	Operating Systems	3
EE 418	Senior Design	3	CS 458	Formal Methods for Program Verification	3
	Undesignated Elective	3		Professional Elective [2]	3
	Professional Elective[2]	3	EE 466	Computer Architecture	3
	KA/ UC Elective[1]	3		Undesignated Elective[3]	3
Total		15	Total		15

*This is a typical first- and second-semester curriculum sequence. Not all students will complete these courses in the first year. For example, some students will take ES110 in lieu of PH131 in the first semester, then PH131 in the second, and PH132 in the third.

[1] There are a total of five courses which must be taken to cover at least four Knowledge Areas. At least one of these courses must be a University Course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the Knowledge Area courses is the required ES110 (or Equivalent). One of the Knowledge Area courses must be an economics course; EC 350 is recommended.

[2] Professional Electives may be any course numbered EE 300+, CS 300+, MS 300+, AS 300+, BR 400, ME 444, COMM 341, COMM 395, or CS 242.

[3] The Undesignated Electives are fulfilled by college level courses that do not contain a significant amount of material already covered elsewhere in the student's program.

See Academic Requirements for details of the Clarkson Common Experience, including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements and professional experience.

MINORS

Applied Machine Learning

This program meets the demands of a rapidly evolving technological landscape and industry needs. The minor comprises four required courses and two elective courses

Learning Outcomes

Students will be able to:

1. Describe the concepts, theories, and algorithms of machine learning & artificial intelligence, and choose appropriate approaches for different types of ML problems.
2. Implement and apply machine learning techniques, including supervised and unsupervised learning, reinforcement learning, or deep learning, to solve complex problems.
3. Identify patterns in data, design experiments, and make data-driven decisions to address real-world challenges.

Curriculum Details (*Prerequisites are italicized in parentheses next to each course*)

Minor in “Machine Learning and Artificial Intelligence in Practice”

Required courses (4)

Mathematics: Probability and Statistics (one)

STAT 389	Probability & Statistics with Multivariate Analysis (*MA230/MA231*)
STAT 383	Probability and Statistics (*MA132*)
MA 330	Advanced Engineering Mathematics (*MA231 and MA232*)
MA/STAT 381	Probability (*MA231 or MA230 (MA211 Recommended)*)

Mathematics: Linear Algebra (one)

MA 339	Applied Linear Algebra (*MA132; MA230/231 recommended*)
MA 330	Advanced Engineering Mathematics (*MA231 and MA232*)

Programming:

CS141	Introduction to Computer Science I
IS237	Introduction to Application Development
MA/DS 241	Introduction to Data Science (*Corequisite: STAT282, or STAT383, or STAT318, or STAT389*)

Machine learning (one):

EE 428	Hands-on introduction to Machine Learning (*EE262 or Instructor approval*)
IS 400	Applied Machine Learning *(IS237 or CS141 or EE261)*
CS 449	Computational Learning (*CS344 and CS345 or Instructor approval*)

Electives:

STAT 385	Bayesian Data Analysis (*STAT 383 or MA/STAT 381 or Instructor approval*)
DS 392	Ethics in Data Science and Applied Mathematics (*Any STAT or DS course*)
EE 402	Machine learning on biomedical signals (*MA132, EE321, and BR400 or equivalent or instructor approval*)
EE 423	Introduction to Biometrics
ME 419	Data Science Tools (*ME/AE401*)
CS 451	Artificial Intelligence (*CS344 (CS250 and CS341 recommended)*)
EE 404/CS 470	Deep Learning (*CS142, EE262, or EE361, and MA339*)

EM 450	AI in Manufacturing (OM331, STAT282 or STAT383, and IS237 or IS400 or familiarity with a programming language as approved by the course instructor)
EE 455	Introduction to Mobile Robotics *(EE321, EE/ME324, or MA339 or instructor approval)*
EE 473/CS 473	Computer Vision (*CS142 or EE262, and MA339*)
CS 475	Computing, Ethics, and Society
EE 519	High Performance Computing (*EE262 or CS142 or instructor approval*)
EE 520	Data-driven analysis of complex systems
EE 525	Data Analytics for Power System Application (*EE333 or equivalent*)
EE 526	Detection and Estimation Theory (*EE529 or equivalent or instructor approval*)
EE 574	Pattern Recognition and Machine Intelligence (*MA/STAT383 or MA/STAT381 or EE529 or equivalent*)
EE 628	Adaptive Signal Processing (*EE401/501 or equivalent, and EE529 or equivalent or instructor approval*)

Notes on electives

- Students select three electives if MA 330 is used to satisfy both Mathematics requirements.
- Students cannot get credit for both DS 392 and CS 475 towards the minor.
- At least two courses applied toward the minor must not overlap with the student's major requirements (not counting electives).

Architectural and Facilities Engineering

Architectural engineering, also known as building engineering, is an engineering discipline that deals with the technological aspects and multi-disciplinary approach to planning, design, construction, and operation of buildings, such as analysis and integrated design of indoor environmental systems (energy conservation, HVAC, plumbing, lighting, fire protection, acoustics, vertical and horizontal transportation), structural systems, behavior and properties of building components and materials, and construction management. Facilities engineering carries this forward into the operations, maintenance, renovation, upgrade, commissioning, and other aspects of how buildings function throughout their lifecycle. The practice of architectural and facilities engineering is a practice that also involves mechanical, electrical, environmental, and other engineering disciplines as well as building science, energy management, architecture, construction management, and other allied fields. The architectural, engineering, and construction industry is seeking people from a variety of

majors in engineering to perform within the space of Architectural and Facilities Engineering.

Required courses	
CE 305	Construction Planning and Management
CE 408	Building Information Modeling & Integrated Project Delivery
CE 409	Fundamentals of Building Systems
CE 448	Introduction to Architectural Engineering
Choose two out of the following elective courses	
CE 304	Introduction to Scheduling and Estimating
CE 404	Applications in Scheduling and Estimating
CE 410/510	Sustainable Infrastructure and Building
CE 411	Construction Materials Engineering
CE 415/515	Dynamical Systems
CE 441	Reinforced Concrete Design
CE 442	Steel Design
EE 321	Systems and Signal Processing
EE 331	Energy Conversion
EE 478	Power System Engineering
EE/ME 450	Control Systems
EHS 330	Occupational Safety and Ergonomics
ES 238	Introduction to Energy Systems
EV 305	Sustainability & the Environment
ME 310	Thermodynamic System Engineering
ME 411	Introduction to Heat Transfer
ME 444	Computer Aided Engineering

Choose one out of four of the elective courses	
DS 241	Introduction to Data Science
MA 330	Advanced Engineering Mathematics
STAT 383	Probability and Statistics
STAT 389	Probability and Statistics with Multivariate Analysis
Choose 1 course in art history, architectural history, art appreciation, applied art, or related study (as a knowledge area/university course), 3 credit hours.	
Choose one out of the four elective courses	
EM/OM 380	Project Management
FN 361	Financial Management
LW 270	Law and Society I
OS 286	Organizational Behavior I

Students must also complete a capstone experience (CE490/491, ME446, EE412, EM456, or equivalent) with an Architectural and/or Facilities focus. Students are also encouraged to seek out alternative multidisciplinary or interdisciplinary capstone options (inclusive of courses related to Clarkson Ignite President's Challenge) to satisfy this requirement.

Note: these lists are inclusive of their subsequent course formulations, if modified. Courses not listed must be approved by the CEE Department.

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, while they graduate with a traditional engineering degree. This minor is connected closely with the minor in Biomedical Science and Technology. Students from both minors participate in shared core courses. Students can take only one (not both) of the two minors.

A foundation knowledge of Calculus I & II (MA131/132), Differential Equations (MA232), Physics I & II (PH131/132), and Biology II: Cell and Molecular Biology (BY160) is required for this minor.

Physiology/Anatomy Requirement (select one of the following 2 options)	
BY 471/ BY 473	Anatomy and Physiology I Anatomy and Physiology I Lab
BY 472/ BY 474	Anatomy and Physiology II Anatomy and Physiology II Lab *Recommended option–Permission of instructor will be given if you do not have the prerequisite BY471/BY473.*
BR 200	Introduction to Biomedical and Rehabilitation Engineering, Science and Technology
BR 400	Biomedical Engineering Fundamentals
Choose 2 from the approved list of upper division biomedical engineering and science related courses, at least one from engineering (ME, EE, CH, ES, BR).	

Arts, Culture & Technology

The Department of Arts, Culture & Technology offers an interdisciplinary curriculum. Integrating knowledge from several disciplinary areas to address recently emerging issues, all offerings benefit from Clarkson's strengths in engineering and business, and all are focused on preparing students for graduate school, professional programs, and careers.

Clarkson University is no longer accepting applications for the Bachelor of Science Degrees in Communication, Digital Arts & Sciences, History, Interdisciplinary Liberal Studies, Interdisciplinary Social Sciences, Literature, Political Science, and Sociology. Continuing students may reference historical University Catalogs for each of these program's degree requirements.

Minors

The Arts, Culture, and Technology (ACT) Department helps students to stand out by building essential "power" skills alongside your major. With minors across the arts, humanities, communications, and social sciences, you'll sharpen your creativity, critical thinking and problem-solving — making you a well-rounded, career-ready pro in any field.

Clarkson University is no longer accepting applications for the Bachelor of Science Degrees in Communication, Digital Arts & Sciences, History, Interdisciplinary Liberal Studies, Interdisciplinary Social Sciences, Literature, Political Science, and Sociology. Continuing students may reference historical University Catalogs for each of these program's degree requirements.

Disciplinary Minors

- Communication (see requirements below)
- Digital Arts (see requirements below)

The disciplinary minors below each consist of any five courses in one of the disciplinary areas in the Department of Arts, Culture, and Technology:

- Anthropology
- History
- Sociology
- Philosophy
- Political Science
- Interdisciplinary Social Sciences

Interdisciplinary Thematic Minors

- Gender and Sexuality Studies (see requirements below).
- Law Studies (please see the Law Studies Minor content located in the David D. Reh School Business section of the Catalog).

The interdisciplinary minors below consist of five related courses that address a common theme:

- Literature and the Arts
- War Studies
- Social Justice and Equity Studies

Student Designed Minors

Students propose these minors through the office of the Department of Arts, Culture & Technology. The proposal lists the courses that a student will take for their 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 Arts, Culture & Technology. Guidelines for developing and submitting a proposal for a student-designed minor are available from the department office.

Gender and Sexuality Studies

All students choosing a minor in Gender and Sexuality Studies must complete 15 credit hours and satisfy the following requirements:

Required courses	
SS 220 **or** SS 221	Introduction to Gender Introduction to Sexuality
Choose four of the following Gender and Sexuality courses	

SS 220 **or** SS 221	Introduction to Gender Introduction to Sexuality (Whichever one was not taken to satisfy the required course)
ANTH 225	Global Perspectives on Sexuality
ANTH 325	Sex and Commerce
ANTH 330	Men and Masculinities
HIST 326	Modern Sex: Sexualities and Genders in Modern America
HIST 327	History of Women and Gender in America
HIST 328	History of Gender and Sexuality in the Transatlantic World
HIST 329	History of the American Family
HIST 338	Women, Gender, and Science in American History
HIST 342	War and Gender: The Modern Period
LIT 240	Gender and Popular Culture
POL 355	Women and Politics
SOC 310	Women and Religion
SOC 330	Health, Wealth, Inequality and the Environment

Biology

A minor in Biology is available to students who take at least 19 credit hours in Biology. 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:

Choose one of the following	
BY 214	Genetics
BY 222	Ecology
BY 320	Microbiology
BY 360	Comparative Physiology
BY 471	Human Anatomy and Physiology I
BY 472	Human Anatomy and Physiology II

Students must also take at least 9 credits of Biology courses numbered 300 or above	
Students must choose one of the following laboratory courses	
BY 142	Biology II Laboratory
BY 162	Biology II Laboratory
BY 224	Ecology Laboratory
BY 322	Microbiology Laboratory
BY 362	Comparative Physiology Laboratory
BY 473	Human Anatomy and Physiology I Laboratory
BY 474	Human Anatomy and Physiology II Laboratory

*Students should consult with the Biology Program Lead to determine whether AP Biology will satisfy the BY 140 and BY 160 requirements.

Biology, Behavior, and Society (BiBS)

A diverse group of disciplines attempt to document and explain the origins and functions of human cognition, social behavior, and social organization: anthropology, biology, economics, history, psychology, and sociology each include a disciplinary focus on the origins and current consequences of individual and group behavior and social outcomes. However, among disciplines - and even within disciplines - there is disagreement about the relative importance of genes, natural environment, individual rational-choice, and sociocultural-construction on individual and group behavior, cultures, and social institutions. Historical views have ranged from strong biopsychological determinism, to environmental determinism & individual rational choice, to strong sociocultural determinism. Views on the origins and current functions of behavior, culture, and society can and often do affect social policy; extreme views have provided the intellectual rationale for eugenics, racism, sexism, imperialism, laissez-faire capitalism, and collectivization and 'cultural revolution'. On a positive note, interdisciplinary progress at understanding the origins and functions of human behavior and human cultures & societies has contributed to progressive reforms in the areas of mental health, public health, laws and criminal justice, education, intercultural understanding, and programs to provide economic and social opportunity for the underprivileged. Views on questions of 'human nature' have tended to become polarized between the 'biological' (biology, evolutionary psychology, biological anthropology) and the 'social science' (social psychology, cultural anthropology, history, sociology) poles. This dialectical relationship between the social and biological sciences and the corresponding dialogue between both, forces both sides in this rich debate to refine their positions and expose students to a deeper understanding of the foundations of the respective disciplines and their impact on the world. Our minor in Biology, Behavior, and

Society (BiBS) will expose students to these diverse disciplinary traditions and their conflicts and debates in the present and past. This minor provides students the knowledge and skills to become informed, critical, and reflective citizens that can make balanced decisions about the imbricate relationship of biology, psychology, culture and society.

The BiBS minor is intended for students who want to acquire an interdisciplinary and comprehensive overview of the different perspectives on human behavior, human cultural evolution, and human social organization. The objective of this minor is for students to understand the theoretical and empirical foundations of multiple disciplines that contribute to understanding human behavior and be able to knowledgeably weigh the perspectives of each. An aspirational outcome is that students can develop a synthetic, informed understanding of the origins and function of human behavior, cultures, and societies. We believe that this minor will attract students who are interested in biology, psychology, social sciences, health careers, law, politics, and economics and provide them with bio-cultural literacy critical to evaluating the multiplicity of scientific claims about 'human nature'.

The four core course requirements within this degree program provide the interdisciplinary foundation of psychology, biology, and social science. The three additional electives will provide a student with depth in specific areas while continuing to confront an interdisciplinary set of perspectives.

A minor in Biology, Behavior, and Society is available to students in all degree programs. To obtain a minor, students must complete 20 credits of required courses, and electives from outside the students declared major.

Five required courses	
BY/PY 340	Behavioral Ecology and Sociobiology
BY/PY 357	Human Cognitive Evolution
HIST 270	Introduction to Culture, Society & Biology
SAS 300	Arts and Sciences Seminar
SAS 499*	Biology, Behavior and Society Minor Portfolio
Choose one course from each of the two categories	
Category I	
ANTH 220	Understanding the Americas

ANTH 225	Global Perspectives on Sexuality
ANTH 230	Introduction to Race and Ethnicity
ANTH 270	Environment, Technology and Society
ANTH 325	Sex and Commerce
ANTH 330	Men and Masculinities
HIST 320	Medicine and Society in America
HIST 326	Modern Sex
HIST 327	History of Women and Gender in America
HIST 328	History of Gender and Sex
HIST 329	History of the American Family
HIST 342	War and Gender
HIST 350	History of Nazi Germany
HIST 351	History of the Holocaust
SOC 330	Health, Wealth, Inequality and the Environment
POL/SOC 350	International Development and Social Change
SOC 385	Food and Society
SS 220	Introduction to Gender
Category II	
BY/PY 319	Current Readings in Animal Behavior
BY/PY 358	Animal Learning and Cognition
BY 420	Evolution
BY 460	Neurobiology
EC 384	Game Theory and Economic Strategy
HIST/PY 459	Neuroscience and Society
OS 286/PY 286	Organizational Behavior I

PH 253	Social Psychology
PY 310	Human Sexuality
PY 315	Personal Relationships
PY 360	Learning and Memory
PY 453	Advanced Topics in Social Psychology
PY 461	Judgment and Decision Making
PY 463	Health Psychology

*A student, to complete the minor, will take SAS 499 as an independent study course under the mentorship of the student's minor advisor. The student will provide a portfolio based on:

1. Term papers of equivalent products from the three major required courses
2. Representative course material that shows mastery of subject matter area
3. Will use the portfolio and materials from other courses taken for the BiBS minor to prepare a 10 page self-reflective essay on what the student has learned about the biological, psychological, and socio-cultural influences on human behavior, human cultural evolution, and human social organization.

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 non-engineering 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.

Students can take only one (not both) of the two minors.

A foundation knowledge of Biology II: Cell and Molecular Biology (BY 160) is required for this minor.

Biology Fundamentals requirement (select one of the following 2 options)	
BY 471/ BY 473	Anatomy and Physiology I Anatomy and Physiology I Lab

BY 472/ BY 474	Anatomy and Physiology II Anatomy and Physiology II Lab *Recommended option–Permission of instructor will be given if you do not have the prerequisite BY471/BY473.*
BR 200	Introduction to Biomedical and Rehabilitation Engineering, Science, and Technology
Choose 3 from an approved list of upper division biomedical related courses.	

Chemistry

Students pursuing the minor in Chemistry must complete the following requirements. The minor is not open to students majoring in Chemistry or Biochemistry.

Required courses	
CM 103	Structure and Bonding
CM 104	Chemical Equilibrium and Dynamics
CM 105	Chemistry Laboratory I
CM 106/ CM 131 and CM 132	Chemistry Laboratory II General Chemistry I and General Chemistry II
Choose five of the following courses, including at least one of the labs	
CM 221	Spectroscopy
CM 223	Spectroscopy Lab
CM 241	Organic Chemistry I
CM 242	Organic Chemistry II
CM 244	Organic Chemistry Lab
CM 300	Instrumental Lab
CM 312	Survey of Inorganic Chemistry
CM 320	Separations and Electrochemistry
CM 345	Advanced Lab

CM 371	Physical Chemistry I
CM 372	Physical Chemistry II
CM 460	Biochemistry I
CM 461	Biochemistry II
CM 470	Biochemistry/ Biotechnology Lab

Cognitive Neuroscience

Cognitive neuroscience is the study of the physiological and biochemical mechanisms underlying higher-order human cognitive processes, such as attention, memory, perception and emotion.

Students interested in pursuing a career in the clinical health sciences (medicine, physical therapy, clinical psychology, neuropsychology) might be particularly interested in the cognitive neuroscience minor, offered by the Psychology Program.

Required Courses	
PY151	Introduction to Psychology
BY140	Biology I: Inheritance, Evolution and Diversity
BY142	Biology I Laboratory
BY160	Biology II: Cellular and Molecular Biology
BY162	Biology II Laboratory
CM131	General Chemistry I
CM132	General Chemistry II
PH141	Physics for Life Sciences I
PH142	Physics for Life Sciences II
BY/PY458	Cognitive Neuroscience
BY/PY454	Physiological Psychology
BY/PY460	Neurobiology

Two from	
PY317	Psychology of Psychoactive Drugs
BY/PY358	Animal Learning and Cognition
PY/BY357	Human Cognitive Evolution
BY/PY359	Perception
PY360	Learning and Memory
PY462	Abnormal Psychology
PY463	Health Psychology
Two From	
BY360	Physiology
BY480	Advanced Cell Biology
BY214	Genetics
BY310	Developmental Biology
BY350	Comparative Anatomy
BY471	Anatomy and Physiology I
BY472	Anatomy and Physiology II

Communication

Clarkson University offers a minor in Communication that is available to all undergraduate students with the exception of Communication majors. Courses used to fulfill the requirements of the minor include writing, speaking, graphic design, and theory. To achieve a minor in Communication, students must achieve a 2.00 grade average in six three-credit courses, distributed in the following fashion:

Students must take one course from each of the four groups below, plus any other two communication courses. The currently available courses in each group are listed below. Contact the Arts, Culture & Technology departmental office for further information.

Choose one Writing course from the following

COMM 210	Theory of Rhetoric for Business, Science and Engineering
COMM 219	Introduction to Social Media
COMM 226	Short Film Screenwriting
COMM 245	Writing for Media
COMM 312*	Public Relations
COMM 313*	Professional Communication
COMM 314*	Communicating, Promoting and Marketing “Place”
COMM 315*	STEAM Journalism
COMM 326	Feature Film Screenwriting
COMM 330	Science Journalism
COMM 428*	Environmental Communication
Choose one Speaking course from the following	
COMM 217	Introduction to Public Speaking
COMM 312*	Public Relations
COMM 313*	Professional Communication
Choose one Design course from the following	
COMM 100	2D Digital Design
COMM 229	Principles of User-Experience Design
COMM 322	Typography and Design
COMM 327	Digital Video Production
COMM 329	Front-End Development for the Web
COMM 345	Information Design
COMM 360	Sound Design
COMM 427	Digital Video Production
Choose one Theory course from the following	

COMM 310	Mass Media and Society
COMM 314*	Communicating, Promoting and Marketing “Place”
COMM 315*	STEAM Journalism
COMM 410	Theory and Philosophy of Communication
COMM 412	Organizational Communications and Public Relations Theory
COMM 428*	Environmental Communication

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

Note: Students may transfer no more than six off-campus credits towards the minor.

Digital Arts

In addition to the minor portfolio requirement DA 499, all students choosing a minor in Digital Art must complete 15 credit hours within the listed class selection and satisfy the following requirements:

- Completion of DA 100: Introduction to Digital Art: Time and Image **or** its cross-listed counterpart COMM 100: 2D Digital Design

Two classes from the following list at 100-level or higher	
DA 110	Drawing
DA 120	Elements of Design
DA 140	Introduction to Digital Art: Form & Code
One class from the following list at 200-level or higher	
DA 207	Media Landscapes 1
DA 208	Media Landscapes 2
DA 212	Art in Context
DA 225	Digital Painting & Illustration
DA 250	Interactive & Algorithmic Art
One class from the following list at 300-level or higher	

DA 300	3D Imagery & Animation
DA 320	Moving Images: Motion Graphics & Animation
DA 340	Virtual Reality (VR) and Mixed Reality
DA 39*	Special Topics Classes in Digital Arts & Sciences
DA 400	Directed & Collaborative Study
DA 410	Directed & Collaborative Study
DA 42*	Digital Arts Independent Studies
DA 500	Directed Study & Collaborative Projects

(As the capstone class in the Digital Arts & Sciences major, DA 492 Senior Studies is not open to students taking the Digital Art minor.)

Completion of a Digital Arts Portfolio
Under the guidance of Digital Arts faculty advisers from within the Department of Arts, Culture & Technology students will compile a portfolio that functions as a way of showcasing and reflecting upon their achievements within the minor. The portfolio will be completed within a zero-credit hour course (DA499 Digital Art Minor Portfolio.) Students must receive a P (pass) in the minor portfolio in order to complete the requirements for the minor.

Computational Science

The minor in Computational Science is available to students in any major. The minor allows students to develop an expertise in Computational Science while pursuing a conventional major, which provides the context wherein they apply their computational skills. To complete the minor the student must achieve a grade-point average of at least 2.00 in courses totaling at least 21 credits, distributed as follows:

Required course	
MA 377	Numerical Methods
Choose two of the following courses	
MA 232	Elementary Differential Equations
MA 239/ MA 339	Elementary Linear Algebra/ Applied Linear Algebra

STAT 282/ STAT 383	General Statistics/ Probability and Statistics
Application area electives to make a total of 21 credits*	

*Application area electives are computational courses in departments other than Mathematics, typically drawn from the student's major. The current list of approved courses is maintained by the Mathematics Department.

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

Computer Science

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

Required courses	
CS 141	Introduction to Computer Science I
CS 142	Introduction to Computer Science II
CS 344	Algorithms and Data Structures
MA 211	Discrete Mathematics and Proof
Electives	
Three additional CS courses, one numbered 200 or higher, one numbered 300 or higher, and one numbered 400 or higher. Each course must be worth at least three credits*	

*Certain courses cannot be used for the minor and some substitutions are acceptable. Contact the Department of Computer Science for details.

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 four elective courses from the following list:

Required courses	
EE 331	Energy Conversion
EE 381	Electromagnetic Fields and Waves

ES 250	Electrical Science
EE 264	Introduction to Digital Design
Choose two out of four of the elective courses	
EE 321	Systems and Signal Processing
EE 324	Dynamical Systems
EE 341	Microelectronics
EE 478	Power System Engineering

Courses not on this list must be approved by the ECE Department.

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:

1. Satisfy prerequisites (MA 131, MA 132, PH 131, PH 132, MA 232, CM 131 or equivalents) for the three core ES courses – ES 220, ES 250, ES 260.
2. Complete the three core ES courses- ES 220, ES 250, ES 260
3. 1 scientific programming course (minimum two credit hours ES 100 or equivalent)
4. 3 engineering electives (minimum nine credit hours – any ES, ME, AE, CE, CH EE courses for which the candidate has the prerequisites, except ES 100, ES110, ES 238, BR 200)

This minor is not open to School of Engineering majors or Engineering & Management majors.

Environmental Engineering

A minor in Environmental Engineering is available to all students except those majoring in Environmental Engineering. To obtain a minor, a student must successfully earn 18-20 credit hours by completing the following required courses:

Core required courses (2)	
One of the following courses	
CE 340	Introduction to Environmental Engineering
CE 380	Fundamentals of Environmental Engineering

CH 220	Material Balances
One of the following courses	
Capstone Design with specific environmental focus (e.g., CE 490/491, MP 401, AE 451, CH 420, EE 412, EM 456, ME 446)	
Environmentally-related research (e.g., CE 495, CE496, ES 443/5/6/7)	
One of the following chemical principles courses	
CE 487	Environmental Engineering Laboratory
CH 210	Molecular Properties
CM 221	Spectroscopy
CM 241	Organic Chemistry I
CM 371	Physical Chemistry I
One of the following biological principles courses	
BY 214	Genetics
BY 222	Ecology
BY 320	Microbiology
BY 330/EV 330	Great Lakes Water Protection
Two of the following courses* Note: at least ONE course must be a core professional elective	
Core Professional Electives (minimum ONE required)	
ES 432 **or** CE 433	Risk Analysis Human Exposure Analysis
ES 436	Global Climate Change: Science, Engineering & Policy
CE 434	Sustainable Development Engineering
CE 479	Water and Wastewater Treatment Design
CE 481	Hazardous Waste Management Engineering
CE 482	Environmental Systems Analysis Design

CE 486	Industrial Ecology
Other Professional Electives	
BY 314	Bioinformatics
BY 328	Conservation Biology
BY 412	Molecular Biology Laboratory
BY 425	Biological Systems and Environmental Change
BY 431	Limnology
BY 486	Molecular Biotechnology
CE 430	Water Resources Engineering II
CE 435	Groundwater Hydrology & Geochemistry
CE 477	Atmospheric Chemistry
CE 478	Solid Waste Management and Landfill Design
EHS 406	Industrial Hygiene Control Methods
EHS 416	Principles of Toxicology and Epidemiology
EV 314	Adirondack Integrated Research Project

*Substitutions made upon approval of the appropriate academic administrator

A minimum grade-point average of 2.0 is required in the courses taken for the minor. At least one quarter of the total credit hours required must be completed at Clarkson, unless the Dean of the Coulter School of Engineering approves an exception.

Environmental Health & Safety

A minor in Environmental Health & Safety Is available to all students except those majoring in the Environmental Science & Sustainability BS degree program. To obtain a minor, a student must successfully complete the 17 credit hours outlined below:

Required Courses		**Credits**
EHS309	Introduction to Industrial Hygiene	3
EHS310	Introduction to Industrial Hygiene Lab	2

EV280	Environmental Science	3
Select any TWO EHS courses (see the list updated on the university minors website)		6
Select ONE relevant Policy, Social Science, Comm or Econ class (see the list updated on the university minors website)		3

In addition to the required courses, it is recommended that STAT 282 or STAT 383 or BY 318 be taken as a mathematics elective course for this minor. A minimum grade point average of 2.0 is required in the courses taken for the minor.

Environmental Science

A minor in Environmental Science is available to all students except those majoring in the Environmental Science & Sustainability BS degree program. To obtain a minor, a student must successfully complete the 18 credit hours outlined below:

Required Courses		**Credits**
BY222	Ecology	3
EV280	Environmental Science (or CE340)	3
EV305	Sustainability & the Environment (or CE486)	3
Select ONE course for each of these three categories courses (see the complete lists updated on the university minors website)		
Earth Science elective		3
Environmental Science Elective		3
Policy, Social Science, Comm or Econ. Elective		3

Note: Classes from the Adirondack semester can substitute for the Ecology (or Env. Science) requirement and the Policy, Social Science, Comm or Econ. Elective

Environmental Policy

A minor in Environmental Policy is available to all students except those majoring in the Environmental Science & Sustainability BS degree program. To obtain a minor, a student must successfully complete the 18 credit hours outlined below:

Required Courses		Credits
EV280	Environmental Science (or CE340)	3
EV305	Sustainability & the Environment (or CE486)	3
POL470	Environmental Policy	3
Select THREE relevant Policy, Social Science, Comm or Econ classes (see the list updated on the university minors website)		9

Note: Classes from the Adirondack semester can substitute for 2 of the 3 required the Policy, Social Science, Comm or Econ. Electives

Sustainable Solutions

A minor in Sustainable Solutions is available to all students except those majoring in the Environmental Science & Sustainability BS degree program. To obtain a minor, a student must successfully complete the 18 credit hours outlined below:

Core Courses - choose TWO of these three, 6 credits	
EV280	Environmental Science (or CE340)
EV305	Sustainability & the Environment (or CE486)
ES238	Introductions to Energy Systems
Select ONE Sustainable Solutions Elective*, 3 credits (see the list updated on the university minors website)	
Select ONE course from THREE of these four categories, 9 credits (see the complete lists updated on the university minors website)	
ES436 or CE 316	Climate Change Choice
SOC 330, ANTH 255, ANTH 285, EV320)*	Sustainable Social Science choice
EC360, OS352, SB/EM361, EM121, EM/OM451)	Sustainable Business choice

	DEI designated course

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: CS 141 or EE 261, and CS 142 or EE 361
2. One course in computer systems: CS 241 or EE 360
3. One course in database administration IS 314*
4. One course in computer networks EE 407 or CS 455
5. Two courses concerned with Web Technologies and administration COMM 442 and COMM 444

*For School of Business Majors for whom IS 314 is not a required course, IS 211 may be used to fulfill this requirement.

Mathematics

The Minor in Mathematics is open to all students except those majoring in Mathematics, Applied Mathematics and Statistics, Data Science, or Mathematical Economics. To complete the minor the student must achieve at least a grade-point average of at least 2.00 in seven three-credit courses from the following list:

Choose seven from the following courses	
MA 131	Calculus I
MA 132	Calculus II
MA 200	Introduction to Mathematical Modeling and Software
MA 211	Discrete Mathematics and Proof
MA 230	3-D Space and Projective Geometry
MA 231	Calculus III
MA 232	Elementary Differential Equations
MA 239	Elementary Linear Algebra
MA 241	Introduction to Data Science
MA 277	Elementary Numerical Methods

	Any Clarkson University 3 credit MA or STAT course at the 300-level or above

Any CS course which is double-listed as an MA course at the 300-level or above also counts toward the minor; check with the Mathematics Department for details.

Manufacturing Engineering

The minor in Manufacturing Engineering provides students the opportunity to expand their knowledge of manufacturing-related topics such as production management, statistical quality control, and manufacturing processes. The objectives of this minor are to provide students with exposure to the engineering, economics, and business methods relevant to advanced manufacturing and prepare them to apply these methods to solve professional problems in manufacturing. Students seeking the minor must complete 4 required courses and 3 elective courses, as listed below, for a minimum of 21 credit hours. The elective courses listed comprise a representative list of elective courses approved for the minor. This list will be updated periodically by the Manufacturing Engineering Committee, and the full list will be maintained by the Department of Mechanical and Aerospace Engineering.

Core Required Courses (4)	
ES 260	Materials Science and Engineering I
ME 390	Advanced Manufacturing Processes
OM/EM 331	Operations and Supply Chain Management
EC 350	Economic Principles of Engineering Economics
Choose 3 out of the following elective courses	
OM/EM 451	Quality Management and Lean Enterprise
CE 481	Hazardous Waste Management Engineering
CE 486	Industrial Ecology
CH 430	Chemical Process Safety
CH 460	Process Dynamics and Control
EE 264	Introduction to Digital Design
EE 331	Energy Conversion

EE 450	Control Systems
EE 455	Robotics I
EE 456	Robotics II
ME 385	Design of Electromechanical Systems
ME 405	Geometric Dimensioning and Tolerancing
ME 443	Optimal Engineering
ME 444	Computer Aided Design
AE 457	Composites Mechanics and Design
ME 492	Welding Metallurgy
AE 459	Space Robotics

Materials Engineering

Many engineers and scientists are employed in the materials processing and manufacturing industries and research labs. Current and emerging areas of infrastructure construction, microelectronics fabrication, polymer processing, biomaterials, and sustainable energy systems, require materials engineering expertise.

Clarkson University is offering a Materials Engineering Minor to prepare students for diverse employment opportunities that require knowledge of materials fundamentals and applications. Students seeking the minor must complete 2 required courses and 3 electives from the courses listed below for a minimum of 15 credit hours.

Required courses (2)	
ES260	Materials Science and Engineering I
ES360	Materials Science and Engineering II

Electives (3)		
Engineering Courses		***Pre-requisite or co-requisite***
ES222	Strength of Materials	ES220 or permission of the instructor

ES241	Solid-State Materials Systems for Advanced Technologies	PH131, CM103 (or CM131), MA131, and MA132 (corequisite)
ES361	Fine Particle Technology	CM104 (or CM132)
ES452	Biomaterials and Biomedical Applications	Junior or Senior standing
ES464	Corrosion of Metals	CM132 (or CM104) and ES260
MSE451	Advanced Materials Characterization	CM132 (or CM104 and CM106), PH132, and ES260
CE411	Construction Materials Engineering	Junior or Senior standing
CE453	Properties and Performance of Concrete	ES260
EE341	Microelectronics	ES250
EE439	Dielectrics	none
EE443	Semiconductor Material and Devices for Engineers	none
AE/ME457	Composite Mechanics and Design	ES222 and ES260
ME390	Advanced Manufacturing Processes	ES260
ME457	Composite Mechanics and Design	ES222 and ES260
ME492	Welding Metallurgy	ES260
Science Courses		***Pre-requisite or co-requisite***
CM221	Spectroscopy	CM104 (or CM132)
CM430	Colloids and Interfaces	none
CM432	Fine Particle Characterization	none
CM475	Sustainable Nanotechnology	none
CM481	Computational Chemistry	CM371 and CM372
CM483	Introduction to Polymer Science	Junior standing or permission by instructor

CM485	Nanostructured materials	Senior standing or permission by instructor
PH331	Quantum Physics	PH231 and MA232
PH341	Solid State Physics I	PH231, or ES260, or permission by instructor
PH487	Applications of Synchrotron and Electron Based Techniques	PH132 or consent of the instructor; ES260 and/or PH231 are recommended pre-requisites

*Possible alternative courses include those at the graduate level, such as:

ME506	Mechanical Behavior of Materials	Permission by instructor
ME508	Fracture Mechanics	Permission by instructor

Pre-Teaching

The Pre-Teaching Concentration prepares undergraduate students with some of the necessary prerequisites to apply for a Master of Arts in Teaching (MAT) program.

Students pursuing the pre-teaching track, or those interested in a pre-teaching minor, would complete the following course of study, 16 credits total.

- PY 151 Intro to Psychology (3 credits)
- PY246 Educational Psychology (3 credits)
- COMM 217 Introduction to Public Speaking (3 credits)
- One of the following (3 credits)
    - STEM 330/STEM 530 Analyzing Science and Mathematical Theories from Philosophical
    - MA 453/MA553 Introduction to Mathematical Teaching (for math and possibly other majors
- ED560 Modern Teacher (3 Credits)
- Educational Field Experience (1 credits)--Independent Study: Student would observe 25 hours in secondary classrooms and complete a paper

Physics

A minor in Physics is available to students in any degree program. This option requires 24 credits of PH courses. A minimum 2.0 average must be maintained in these courses

and none can be designated pass/no entry. The minor should be initiated by the beginning of the junior year to allow time to complete the necessary coursework. To obtain a minor, a student must complete the following:

Required courses	
PH 131	Physics I
PH 132	Physics II
PH 231	Fundamentals of Modern Physics
PH 331	Quantum Physics
Choose one of the following intermediate courses	
PH 221	Theoretical Mechanics
PH 230	Physics III
Choose one of the following one-credit courses	
PH 121	Physics Freshman Seminar
PH 232	Modern Physics Laboratory
PH 435	Physics Seminar
PH 470	Directed Study Experimental
PH 474	Directed Study Theoretical

Any two 3-credit Physics or equivalent courses approved by the department at the 300-400 level.

Software Engineering

The discipline of software engineering is concerned with applying 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 for execution, 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, security, 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 manage the project so that it is produced in an economical, timely manner.

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 our graduates to be contributing professionals and effective, responsible collaborators. They should also have continued to grow intellectually and as well-rounded citizens.

Program Educational Objectives (PEOs)

PEO1: Graduates of the Software Engineering Program are expected to have advanced their careers as contributing professionals in the software industry who apply fundamental software engineering knowledge and analytical problem-solving skills in a wide variety of practical applications.

PEO2: Graduates of the Software Engineering Program are expected to have become well-rounded citizens who rely on their education to serve society with an understanding of their professional and ethical responsibilities.

PEO3: Graduates of the Software Engineering Program are expected to have become effective and responsible collaborators who function well in diverse team environments in the software industry. Some graduates will have emerged as leaders.

PEO4: Graduates of the Software Engineering Program are expected to have exhibited intellectual growth and pursue continual innovation in software engineering. Those graduates who are especially talented and motivated to pursue a graduate degree should be successful at entering and completing graduate studies.

Student Outcomes (SOs)

In order to prepare our graduates to attain these objectives, we have adopted the following student outcomes that we expect our graduates to achieve:

SO1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

SO2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

SO3: an ability to communicate effectively with a range of audiences

SO4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

SO5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

SO6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

SO7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

In the context of the software engineering discipline, this means that graduates of the program will:

1. Have a fundamental understanding of computer systems
2. Be able to apply engineering principles to software design and construction, having developed the ability 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 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
3. Have experience with issues encountered at every stage in the software life-cycle
4. Understand how to manage the development of software intensive systems
5. Be able to work on an interdisciplinary team of software components of a system
6. Have good interpersonal and communication skills
7. Be able to readily assimilate new technologies
8. Understand the impact their discipline has on society

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.

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 Department and the Computer Science Department. That benefits the students because they master the application of theory, develop knowledge and understanding of software processes, and 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.

Requirements for the BS in Software Engineering:

1. Complete at least 120 credit hours of coursework with at least a 2.000 GPA, both overall and in the Software Engineering major courses.
2. Complete the course requirements listed in the table below.

Software Engineering Curriculum					
First Semester*		**Credits**	**Second Semester***		**Credits**
CM131	Chemistry I	4	CS141	Intro to Computer Science I	4
PH131	Physics I	4	PH132	Physics II	4
MA131	Calculus I	3	MA132	Calculus II	3
UNIV190	Clarkson Seminar	3	ES110	Engineering & Society, or Equivalent Course[1]	3
FY100	First-Year Seminar	1	ES100	Introduction to Engineering Use of the Computer	2

Total		15			16
Third Semester		**Credits**	**Fourth Semester**		**Credits**
EE 262	Intro to Object Oriented Programming and Software Design	3	EE 321	Syst & Signals or ES or Sci. Elective	3
EE 264	Digital Design	3	EE 260	Embedded Systems	3
ES 250	Electrical Science	3	MA 211	Foundations	3
MA 232	Differential Equations	3	MA 231	Calculus III	3
	KA/UC Elective[1]	3		KA/ UC Elective (EC)	3
Total		15	Total		15
Fifth Semester		**Credits**	**Sixth Semester**		**Credits**
EE 363	Generic Programming and Software Components	3	CS 344	Algorithms and Data Structures	3
EE 407	Computer Networks	3	EE 361	Fundamentals of Software Engineering	3
EE 408	Software Design for Visual Environment	3	EE 368	Software Engineering	3
MA 381/ STAT 383	Probability/ Probability and Statistics	3		Undesignated Elective	3
	KA/ UC Elective[1]	3	EE 468	Database Systems	3

ES 499	Professional Experience	0			
Total		15	Total		15
Seventh Semester		**Credits**	**Eighth Semester**		**Credits**
CS 341	Programming Languages	3	CS 444	Operating Systems	3
EE 418	Senior Design	3	CS 458	Formal Methods for Program Verification	3
	Undesignated Elective	3		Professional Elective [2]	3
	Professional Elective[2]	3	EE 466	Computer Architecture	3
	KA/ UC Elective[1]	3		Undesignated Elective[3]	3
Total		15	Total		15

*This is a typical first- and second-semester curriculum sequence. Not all students will complete these courses in the first year. For example, some students will take ES110 in lieu of PH131 in the first semester, then PH131 in the second, and PH132 in the third.

[1] There are a total of five courses which must be taken to cover at least four Knowledge Areas. At least one of these courses must be a University Course. University courses are interdisciplinary courses that cover two or more knowledge areas. One of the Knowledge Area courses is the required ES110 (or Equivalent). One of the Knowledge Area courses must be an economics course; EC 350 is recommended.

[2] Professional Electives may be any course numbered EE 300+, CS 300+, MS 300+, AS 300+, BR 400, ME 444, COMM 341, COMM 395, or CS 242.

[3] The Undesignated Electives are fulfilled by college level courses that do not contain a significant amount of material already covered elsewhere in the student's program.

See Academic Requirements for details of the Clarkson Common Experience, including the First-Year Seminar, the Clarkson Seminar, Knowledge Area (KA) courses, University Courses (UC), and related requirements and professional experience.

Software Engineering

A minor in Software Engineering is available to students in any degree program with the exception of the Software Engineering and Computer Science degree programs. To obtain a minor, a student must complete the following course requirements:

1. CS 141, CS 142, and CS 344 **or** EE 261, EE 361, and EE 363
2. CS 242 **or** EE 408
3. EE 368 **or** CS 350
4. EE 465/CS 453, CS 455/EE 407, EE 468/CS 460, **or** other course approved by the Software Engineering Program Committee

Statistics

The minor in Statistics is open to all students except those majoring in Mathematics, Applied Mathematics and Statistics, or Data Science.. To complete the minor the student must achieve at least a 2.000 grade-point average in courses totaling at least 21 credits, distributed as follows:

1. One calculus course (MA 181 or MA 131 equivalent)
2. One linear algebra course (MA 239 or MA 339 equivalent)
3. One introductory statistics course (STAT 282 or STAT 383 equivalent)
4. At least 12 additional credits from statistics courses or projects including at least two statistics courses or projects from departments other than Mathematics. The current list of approved courses is maintained by the Mathematics Department.

Sustainable Energy Systems Engineering

Clarkson University offers a minor in Sustainable Energy Systems Engineering to all students who meet the prerequisite requirements. Our reliance on energy-rich sources of fossil fuels has enabled growth of modern society, increasing our mobility, industrial growth, domestic comfort, abundant food supply, and economic prosperity. This fossil fuel combustion though also generates over three-quarters of the worlds' carbon dioxide emissions and contributes to other air pollutants that are harmful to public health. Engineers are among the many types of professionals that need to understand the limits of our present energy systems and lead us to a future in which we can continue to provide reasonable energy resources for human quality of life. This minor emphasizes that all engineering disciplines are necessary to develop and assess technologies to both increase the efficiency of our energy use and advance renewable and alternative energy sources.

A total of 21 credits is required for this minor. Depending upon the student's major, between 9 – 12 hours of this 21 credit total are in addition to the major's core requirements. A student must complete the course requirements as follows:

Required Courses	
ES 238	Introduction to Energy Systems
ES 340/ CH 260	Thermodynamics
AE 451/ CE 490/ CE 491/ CE 492/ CH 482/ CH420/ EE 412/ EM 456/ ME 446/ ES 443 / EE416	Capstone Design (or energy related research) with specific energy focus
One of the following Environmental Impacts Choice Courses	
CE 486	Industrial Ecology
ES 436	Global Climate Change: Science Engineering and Policy
EV 305	Sustainability and the Environment
One of the following Policy Choice Courses	
EC 360	Environmental Economics
POL 375	Environmental Law
POL 470	Environmental Policy
POL 471	Energy Policy
PHIL 370	Environmental Ethics
Two of the following Technology Choice Courses (at least one must focus on energy tech)	
CE 409*	Fundamentals of Building Systems
CE 410	Sustainable Infrastructure and Building
CE 486[1]	Industrial Ecology
CH/CM413	Carbon Capture and Sequestration
EE 331*	Energy Conversions

EE 478	Power Systems Engineering
EE 438*	Alternative Energy Systems
ES 436[1]	Global Climate Change: Science, Engineering, and Policy
ES 443*	Energy Technology related research projects
ES459	Electrochemistry for Sustainability
EV 390[2]	Sustainability Project Experience
ME 310*	Thermodynamic System Engineering

*At least one of the two technology choice classes must have this designator
[1]If not taken as an environmental impacts choice
[2]Applicability of this class changes annually

Medicine and Healthcare

A minor in Medicine and Healthcare is available to students in all degree programs. To obtain a minor, students must complete 25 credits:

Required courses	
BY 160	Biology II - Cellular and Molecular Biology
BY 162	Biology II Laboratory
BY 471	Anatomy and Physiology
PY 151	Introduction to Psychology
HS 220	Medicine and Healthcare Profession Seminar
HS 405	Experiential Learning in Healthcare
Choose one the following Biomedical Science and Engineering Elective courses	
BY 416/EHS 415	Principles of Toxicology and Epidemiology
BY 380	Techniques in Immunological Research

BY 419	Immunology
BY 440	Introduction to Biomedical Rehabilitation Engineering and Science
BY 448	Medical Microbiology
BY 452	Pharmacology
BY 472	Anatomy and Physiology II
BY 473	Anatomy and Physiology I Lab
BY 474	Anatomy and Physiology II Lab
BY 476	Current Topics in Biology and Medicine
BY 480	Advanced Cell Biology
BY 485	Neural Engineering
BY 488	Stem Cells and Regenerative Medicine
BR 200	Intro to Biomedical and Rehabilitation Engineering
CM 305/CM 460	Biochemistry for Health Science or Biochemistry I
Choose one of the following Health Psychology and Social Sciences Elective courses	
ANTH 238	Men and Masculinities
HS 200	Health Coaches I
HS 210	Health Coaches II
PY 268	Diversity Science
PY 372	Community Psychology
PY 461/PY 363	Judgement and Decision Making or Judgement and Decision Making for the Biomedical Sciences
PY 462	Abnormal Psychology
PY 463	Health Psychology
SOC 320	Medical Sociology

SOC 330	Health, Wealth, Inequality and the Environment
SS 221	Introduction to Sexuality
Choose one of the following Medical Humanities courses	
HIST 230	Science and Society
HIST 270	Introduction to Society, Culture and Biology
HIST 338	Women, Gender and Science in American History
HIST 331	Ancient Medicine and Magic
HIST 333	Science, Technology and Society in the Renaissance
HIST 321	History of Public Health in America
HIST 459	Neuroscience and Society
HIST 335	History of Medicine in Europe and North America
Choose one of the following Medical Ethics courses	
BIE 400	Responsible Conduct of Research
BIE 410	Biomedical Ethics
PHIL 241	Medical Ethics
POL 380	The Law and Bioethics

Psychology

A minor in Psychology is available to students in any degree program except Psychology. To obtain a minor in Psychology a student must complete six courses: PY 151 (Introduction to Psychology) and any 5 Psychology courses (1) that are numbered 200 or above and (2) are each worth 3 or more credit hours. Only one of which can be one of the directed research or internship courses.

Professional Concentration in Health Psychology

The Professional Concentration in Health Psychology is aimed at Psychology majors interested in careers in health science. The Professional Concentration in Health Psychology can be obtained by completing any 6 of the courses listed below (18-21 credits). Note that 3 of these courses must be used as undesignated free elective courses and cannot be used for the Psychology major.

Choose three from the following courses	
PY 253	Social Psychology
PY 310	Human Sexuality
PY 317	The Psychology of Psychoactive Drugs
PY 360	Learning and Memory
PY 361	Motivation and Emotion
PY 412	Psychiatric Center Professional Experience
PY 454	Biological Psychology
PY 458	Cognitive Neuroscience
PY 462	Abnormal Psychology
PY 463	Health Psychology

Robotics

Robotics is an interdisciplinary field that involves the application of mechanical engineering, electrical, computer and software engineering, and computer science knowledge for the design, construction and operation of automated machines that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behavior, and/or cognition. Commercial and Industrial robots are now in widespread use performing jobs more cheaply or with greater accuracy and reliability than humans, or that are too dirty, dangerous or dull to be suitable for humans, e.g., in manufacturing, assembly and packing, transport, earth and space exploration, surgery, weaponry, laboratory research, and the mass production of consumer and industrial goods. The Minor in Robotics is designed to provide students with a solid and coherent introduction to field and consists of two parts: four required core courses (9 credit hours) to give students a strong, working foundation in the associated technology and three elective courses (9 credit hours) that allow students to explore various sub-areas within the field or specialize more deeply in one area.

Requirements

To graduate with a Minor in Robotics, students must earn an average GPA of 2.0 in six courses (18 credit hours) that satisfy the following requirements:

Core Courses (required)

1. MA339- Applied Linear Algebra, 3 credits, Fall/Spring (Prerequisites: MA132; MA230/231), or MA330- Advanced Engineering Mathematics, 3 credits, Fall/Spring (Prereq.: MA231 and MA232)
2. EE455- Introduction to Mobile Robotics, 3 credits, Spring (Prereq.: EE321, EE/ME324, or MA339)
3. EE456- Introduction to Robot Manipulators, 3 credits, Fall (Prereq.: EE321, EE/ME324, or MA339)
4. MP414- Applied Robotics or equivalent robotics project experience, 0 credits (P/NC), Spring/Fall

Elective Courses (minimum of three courses, i.e., nine (9) credits, from the following

ECE Department

EE260 Embedded Systems (Prerequisite: CS141)
EE401 Digital Signal Processing (Prerequisites: EE321)
EE408 Software Design for Visual Environments (Prerequisite: EE262)
EE450 Control Systems (Prerequisites: EE324)
EE451 Digital Control (Prerequisites: EE321)
EE452 Optimization Techniques In Engineering (Prerequisites: MA339)
EE465 Computer Graphics (Prereq.: CS142 or EE262; and MA232 or MA239, or MA339 as a corequisite)
EE506 Image Processing and Computer Vision (Prerequisites: EE321)
EE652 Computer Vision (Prerequisites: CS344 and MA339 with minimum 3.5 GPA and junior standing)

MAE Department

ME385 Design of Electromechanical Systems (Prerequisites: ES250, EE/ME324)
ME443 Optimal Engineering (Prerequisites: ME350 or ME341)
ME444 Computer Aided Engineering (Prerequisites: ES100 or EM121, and MA231)
ME450 Control Systems (Prerequisites: AE/EE/ME324 or Corequisite: EE321)

CS Department

CS449 Computational Learning (Prerequisites: CS344 and CS345)
CS451 Artificial Intelligence (Prerequisite: CS344)
CS452 Computer Graphics (Prerequisite: CS142 or EE262; and MA232 or MA239, or MA339 as a corequisite)
CS459 Human-Computer Interaction (Prerequisites: proficiency in C++, Java, or C)

CS461 Mixed Reality (Prerequisites: CS142 or EE262; and MA232 or MA239, or MA339 as a corequisite)
CS465 Mobile Robotics/Human-Robot Interaction (Prerequisite: CS344)
CS652 Computer Vision (Prerequisites: CS344 and MA339 with minimum 3.5 GPA and junior standing)

*Some course substitutions are possible: a list of acceptable substitutions will be maintained by the School of Engineering in conjunction with the MAE, ECE, and CS Departments and updated annually.

In addition, students must satisfy the following University requirements regarding minors:

- A minimum 2.0 grade point average is required in the minor;
- Only zero credit hour courses can be designated as pass/no entry; at least one-fourth of the credit hours required must be completed at Clarkson, unless an exception is approved by the Division Head of the minor program.

CONCENTRATIONS

Biomolecular Engineering

A professional concentration in Biomolecular Engineering has been designed for chemical engineering majors who desire a strong background in biochemical engineering and biology. This will benefit students pursuing careers in medicine, biomedical engineering or in the following industries: consumer products, food processing, and pharmaceuticals. The decision to obtain this concentration is made optimally in the sophomore year.

The professional concentration in Biomolecular Engineering offers a chemical engineering major an alternative path for obtaining a BS degree in Chemical Engineering. Students must take BY 160 Cellular & Molecular Biology (3 credit hours) and BY 162 Cellular & Molecular Biology Lab (2 credit hours) in the spring semester of the sophomore year. BY 160 is a requirement for all chemical engineering students; students pursuing the concentration must also take the BY 162 laboratory course. The required mathematics elective must be a suitable statistics course (STAT 383 Applied Statistics or STAT 318 Biostatistics) and technical and engineering electives are replaced with the required courses CM 460 Biochemistry I and CH 465 Biochemical Engineering. An undesignated elective is replaced with a course selected from the following list of courses relevant to biomolecular engineering: BR 200 Introduction to Biomedical Rehabilitation Engineering and Science, BY 214 Genetics, BY 320 Microbiology, BY 360/ 362 Comparative Physiology with Lab, BY 412 Molecular Biology Laboratory, BY 419 Immunology, BY 471/ 473 Anatomy and Physiology I with lab, BY

485 Neural Engineering, EHS 416 Principles of Toxicology and Epidemiology, ES 380 Biomechanics or ES 452 Biomaterials and Biomedical Engineering Applications.

Further information on this concentration is available in the Chemical Engineering Program 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 (CEM) 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 sub-discipline of Construction Engineering as defined by the Accreditation Board of Engineering and Technology (ABET). The CEM concentration has two tracks: (1) Construction/Infrastructure track for students planning a career in heavy construction management and (2) Architectural Engineering & Building Construction track for students planning a career in sustainable building design and construction management.

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:

Four required courses including	
CE 411	Construction Materials Engineering
CE 415/ 515	Foundations, Stability, and Retaining Structures
CE 441	Reinforced Concrete Design
CE 442	Steel Design
Choose at least one of the following non-CE courses	
COMM 217	Introduction to Public Speaking
EHS 330	Occupational Safety and Ergonomics
EM/OM 380	Project Management
EM/OM 451	Quality Management and Lean Enterprise

FN 361	Financial Management
LW 270	Law and Society I
OS 286	Organizational Behavior I
LW 466	The Law of the Workplace
Completion of at least one of these two tracks	
Construction/Infrastructure Track	
Choose at least two of the following	
CE 302	Surveying, Geodetic Control, and Engineering Measurements
CE 304	Introduction to Scheduling and Estimating
CE 315	Geology for Engineers
CE 404	Applications in Scheduling and Estimating
CE 406	Infrastructure Construction
CE 408	Building Information Modeling (BIM) & Integrated Project Delivery (IPD)
CE 410/510	Sustainable Infrastructure and Building
CE 453/553	Properties and Performance of Concrete Materials
CE 461	Transportation Systems Design
Architectural Engineering & Building Construction Track	
Choose at least two of the following	
CE 304	Introduction to Scheduling and Estimating
CE 404	Applications in Scheduling and Estimating
CE 408	Building Information Modeling (BIM) & Integrated Project Delivery (IPD)
CE 409	Fundamentals of Building Systems
CE 410/510	Sustainable Infrastructure and Building
CE 448	Introduction to Architectural Engineering

CE 509	Advanced Building Science

Students should meet with their academic advisor to select the most appropriate CEM courses according to their career objectives.

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.

Electrical Power Engineering

Clarkson University offers a professional concentration in Electric Power Engineering that is available to electrical engineering majors. The concentration consists of:

1. EE 331 Energy Conversion
2. EE 478 Power System Engineering
3. EE 431 Power Transmission and Distribution
4. Two power elective courses
5. One breadth elective course

Two of the following Power Electives	
EE 430	High Voltage Techniques and Measurements
EE 439	Dielectrics
EE 450	Control Systems
ES 340	Thermodynamics
EE 438	Alternative Energy Systems
EE 451	Digital Control
EE 432	Control and Management of Modern Electric Power Distribution
Any power engineering graduate course with department approval	
One of the following Breadth Electives	
EE 450	Controls Systems
EE 451	Digital Control
EE 401	Digital Signal Processing

EE 407	Computer Networks
EE 365	Advanced Digital Circuit Design

Courses not on this list must be approved by the ECE Department. By successfully completing the concentration, upon graduation, students receive a BS in Electrical Engineering with a Dean's Certificate indicating a "Professional Concentration in Electric Power Engineering" and a notation to that effect on their transcript.

*EE450 and EE451 can only be used as breadth electives if not used as power elective.

Structural Engineering

A professional concentration in Structural Engineering is available to civil engineering students to increase their ability to modernize and increase the effectiveness of the nation's physical infrastructure. This challenge involves the design and construction of new physical systems such as our highways, harbors and waterways, bridges, buildings, and water treatment facilities. This effort requires a variety of specialized talents that can in part be developed through the selection of professional electives.

To obtain a Professional Concentration in Structural Engineering, a student must choose required and professional electives in order to complete the following seven courses:

Five required courses including	
CE 420/520	Computational Methods of Structural Analysis
CE 415/515	Foundations, Stability, and Retaining Structures
CE 441	Reinforced Concrete Design
CE 442	Steel Design
CE 490/491	Senior Design with Structures Focus or approved alternate
Choose at least two of the following	
CE 408	Building Information Modeling(BIM) and Integrated Project Delivery (IPD)
CE 411	Construction Materials Engineering
CE 448	Introduction to Architectural Engineering

CE 452/552	Advanced Strength of Materials
CE 453/553	Properties & Performance of Concrete Materials
CE 501	Fracture Mechanics of Concrete Structures
CE 512	Structural Dynamics
CE 538	Finite Element Methods
CE 541	Bridge Engineering
CE 549	Experimental Methods in Structures
CE 555	Structural Damage Assessment, Rehabilitation, and Repair

It is of particular importance for transfer students to be aware of the sequence of prerequisite courses required to complete Steel Design and Reinforced Concrete Design for the Structural Engineering concentration. This sequence consists of ES220, ES222, CE320, CE441 (Spring), CE442 (Fall), 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.

Water Resources Engineering

A professional concentration in Water Resources Engineering is available to undergraduate students who are planning a career in hydraulics, open channel flow, water treatment, or hydrology. The professional concentration allows students to satisfy the accreditation requirements in civil engineering while pursuing a course of study in water resources engineering. Students receive a Bachelor of Science degree in CE with a certificate of professional concentration in Water Resources Engineering.

To obtain a Professional Concentration in Water Resources Engineering, a student must choose required and professional electives in order to complete the following seven courses:

Four required courses including	
CE 430	Water Resources Engineering II

CE 470	River Restoration
CE 479	Water and Wastewater Treatment Design
CE 490/ 491	Senior Design with Water Resources Focus or approved alternate
Choose any two from the following	
CE 315	Geology for Engineers
CE 340	Introduction to Environmental Engineering
CE 380	Fundamentals of Environmental Engineering
CE 434	Sustainable Development Engineering
CE 435	Groundwater Hydrology and Geochemistry
CE 478	Solid Waste Management and Landfill Design
CE 481/581	Hazardous Waste Management and Engineering
CE 482/582	Environmental Systems Analysis and Design
And choose at least one from the following	
BY/CE/EV 313	Biogeochemical Earth Systems Science
BY 330/ EV 330	Great Lakes Water Protection
BY 431	Limnology
CE 316	Earth's Dynamic Climate: Science & Impacts
CE 317	Geologic Hazards
ES 436	Global Climate Change: Science, Engineering & Policy
COMM 428	Environmental Communication
EV 305	Sustainability & the Environment
POL 374	Environmental Political Theory
POL 375	Environmental Law
POL 470	Environmental Policy

NON-DEGREE GRANTING DEPARTMENTS

Reserve Officers' Training Corps

ROTC at Clarkson University is an elective course of study that provides college-trained officers to the United States Army, Air Force, and Space Force. Upon graduation and successful completion of either the Army program in Military Science or the Air and Space Force program in Air, Space, and Cyberspace Studies, students receive appointments as commissioned officers at the rank of second lieutenant. Each program provides a Basic Course in the freshman 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 basic camp in the summer prior to their junior year. There are other entry options available for veterans and graduate students. Students may enroll in either program's Basic Course without incurring a military service obligation.

Admission to junior and senior (300- and 400-) level classes is contingent upon successful completion of freshman and sophomore curriculum (or its equivalent). In special situations, students may qualify for admission into Army ROTC Advanced Course by meeting other criteria. Non-ROTC students are eligible to enroll in Air Force ROTC 300- and 400-level curriculum with the approval of the instructor. Academic credit toward graduation requirements for Military Science and Air, Space, and Cyberspace Studies courses is determined by the individual schools at Clarkson. Interested individuals should contact the Army ROTC Golden Knights Battalion or Air Force ROTC Detachment 536 direct.

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

Military Science (Army ROTC)

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 80 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 Advanced Camp. It is a four-week summer camp that evaluates and develops Army ROTC cadets. This camp generally takes place between your junior and senior years of college. Cadets may 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 individual soldier skills. Once each semester, cadets participate in an extended two-day field training exercise, designed to challenge each cadet's leadership and military skills.

The Golden Knight Battalion also participates in additional events during the year such as a military ball, athletic events, Airborne school, Air Assault school, and Army internships during the summers.

After graduation and satisfaction of ROTC requirements, cadets are commissioned as second lieutenants into one of 17 specialized branches in Active Army, Army Reserve or National Guard. There are also opportunities to request to attend Medical School or Law School.

Scholarships

Army ROTC offers a wide range of scholarships for interested and competitive 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:

1. Full tuition and educational fees
2. $1,200 per year for textbooks and classroom supplies
3. $420 per month (tax-free) stipend for up to 10 months per year
4. Clarkson offers all scholarship recipients a Clarkson ROTC Incentive Scholarship to be used to defray the costs of room and board

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, 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. We utilize the local police range for rifle marksmanship training.

Other Activities

There are many extracurricular activities open to ROTC cadets, including the Ranger Challenge Team, Color Guard, Army 10-Miler Team, Clarkson Guard and Intramural Teams. Some of these groups compete against other universities and ROTC programs in military and athletic competitions. The Cadet Color Guard performs at home hockey games, commissioning and graduation ceremonies, and other official events.

Leadership Training

No other college programs offer leadership training that is comparable to Army ROTC. An Army ROTC student knows how to lead, manage and work with people. Whether you decide on the Army as a career, or use it as a stepping stone to other goals in life, you will have a competitive advantage because you will learn what it takes to lead!

Military Science Curriculum*					
First Semester		**Credits**	**Second Semester**		**Credits**
MS 111	Leadership and Personal Development	1	MS 112	Introduction to Tactical Leadership	1
Third Semester			**Fourth Semester**		
MS 221	Innovative Team Leadership	2	MS 222	Foundations of Tactical Leadership	2
Fifth Semester			**Sixth Semester**		
MS 331	Adaptive Tactical Leadership	3	MS 332	Leadership in Changing Environment	3
Seventh Semester			**Eighth Semester**		
MS 441	Developing Adaptive Leaders	3	MS 442	Leadership in a Complex World	3

*Courses may be applicable as free electives in some majors where noted. Completion of this program may be applicable towards the award of a minor in Military Leadership Studies. Consult individual departments for details.

If you have any questions or would like to speak with someone about Army ROTC, contact the Golden Knight Battalion at 315-265-2180 or email armyrotc@clarkson.edu.

Air, Space, & Cyberspace Studies (Air Force ROTC)

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 and Space Force. Upon graduation with at least a bachelor's degree, students are commissioned as second lieutenants in the active duty Air Force or Space Force. A commission is an appointment as a military officer by the President of the United States.

AFROTC is normally a four-year program divided into two parts, the General Military Course (GMC) for freshmen and sophomores, and the Professional Officer Course (POC) for juniors and seniors. All students also complete a Leadership Laboratory (LLAB) each semester.

General Military Course

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 providing a fundamental understanding of leadership and team building to include listening, self-assessment, problem solving, and conflict management. Students do not need to be AFROTC cadets to enroll in the academic courses but cannot enroll in the Leadership Laboratory.

Field Training Summer Training

After successful completion of the GMC, cadets are scheduled to attend Field Training during the summer between the sophomore and junior year. Field Training is an intense, two-week, hands-on leadership challenge. Cadets are evaluated on their leadership ability, mastery of military customs and courtesies, and drill and ceremonies. Cadets are exposed to a variety of challenges which forces them to work as a team, critically evaluate situations, and perform under stress. Field Training is often a life-changing experience that builds self-confidence and fine-tunes leadership skills.

Professional Officer Course

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 builds on the leadership and management concepts taught in the sophomore curriculum focusing on their application within the Department of the Air Force. The senior curriculum continues to emphasize leadership, but introduces national security concepts and issues, cultural awareness, military law, the law of armed conflict, and preparation for entrance into the active duty Air Force and Space Force. The POC involves a three credit hour course and a two hour Leadership Laboratory (LLAB) each semester. POC cadets are placed in leadership positions and are charged with running the cadet wing. Non-AFROTC students may be eligible to enroll in the academic courses following completion of the GMC, or equivalent, courses. Contact the department for more information.

Leadership Laboratory

LLAB is a hands-on leadership training program. During LLAB, cadets practice the knowledge and skills learned in the academic classes and are instructed in skills they will need for a thriving military career. POC members are responsible for planning and executing LLAB, as well as other extracurricular activities such as formal dinners and awards ceremonies. Cadets are also expected to participate in 2 hours of Physical Training (PT) per week during each semester. Non-AFROTC cadets are not eligible to attend LLAB or PT.

Scholarships

Merit-based tuition scholarships are available to AFROTC cadets but are not required to join the program. Scholarships vary from $18,000 to full tuition. Below is a list of current scholarships:

1. Type I – Full tuition and fees scholarship
2. Type II - $18,000 towards tuition and fees
3. General Charles McGee Leadership Award - $18,000 towards tuition and fees for two years or can be converted to a $10,000 annual housing scholarship. This award is provided to all cadets entering the POC who are not already on scholarship upon completion of FT

All scholarships include the following:

1. Free room and board (Clarkson incentive)
2. Monthly Stipend during the academic year
3. Book allowance

Air, Space, and Cyberspace Studies Curriculum*					
First Semester		**Credits**	**Second Semester**		**Credits**
AS101	Heritage and Values I	1	AS102	Heritage and Values II	1
AS103	Leadership Laboratory	0	AS104	Leadership Laboratory	0
Third Semester			**Fourth Semester**		
AS201	Team and Leadership Fundamentals I	1	AS202	Team and Leadership Fundamentals II	1

AS203	Leadership Laboratory	0	AS204	Leadership Laboratory	0
Fifth Semester			**Sixth Semester**		
AS 301	Leading People and Effective Communication I	3	AS 302	Leading People and Effective Communication II	3
AS303	Leadership Laboratory	0	AS304	Leadership Laboratory	0
Seventh Semester			**Eighth Semester**		
AS 401	National Security, Leadership Responsibilities and Commissioning Preparation I	3	AS 402	National Security, Leadership Responsibilities and Commissioning Preparation II	3
AS403	Leadership Laboratory	0	AS404	Leadership Laboratory	0

*Courses may be applicable as free electives in some majors where noted. Completion of this program may be applicable towards the award of a minor in Military Leadership Studies. Consult individual departments for details.

Minor in Military Leadership Series

The minor in Military Leadership Studies offers students the opportunity to capture the academic rigor and commitment they have made to study one of our country's major instruments of power, the United States military. In addition to studying Air Force or Army organizations, missions, and operations, the student will gain a broad perspective of the military in general by studying the history of all Department of Defense Services and completing a leadership and/or history course emphasizing the key elements of leadership required of a military officer. Completion of the core required courses will provide students with instruction and application of leadership principles. Knowledge gained on basic skills that can be applied to any profession include values, ethics, time and stress management, risk assessment, decision making, team building, team dynamics, motivating people, counseling techniques and briefing techniques. Additional military oriented competencies taught that can be used as life skills include land navigation, survival training, basic medical training, fitness principles, terrorism awareness, cultural awareness, supply management, maintenance management.

The program is overseen by faculty members from the Departments of Air, Space and Cyberspace Studies (AS) or Military Science (MS) depending on chosen track. These faculty members will annually review the list of course electives for the minor and make appropriate changes (additions and removals) as needed.

Student Learning Outcomes

1. Acquire a broad perspective on the military and branches of service: Air Force, Space Force and Army.
2. Demonstrate and apply an understanding of individual and group dynamics and formal and informal leadership.
3. Demonstrate and apply an understanding of governmental applications of power.
4. Demonstrate preparation for commissioning (AS and MS tracks only).

Requirements

Air, Space and Cyberspace Studies Track: (19 credits)

AS101	Heritage and Values
AS201	Heritage and Values
AS201	Team and Leadership Fundamentals
AS202	Team and Leadership Fundamentals
AS301	Leading People and Effective Communication
AS302	Leading People and Effective Communication
AS401	National Security Leadership Responsibilities & Commissioning Prep
AS402	National Security Leadership Responsibilities & Commissioning Prep
AS103	Mil Leadership Lab
AS104	Mil Leadership Lab
AS203	Mil Leadership Lab
AS204	Mil Leadership Lab
AS303	Mil Leadership Lab
AS304	Mil Leadership Lab
AS403	Mil Leadership Lab
AS404	Mil Leadership Lab

One Related Elective Course (3 Hours) from the approved related course listing

Military Science Track (19 Credits)

MS111	Foundations of Officership and Basic Leadership
MS112	Foundations of Officership and Basic Leadership
MS221	Individual Leadership Studies
MS222	Individual Leadership Studies
MS331	Military Leadership & Problem Solving
MS332	Military Leadership & Problem Solving
MS441	Military Leadership and Management
MS442	Military Leadership and Management
MS100	Mil Leadership Labs

MS200 Mil Leadership Labs
MS300 Mil Leadership Labs
MS400 Mil Leadership Labs
One Related Elective Course (3 Hours) from the approved related course listing

Non-commissioning Student Track (19 Credits)
All 100 and 200 series MS track courses and five courses (15 credits) from the department's approved related course listing
OR
All AS track courses other than AS402 and two courses (6 credits) from the department's approved related course listing.

Note: Non-commissioning track students cannot participate in Leadership Labs or Physical Training.

Related Elective Course Listing (contact either AS or MS dept for the most recent list)

PHIL200	Philosophy and Contemporary Issues
HIST270	Introduction to Culture, Society & Biology
HIST235	Flight in History
HIST240	War and Society
HIST241/LIT241	War Stories I
HIST340	War in Ancient Greece
HIST341	War in Ancient Rome
HIST343	War in the Middle Ages
HIST347	World War I
HIST348	World War II
HIST349	Cold War Era: War and Society in the…
HIST365	Technology and the Modern State
PY461	Judgment and Decision Making
OS286/ PY286	Organizational Behavior I
PHIL330	Logic for Critical Thinking
POL220	American Politics
POL240	Politics, Decisions and War

Independent Research Plan (pending approval of owning program and respective MS/AS division head.)

Other related elective course options must be proposed by the student to either division head before related elective credit will be awarded. The above related elective course listing is an adaptive listing and will be updated to reflect changes to the university course catalog.

ACADEMIC CENTERS

Advanced Materials Processing

The Center for Advanced Materials Processing (CAMP) is a Center for Advanced Technology (CAT) funded by New York's Empire State Development Division of Science Technology and Innovation (ESD-NYSTAR).

CAMP's mission is to offer companies, industries and entrepreneurs a vibrant, collaborative, trusted environment in which to engage in focused applied research and technology development activities intended to advance innovation, improve products, solve manufacturing challenges and/or develop new products. CAMP's overarching goal is to contribute significantly to economic growth in New York State. Our main objectives are to:

1. Form collaborative relationships with industry, corporations and entrepreneurs in NYS to assist them in accelerating innovation, discovering and implementing next generation materials, addressing real-world challenges and fostering growth of their businesses.
2. Perform applied research, technology development and technology transfer activities related to the synthesis, processing and design of advanced materials to benefit industry and corporations.
3. Develop the next-generation, high tech workforce by providing excellent education and real-world research/development experiences needed by NY industry and companies.

CAMP relies on faculty and students in four core capability areas:

1. Materials synthesis and functionalization
2. Materials processing
3. Materials-by-design, and
4. Chemical mechanical planarization, underpinned by materials characterization and computational modeling and simulation

CAMP's industry-sponsored research program provides numerous materials science and engineering research opportunities to enrich undergraduate and graduate students' educational experience.

Excellence in Healthy Water Solutions

Ensuring a healthy and sustainable future through the protection and conservation of water resources, CoEHWS' mission is to generate solutions that help protect and improve waters for a sustainable natural environment, healthy populations, resilient communities and sound economies. Additional information can be found at https://www.healthywaters.org/

Air and Aquatic Resources Engineering and Sciences

The presence of contaminants in the environment can have a wide variety of negative effects including impacting public health, degrading ecosystems, harming lakes and rivers, and damaging forests and crops. Although, environmental quality has significantly improved over the past 40 years, there are still a number of problems that are attributed to the release of contaminants including the widespread loss of environmental services, climate change, harmful algal blooms, and emerging contaminants including per- and polyfluoroalkyl substances (PFAS). Clarkson University has significant resources in people and equipment that focus on the management of air, water and soil pollution. CAARES is the center that brings together this world-class expertise. CAARES laboratory, office space, and equipment including an aerosol wind tunnel; aerosol sensors, analyzers, and spectrometer; air and water field sampling platforms and, world class analytical equipment are available for research and education programs at Clarkson. Specific analytical instruments include high-resolution gas and liquid chromatographs, high resolution instruments for trace metals analysis, mercury analytical instrumentation, ion chromatographs and sample preparation instrumentation. Additional information can be found at https://www.clarkson.edu/caares.

Rehabilitation, Engineering, Science, & Technology

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.

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 and Occupational Therapy programs, 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 Minor in Biomedical Engineering to meet this need. Combining a traditional engineering degree with this BmE Minor is an attractive opportunity for 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 Minor to augment a degree from a traditional engineering department. A similar Minor in Biomedical Science and Technology (BS&T) is available to non-engineers. Both Minors are multi- disciplinary, and will include courses from multiple schools or departments across the University. The Biomedical Engineering Minor is just one of the examples addressing Clarkson's Coulter School of Engineering's motto "Technology Serving Humanity."

Complex Systems Science

Complex systems science involves the study of how many elements develop behaviors that are beyond those behaviors possible by considering the individual elements alone. While the behavior of each individual component of a system in isolation may support intricate dynamics, together the individual components interact to support group behaviors and system dynamics well beyond those possible from individual components alone.

Complex systems science is a rapidly growing and emerging field that is inherently interdisciplinary. It can be applied to a wide variety of fields including biology, medicine and cognitive science, mechanical, chemical, electrical, and civil engineering, physics and astronomy, economics and social sciences. The future of research in these fields lies in understanding not just the isolated components of a given system, but the manner in which the individual components interact to produce "emergent" group behavior.

In contrast to "data mining" or "big data", where a primary focus is to understand hidden patterns or structure in large data sets, complex systems science attempts to identify "causality" and uncover "universality" that exists in large scale systems. Causality and universality are due to peer and hierarchical interactions, patterns, and scaling of individual system components. Universality has been observed across a wide range of fields such as brain science, insect swarming, social science, and fluid dynamics.

Key to the advancement of complex systems science is the development and use of mathematical tools designed to understand the resultant outcome of group behaviors that are not evident when studying the behavior of individual elements alone. Mathematical tools for complex systems science are drawn from the following fields:

1. Information dynamics. The study of interaction of elements and the information flow between elements. Of particular interest is the minimum information needed to produce an outcome of important behaviors
2. Algorithmic complexity. In contrast to information dynamics and entropy of evolving systems is the concept of algorithmic complexity, Kolmogorov

complexity, and the concept of minimality of description, as a contrast that intricate behavior is often opposite to simplicity of design

3. Structure and dynamics on networks, as a large number of interacting parts can give rise to behaviors that emerge from the group interactions and not implicit in any one element. Consider that collective behaviors and capabilities of an ant swarm, which is clearly not understood in terms of the behaviors of the parts. Considering networks brings in the mathematics of graph theory, but well beyond this when understanding dynamics on networks, comes complexity theory.
4. Criticality and scaling, modeling of random networks, the implications of critical phenomena to complexity, and the recent approaches to evolutionary dynamics are all part of this field. As such, understanding interactions from food webs to economies all have a universality that can be understood in terms of the science that includes hierarchical interactions. It is the characterization of such universalities that lead to complex systems as a unifying field across such disciplines
5. Technical details and the tool-sets include areas of dynamical systems and chaos theory, network theory and graph theory, information theory, thermodynamics and statistical mechanics, cellular automate, information theory, activated processes including glasses, fractals, scaling and renormalization

Electric Power Systems

Electric Power System Engineering is a recognized strength of Clarkson University. The electric power system is undergoing rapid dynamic change due to the development of clean energy sources, the deployment of smart grid technologies, the deregulation of the industry, and the developing growth of the electric vehicle industry. There is a strong need for research, development, and workforce training across the breadth of research areas that focus on electric power systems.

The Center for Electric Power System Research mission is to foster research collaborations across the university, and to grow our power systems research capability. The Center goal is to work closely with industry, and the Industry Advisory Board has an important role in the Center governance.

The center has a strong education mission, at the undergraduate and graduate levels, as well as in programs for practicing professionals. Our undergraduates can select the Electrical Power Engineering Concentration. This concentration is a set of 6 courses that prepare our students for careers in the electric power industry, whether working for electric power utilities, generation and utilization industries, equipment manufacturers, consultants, and government. The large majority of students in the Concentration complete one or more internships in the power industry before graduating.

STUDENT AFFAIRS

Dean of Students Office

The Office of the Dean of Students is committed to promoting students' personal and academic growth while representing their concerns and helping them enhance their character, quality, and perspective during and after their time at Clarkson. Staff work to allow students the ability to achieve a quality education dedicated to excellence, leadership, and citizenship.

Clarkson Student Regulations

Each student is responsible for knowing the contents of the Clarkson Regulations. The Regulations contain information on student rights and responsibilities, course policies, academic regulations, academic integrity, student conduct, grievance procedures, and policy statements. For a link to the Clarkson Regulations, please visit: https://www.clarkson.edu/student-administrative-services-sas/clarkson-regulations.

Orientation

Students 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 provides the Clarkson student with experience and insight into the significance of developing intellectual and interpersonal skills simultaneously.

Clarkson's concern for new students begins even before they arrive on campus. From acceptance to arrival (for campus-based programs), students will receive relevant information pertaining to their experience, including access to an online platform to ease assimilation prior to matriculation that shares important information before students begin, their first few days, and navigating Clarkson University prior to the first day of class.

Clarkson Housing

Undergraduate students in their first, second, third, and fourth cohort years are required to live in University housing unless they are granted an exemption to the residency requirement. 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).

The Residence Life Staff provides supportive and development programming for students. All events and programs are designed to involve and engage students with the campus community and provide a healthy mix of educational, fun, and recreational activities to support the diverse interests of Clarkson students.

University housing provides accommodations ranging from traditional rooms to suites to apartments. Special attention is given to the assigning of roommates to first-year students. Most first-year students reside together in Cubley-Reynolds and Ross-Brooks (otherwise known as “the Quad”) on theme-based floors. Students select from a wide variety of themes during the summer prior to arrival. Some of our housing units feature suite-type accommodations; these are typically two double rooms with interconnecting baths. Lounges and recreational areas, laundry rooms, and vending machines are located in or near each residence facility.

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 choose to do so. Students residing off campus have the option of contracting for University food service.

Cable TV and data ports are available for students in each room or apartment. Smoking is not permitted in any buildings on campus including the residence halls.

Campus housing is staffed by live-in University employees known as Area Coordinators, who supervise and train students who serve as Resident Advisors (RAs) to assist students with personal issues and a variety of educational, social, and recreational programs.

Fifth-year students are housed on campus only as space allows. Fraternity and sorority members who meet academic requirements may live and dine in University-recognized fraternity and sorority housing.

Students are responsible for knowing and adhering to the Residence Regulations enumerated in the University housing contract and on the University's website.

Theme Housing

Clarkson strives to create learning communities by developing innovative theme housing opportunities centered around supplemental learning outside of the classroom within the residential facilities through programming, faculty led events, and guest speakers. In addition, students develop peer groups based on similar academic and social interests which builds lifelong bonds and relationships. Theme housing creates a reliable network to ease a student’s transition from year to year at Clarkson.

Student Health & Counseling Center (SHAC)

Counseling Services

A Clarkson University education encompasses more than classroom learning. Challenges and transitions provide opportunities for personal, social, and academic

growth and cognitive development. Counseling services are confidential and offered at no additional cost to students. Counseling services focus primarily on mental health concerns and problems including: adjustment to change, relationships, self-care, communication, career-vocational choice, academic performance, identity development, personal/sexual/social behaviors, habit change, depressed mood, stress and anxiety, loss and grieving, sexual harassment and/or assault, gender identity, self-esteem, loneliness, substance use, and self-defeating behaviors. The Counseling Center collaborates with online provider Mantra Health to offer additional counseling and mental wellness support resources to students free of charge. The professional staff at Student Health and Counseling also collaborate with other campus team members to enhance the well-being and health of Clarkson students. Mental Health First Aid, which is an extensive workshop designed to build participants' confidence in identifying individuals struggling with mental health challenges, providing support, and connecting to resources, is coordinated through the Counseling Center. It is made available to students for free.

Health Services

The University has forged a partnership with Rochester Regional Health/Canton-Potsdam Hospital (CPH), in which CPH provides professional staffing and services at the University's Student Health Center. Through this partnership, students enjoy a comprehensive health care program and the broad professional capacities provided by the hospital and its highly trained staff. At the Student Health Center (centrally located in the Educational Resources Center), CPH provides clinical services to include basic medical care, preventative care, general physicals for student-related activities and limited urgent care. Most visits to the Student Health Center and many services are free of charge. The Student Health Center is open weekdays from 8 a.m. – 4:30 p.m. during the academic year. After hours care is available at CPH's Urgent Care Center (49 Lawrence Ave) or the CPH emergency department (50 Leroy Street) located approximately one mile from campus. In after hours emergency situations, students are encouraged to contact Campus Safety if they need assistance.

Office of Accessibility Services

This is the initial point of contact for students with documented disabilities seeking accommodations or services. The office is responsible for maintaining disability-related documentation, certifying eligibility for receipt of services, determining reasonable accommodations, and ensuring the provision of those services. Students are asked to make contact with the Office of Accessibility Services prior to the beginning of each semester at Clarkson in order to ensure that accommodations will be available in a timely fashion. The student will meet with the staff of Accessibility Services to review documentation and determine reasonable accommodations. The Office of Accessibility Services will provide instructions to the student for faculty and staff notifications requesting reasonable accommodations. Reasonable accommodations will be provided to eligible students who have followed the procedures as developed by the Office of

Accessibility Services. Services may include short-term arrangements for students who have become temporarily disabled.

Student Success Center

The Student Success Center supports the academic and personal success of all Clarkson students by providing coordinated resources and programs that enhance the student experience. Core offerings include CU Connect Mentoring, First-Year Seminar (FY100), Academic Recovery course, MCAT test prep support, tutoring, academic skills development, and opportunity program support. In partnership with the Office of Information Technology, the Center also manages Slate for Current Students, Clarkson's comprehensive student success platform that integrates advising, communication, and early-alert tools to foster strong connections and help students navigate their academic journey.

First Year Seminar, FY 100

The First Year Seminar is a 12-week, 1-credit (P/NC) graduation requirement, peer-led course designed to support students during their transition to Clarkson University. As a graduation requirement, the seminar plays a foundational role in helping students acclimate to university life, develop essential academic and life skills, and engage meaningfully with the campus community. The course is structured around experiential learning, peer mentoring, and reflective practice.

Academic Recovery - UNIV 100

University Skills Seminar is a seminar-style course that is designed as a positive intervention for first and second year students who demonstrated low academic performance and/or were academically separated in the previous fall semester at Clarkson University. The course is meant to facilitate a holistic approach to academic success and foster retention in participating students. Students will use this course to identify their unique barriers that may impede their academic experience and develop an action plan to overcome these barriers. Students will take a deep dive into the resources available at Clarkson and create individualized action plans that outline which specific resources are needed for the student to achieve academic success. This course will place a focus on building the academic skills necessary to be a successful student at Clarkson, focusing on STEM learning, critical analysis and writing skills. The students will develop and apply time management, academic and study skills that are essential to success in higher education. This course is meant to foster autonomous, self-advocating learning and professionals. The course will focus on forming sustainable and healthy habits that will help students not only reach their academic and personal goals, but foster a stronger sense of emotional and mental wellness.

MCAT

MCAT Prep Moodle page: Is intended to help students prioritize self-directed study in preparation for taking the Medical School Admissions Test (MCAT). Organized by the Student Success Center in collaboration with the Health Professions Advising

Committee, this resource also provides guidance on MCAT exam strategy and access to specialist faculty who have agreed to assist students with encountered topic areas of difficulty. Additionally, periodic proctored practice MCAT exams are offered to help students hone their skills and identify areas that need improvement.

CU Connect Mentoring

The CU Connect initiative was launched to provide deposited students with early, personalized outreach and a clear point of contact prior to matriculation. This cross-campus collaborative approach emphasized proactive relationship-building, timely check-ins, and coordinated support across functional areas, reinforcing students' sense of belonging and readiness during the transition to the institution.

Tutoring Services

Clarkson's Tutoring Program provides students with assistance throughout the semester from trained undergraduate tutors. Tutors are Clarkson students who have successfully completed the same courses, offering relatable guidance while helping peers expand their academic networks. Clarkson has three Drop-In Tutoring centers, which are open five days a week in the afternoon and evenings. The tutors in the centers provide assistance with many math, physics, chemistry, and engineering courses. These services are highly utilized by our students, with many seeking out one or both methods of tutoring assistance.

Office of The Collegiate Science and Technology Entry Program (CSTEP), The Arthur O. Eve Higher Education Opportunity Program (HEOP) and The Ronald E. McNair Postbaccalaureate Achievement Program (McNair)

Together, these federally and state-funded programs provide a comprehensive network of support that promotes student success from enrollment through graduation. Eligible students benefit from academic enrichment, individualized advising, undergraduate research opportunities, graduate school preparation, career and professional development, and social and cultural programming. Through these services, the office fosters academic achievement, personal growth, and educational attainment while empowering students to reach their full academic and professional potential.

Collegiate Science and Technology Entry Program (CSTEP)

Funded to serve 70, the purpose of CSTEP is to increase the number of economically disadvantaged students pursuing careers in STEM fields or NYS licensed professions. CSTEP is sponsored by the New York State Education Department. Clarkson's Collegiate Science and Technology Entry Program (CSTEP) has been in existence since 1994 and has served over 400 students.

The CSTEP program helps to assure a competitive advantage to eligible students by providing academic support, enrichment activities, career development, and graduate school preparedness. Students are provided with academic guidance and tutoring.

Along with this, the office provides academic success workshops and a lending library of textbooks, laptops and other important tools for success.

The CSTEP staff helps students meet the challenges of the competitive STEM field by offering career guidance and skill building that will help students identify and prepare for a career. Students are given opportunities to participate in activities such as conferences; networking with corporations, other colleges and universities; as well as meeting with Clarkson University alumni. This builds their career network, and may lead to becoming involved with research, co-op, study abroad, or internship opportunities. CSTEP offers assistance with various graduate and professional exams, and with applying to graduate schools when approaching the end of baccalaureate degree requirements.

New York State Arthur O. Eve Higher Education Opportunity Program (HEOP)

The Arthur O. Eve Higher Education Opportunity Program (HEOP) is funded jointly by Clarkson University and the New York State Education Department. HEOP provides academically and economically eligible students with the opportunity to attend Clarkson while receiving the support they need to succeed.

Support begins with the Summer Pre-Freshman Experience (SPREE), which helps new students prepare for the academic and social transition to college. Throughout their time at Clarkson, HEOP students receive personalized advising, tutoring, mentoring, financial aid guidance, academic skill-building, leadership opportunities, and connections to campus resources. By providing this comprehensive support, HEOP helps students succeed academically, persist to graduation, and prepare for their future careers or graduate education.

Ronald E. McNair Post Baccalaureate Achievement Program (McNair)

The McNair program, a federal TRIO grant funded by the US Department of Education, serves 31 students per year. The goal of McNair is to increase the number of economically disadvantaged and historically underrepresented students (as defined by the U.S. Department of Education) entering graduate school and obtaining their PhD. Participating in the program allows students firsthand experience in cutting-edge research with faculty member mentors who are dedicated to their teaching and research.

Clarkson's research for McNair Scholars focuses on STEM disciplines. Students in McNair complete a 10-week intense research program, filled with graduate school workshops, GRE preparation, and seminars by alumni and faculty with PhD’s. Students present their research at a national McNair Conference and at Clarkson’s summer SURE Symposium. The goal of the McNair program is to have historically underrepresented and economically disadvantaged, first-generation college students enter graduate school and attain a PhD.

Career Center

The Career Center is a holistic student service that provides connections between students, alumni, and employers as they prepare for their post-graduate career journey. Our office provides career development and services that include exploration, professional development, experiential education, and employment opportunities. We utilize a holistic comprehensive career readiness educational model that meets students where they are at to help prepare them to make their mark on the globally diverse world.

Career and Job Search Services

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

The Career Center facilitates a wide number of career-oriented workshops for first-year students through graduate-level students, including career exploration groups, resume preparation, interviewing techniques, and job-search techniques. The mock interview program is noted for its success in preparing students for their job interviews. The bi-annual Career Fairs attract hundreds of employers to recruit on campus each year. 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: campus recruiting programs with business, industry, and government; Career Fairs, a Web-based resume database system that enables the Center to provide students' resumes to employers; a job listing and networking service online called Handshake; 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 years.

Experiential Education Program

Cooperative Education & Internships Cooperative Education (Co-op) Program

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

Typically, students participate in the Co-op Program for an academic semester and a summer. Students may choose to co-op from January through August or from May through December. However, the co-op work block timeframe is very flexible and the University makes every effort to match a student's academic plans with a company's work schedule. To help prepare students for the co-op experience, the Career Center provides skill-based seminars and workshops. The focus of these programs are on writing resumes, cover letters, practicing job interviews, teaching students how to conduct a successful job search, and professionalism in the workplace. A key decision for the student is how to make up for 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 and does not pay tuition expenses. 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.

Internship Program
As part of the professional experience component, the Career Center also offers assistance in identifying and applying for internships. 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, internships are offered throughout the year, along with individual advising. Most internships are paid; in some cases, students receive a stipend or receive academic credit.

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.

International Center
The International Center is a hub of activity providing the Clarkson community with a multitude of global opportunities – experiences – and advisement.

Go Abroad
One of the best ways to prepare for the global workforce is to immerse yourself in another culture. The International Center provides students with numerous global experiences, such as: traditional semester/year exchange with many universities around the globe – short-term/faculty-led programs – or – international internships.

Study Abroad provides an excellent opportunity for undergraduate students to enhance their academic background and prepare for the global marketplace through exposure to another educational system and culture. The primary program open to all students offered by the International Center is the Student Exchange Program. The program is designed for students to spend a semester or a year abroad usually during their junior year. Students go through a competitive application process during the sophomore year to be considered for the program. Clarkson University has articulated exchange agreements with many universities around the world Please see the Clarkson International Center website for a listing of Clarkson's Exchange Partners by Country.

In addition to the semester or year-long exchange opportunities, Clarkson offers students the option to participate in short-term programs or faculty led trips. The short-term programs are 2-3 weeks in duration and are ideal for those students who do not wish to be gone for a full semester or year. Faculty led trips usually occur immediately following the spring semester while enrolled in a course during the spring semester. The International Center works with all disciplines to ensure all students in all majors that require or want a global experience have the opportunity.

Exchange 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 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. The student should work with the International Center for approval of these non-exchange programs. 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 the credit hour and grading system differ from country to country and school to school. Participants should request to have their grades sent to the International

Center 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 International Center 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.

Work Abroad
Imagine working for an organization or company abroad, and learning what it is like to work in another culture. You will increase your marketability and be better prepared for the global workplace upon graduation. Students interested in an internship abroad can work with the International Center staff to identify the opportunities available across the globe. Some of these jobs are paid and some are for academic credit. Visit the International Center website for more information.

International Student and Scholar Services
This part of the International Center informs and educates the international population as well as the University community on immigration regulations that govern international students, scholars and the University. In addition, International Center staff coordinate services and benefits available to the international population and facilitate international cultural events within the Clarkson community to promote global diversity.

Student Center, Lounges, & Atriums

The Student Center is the focal point of activities on the Collins' Hill Campus. Students in the Earl R. and Barbara D. Lewis School of Health Sciences Programs have an open atrium downtown as well, to socialize, study, and eat meals as students enter the main building. Similarly, the Capital Region Campus offers the student atrium at the entrance of the Main Building. The Student Center and atriums are places where students can come to spend time between classes, study, and hold meetings and evening events. There are a variety of lounges and spaces with comfortable chairs and tables for studying and relaxing. In addition, meeting rooms are available for group meetings and other activities at all campuses.

ATHLETICS

Recreation and Intramural Activities

All students are encouraged to participate in intramural and recreational activities. Clarkson's location provides students with a wide array of outdoor sporting opportunities including individual and team challenges. Intramural contests include both regular leagues and weekend tournaments. Recreational activities included both outdoor and indoor activities.

Varsity Sports
The Clarkson Golden Knights compete in 20 intercollegiate varsity sports, at the NCAA Division I level in men's and women's hockey and with the other 18 at the NCAA Division III/USCSA level.

Facilities
The Henry R. Hodge Sports and Recreation Complex is located on the Potsdam campus, adjacent to the residence halls and easily accessible to all students. Facilities include The Deneka Family Fitness Center, Alumni Gymnasium, Schuler Recreation Building (which houses the Stephenson Field House and the Fuller Pool), the Denny Brown Adirondack Lodge, and the Snell Athletic Fields. Additional facilities include Walker Center, Hantz Turf Field, Bagdad Field, Scott Field, Neugold Field, and the Cheel Campus Center, which is home to The Munter Family Climbing Wall, Steven J. Yianoukos Fitness Center and Hockey Arena.

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. Officers do not have police jurisdiction over public streets, public property, or private property. Arrests and apprehension are referred to the Village Police. Statistics concerning campus safety and campus crime are available upon request from the Office of Campus Safety & Security or can be accessed at http://www.clarkson.edu/campus-safety .

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 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 Association Leadership Board 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 in 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 fundraising efforts, mentoring undergraduates, serving as speakers on campus, serving on advisory councils, and providing opportunities to learn the value of being engaged alumni. There are nearly 30 regional chapters located in almost every major U.S. city. These regional chapters host approximately 120 events each year to engage alumni and keep them connected to Clarkson.

OFFICE OF INFORMATION TECHNOLOGY

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

Access to campus IT 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 connect to this network via high-speed wired and wireless connections in buildings across campus. The campus network is connected to the Internet via several multi-gigabit connections.

All students have access to a broad range of computing and information technology resources, including: high-tech, multimedia classrooms and collaborative spaces; email; web conferencing; digital publishing; online teaching and learning; and campus computer labs equipped with the latest software.

OIT supports Clarkson's commitment to integrating technology into the classroom through its instructional technology operation. Instructional Technology supports both students and faculty by providing and maintaining software, equipment and facilities for the production, dissemination, and utilization of learning resource materials.

Student Personal Computers

Information technology is such an integral part of today's marketplace, it is strongly recommended that every Clarkson student have an appropriate personal computer. 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 found in the academic buildings.

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ATHAVALE, Prashant
BE, University of Mumbai
MS, University of Toledo
MS, PhD, University of Maryland
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MS, University of Calgary
PhD, University of Ottawa
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BAKI, Abul Basar
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PhD, University of Alberta
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BROWN, Anna
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CARLSON, Jay
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PhD, University of South Carolina
Associate Professor, Consumer and Organizational Studies

CHAUDHRY, Shafique
BS, MS, University of Punjab
PhD, Ajou University
Associate Professor, Operations and Information Systems

DEHOFF, Mark
Captain, U.S. Air Force
BS, Embry-Riddle Aeronautical University
MSS, Angelo State University
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DEJOY, John
BBA, Pace University
CPA, New York MBA, Marist College
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HOOVER, Karen
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MS, Columbia University
OTD, Chatham University
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HUSSAIN, Faraz
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BS, MS, University of Dhaka
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KIM, Taeyoung
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PhD, University of Colorado
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KRING, Stefanie
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Associate Professor, Biology / Laboratory Coordinator

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PhD, Southern Illinois University Carbondale
Associate Professor, Electrical and Computer Engineering

LU, Xiaocun
BS, Peking University
PhD, The University of Akron
Associate Professor, Chemistry and Biochemistry

MACIEL, Alexis
BSc, PhD, McGill University
Associate Professor, Computer Science

MACKINNON, William
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BA, Eastern Connecticut State University
MA, Ph, University of Delaware
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MASTORAKOS, Ioannis
BS, PhD, Aristotle University of Thessaloniki
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MICHALEK, Arthur
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MILNE, R. John
BS, M.Eng, Cornell University
PhD, Rensselaer Polytechnic Institute
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PEDERSEN, Steven
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MS, College of Saint Rose
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SACKS, Michael
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SAMWAYS, Damien
BS, University of Southampton, UK
PhD, University of Bristol
Associate Professor, Biology

SCHELLY, David
BS, Colorado State University
MS, PhD, University of Wisconsin
Associate Professor, Healthcare

SCRIMGEOUR, Jan
M. Phys., Heriot-Watt University
D.Phil., University of Oxford
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MBBS, Maharashtra University of Health Sciences
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Assistant Professors

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B.Sc, University of Kelaniya
M.Sc, University of Colombo; Sam Houston State University
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MS, PhD, University of Maryland
Assistant Professor, Mathematics

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PhD, The Pennsylvania State University
Assistant Professor, Communications

GOSS, Krista

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MS, University of Alaska Fairbanks
PhD, University of Waterloo
Assistant Professor, Mathematics

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PhD, Wesleyan University
Assistant Professor, Chemistry and Biochemistry

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BS, Rochester Institute of Technology
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PhD, York University
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DPT, Simmons University
PhD, Clarkson University
Assistant Professor, Healthcare Management

ZHANG, Jianhua
BS, Jimei University
MS, Xiamen University
MS, New Mexico Institute of Mining and Technology
PhD, North Carolina State University
Assistant Professor, Electrical and Computer Engineering

ZHANG, Ying
B.E., Jinan University
MS, Jilin University
PhD, Syracuse University
Assistant Professor, Psychology

Professors of Practice

BACKUS, Erik C.
BS, PhD, Clarkson University
MS, University of Missouri-Rolla
Professor of Practice, Civil and Environmental Engineering

BARKER, Philip
Professor of Practice / Distance Power Engineering MS Program Coordinator

BUCKINGHAM, Ronald
Professor of Practice, Mechanical and Aerospace Engineering

COMPEAU, Marc
BS, SUNY Potsdam
MS, Clarkson University
Professor of Practice, Consumer and Organizational Studies / Reh Family Professor of Entrepreneurship Practice

ISSEN, Marshall
BS, University of Illinois, Urbana
MS, Roosevelt University
P.E., Illinois
Professor of Practice, Engineering and Management

OLSEN, William
BA, University of Buffalo
Professor of Practice, Civil and Environmental Engineering

Instructors

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MBA, Union Graduate College
Instructor, Healthcare Management

CONLON, Tyler
Instructor, Operations and Information Systems

LAROCK, Krista
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MS, MBA, Clarkson University
Instructor, Consumer and Organizational Studies

MARTIN, Christopher
BS, Clarkson University
MS, SUNY Potsdam
Instructor, Mathematics

MCCLURE, Matthew
Instructor, Air Space and Cyberspace Studies

MORRISON, Sara
BS, St. Lawrence University
MS, University of Vermont
Instructor, Mathematics

SAJNA, Catherine
Instructor / Director of the Writing Center and ESL Program / Center for Excellence in Comm

SULLIBAN, Wylee
Instructor, Military Science

WOZNY, Andrew
Instructor, Military Science

WULTSCH, Elisabeth
Instructor, Walter H. Coulter School of Engineering

POLICIES

Clarkson University Nondiscrimination Statement
Clarkson University does not discriminate on the basis of race, creed, color, religion, sex, sexual orientation, gender, gender identity, gender expression, national or ethnic origin, age, disability, pregnancy-related condition, military or veteran status, genetics, domestic violence victim status, marital status, familial status, ancestry, source of income, relationship or association with a member of a protected category, or other basis protected by applicable local, state, or federal law in provision of educational and 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 ADA504@clarkson.edu.

Inquiries concerning Title IX, Title VI, the Age Discrimination Act, or other discrimination concerns should be directed to Vice President for Access Initiatives, Title VI, Title IX, ADA/504 Coordinator Jennifer Ball at jball@clarkson.edu , ERC 1003A, or 315-268-4208.

Information on the procession of grievances and charges relating to the above policies can be obtained here.

Student Complaint Process (HEOA)
In compliance with the Higher Education Opportunity Act of 2008 and the state complaint processes as prescribed for under 34 CFR 600.0, the following resources are provided:

Filing a Grievance with NY State New York State Education Department: Office of College and University Evaluation, Room 960 EBA, 89 Washington Avenue, Albany, New York, 12234. For more information, please visit: http://www.nysed.gov/college-university-evaluation/filing-complaint-about-college-or-university

Online Student Consumer Protection
Clarkson University is a member of the National Council for State Authorization Reciprocity Agreements (NC-SARA) and follows the complaint resolution policies and procedures outlined within the SARA Policy Manual and summarized here. For a list of NC SARA participating states and institutions, you may visit the NC-SARA directory.

Any complaints made regarding grades or student conduct are governed by Clarkson University policy and are not subject to NC-SARA involvement.

Students outside of New York State:
Consumer protection complaints resulting from distance education courses, activities, and operations from students outside of New York State may be submitted to the office of the Associate Vice President of Academic Affairs & Student Achievement for investigation and resolution. If a student is dissatisfied with the institution-based resolution, a concern may be submitted, within two years of the incident about which the complaint is made, to the New York State Education Department as outlined here.

Students within New York State:
Any complaints made by students residing within New York State are not subject to NC-SARA involvement, and should follow the Grievance Procedures detailed in the Clarkson Student Regulations.

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 and Security, 315-268-6666, or visit https://www.clarkson.edu/student-life/student-support-services/safety-security.

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

Student Regulations
Each student is responsible for knowing the contents of the Clarkson Regulations. The Regulations contain information on registration, class absences, the grading system,

scholastic requirements, the method for removing course deficiencies, special examinations, and the Code of Student Conduct, campus policies, and other information regarding University operations. For a link to the Clarkson student regulations, please visit: https://www.clarkson.edu/admissions-financial-aid/sas/clarkson-regulations

ACADEMIC CALENDARS

The academic calendar contains the dates of major academic events occurring each academic year and serves as an information source and planning tool for students, faculty, staff, families, and outside organizations. The academic calendar is published once a year, and is subject to change at any time.

Undergraduate Programs

	2026-2027	2027-2028
Fall Semester Events	**Fall 2026**	**Fall 2027**
New Student Move-in*	21 August	19-20 August
Returning Student Move-In*	22-23 August	22 August
Classes Begin	24 August	23 August
Career Fair	15 September	TBA
Fall Recess	12-13 October	11-12 October
Classes Resume & Midterm grades due	14 October	13 October
Freshman Family Weekend Begins	16-18 Oct	TBA
Enrollment For Spring Classes Begin	4 November	3 November
Sophomore & Junior Family Weekend	6-8 November	TBA
Thanksgiving Recess	25-27 November	24-27 November
Classes Resume	30 November	29 November
Last Day of Class	4 December	3 December
Final Exams	7-11 Dec	6-10 Dec
Fall Graduates Recognition Ceremony	12 December	11 December
Final Grades Due at 9:00am	14 December	13 December

	2026-2027	2027-2028
Spring Semester Events	**Spring 2027**	**Spring 2028**
New Student Move-In	5 January	11 January
Returning Student Move-In	6 January	12 January
Classes Begin	7 January	13 January
Career Fair	3 February	TBA
February Break	18-19 February	24-25 February
Classes Resume	22 February	28 February
Midterm Grades Due	1 March	6 March
Spring Recess	15-19 March	13-17 March
Classes Resume	22 March	20 March
Enrollment For Fall Classes Begin	30 March	5 April
Last Day of Class	23 April	28 April
Reading Days	26-27 April	1-2 May
Final Exams	28 Apr-4 May	3-9 May
Final Grades Due at 9:00am	7 May	12 May
Undergraduate Commencement Ceremony	8 May	13 May

	2026-2027	2027-2028
Summer Semester Events	**Summer 2027**	**Summer 2028**
10 Week Session		
Classes Begin	7 June	12 June
Classes End	6 August	11 August
Finals (not all classes have finals)	9-13 August	14-18 August
Grades Due	17 August	22 August
First 5 Week Session		
Classes Begin	7 June	12June
Classes End	9 July	14 July
Grades Due	13 July	18 July
Second 5 Week Session		
Classes Begin	12 July	17 July
Classes End	13 August	18 August
Grades Due	17 August	22August
Alumni Reunion		
	8-11 July	TBD July

Graduate Programs

Academic Calendar for Graduate Programs (Excluding OT, PA, DPT)
The academic calendar for all graduate programs excluding Health Sciences. This calendar includes all sessions offered within the semester.

	2026-2027	2027-2028
Summer Semester Events	**Summer 2026**	**Summer 2027**
Summer Full Session		
Classes Begin	May 18	June 7
Classes End	July 31	August 6
Finals (not all classes have finals)	August 1	August 9 - 16
Grades Due (by 9am)	August 4	August 17
Summer 10-Week Module Session		
Classes Begin	June 15	June 7
Classes End	August 14	August 6
Finals (not all classes have finals)	August 17 - 21	August 9 - 16
Grades Due (by 9am)	August 4	August 17
Summer 5-Week Session 1		
Classes Begin	May 18	June 7
Classes End	June 19	July 9
Grades Due (by 9am)	June 23	July 13
Summer 5-Week Session 2		
Classes Begin	June 29	July 12
Classes End	July 31	August 13
Grades Due (by 9am)	August 4	August 17

	2026-2027	2027-2028
Fall Semester Events	**Fall 2026**	**Fall 2027**
Fall 10 Week Module Session		
Classes Begin	September 2	September 1
Classes End	November 3	November 2
Final Exams	November 4 - 10	November 3 - 9
Final Grades Due (by 9am)	November 17	November 16
Fall 15 Week Session		
New Student Move-in*	August 20-21	August 19-20
Returning Student Move-In*	August 23	August 22
Classes Begin	August 24	August 23
Career Fair	TBA	TBA
Fall Recess	October 12-13	October 11-12
Classes Resume & Midterm grades due	October 14	October 13
Family Weekend Begins	TBA	TBA
Thanksgiving Recess	November 25-27	November 24-26
Classes Resume	November 30	November 29
Last Day of Class	December 4	December 3
Final Exams	December 7 - 11	December 6-10
Fall Graduates Recognition Ceremony	December 12	December 11
Final Grades Due (by 9am)	December 14	December 13
Fall 7.5 Week Residential MBA Module Session 1		
Classes Begin	August 24	August 23

Classes End	October 9	October 8
Final Exams	October 12- 13	October 11-12
Final Grades Due (by 9am)	October 20	October 19
Fall 7.5 Week Residential MBA Module Session 2		
Classes Begin	October 19	October 18
Classes End	December 8	December 7
Final Exams	December 9 - 11	December 8 - 10
Final Grades Due (by 9am)	December 14	December 13

	2026-2027	**2027-2028**
Spring Semester Events	**Spring 2026**	**Spring 2027**
Enrollment for Classes Begin **(all sessions)**	November 4	November 3
Spring Graduate Commencement Ceremony **(all sessions)**	May 6	May 11
Spring 10 Week Module Session 1		
Classes Begin	January 4	January 10
Classes End	March 5	March 10
Final Exams	March 8 - 12	March 13 - 17
Final Grades Due (by 9am)	March 16	March 21
Spring 10 Week Module Session 2		
Classes Begin	March 22	March 27
Classes End	May 21	May 26
Final Exams	May 24 - 28	May 29 - June 2
Final Grades Due (by 9am)	June 1	June 6

Spring 15 Week Session		
New Student Move-In	January 5	January 11
Returning Student Move-In	January 6	January 12
Classes Begin	January 7	January 13
Career Fair	TBA	TBA
February Break	February 18 - 21	February 24 - 25
Classes Resume	February 22	February 28
Midterm Grades Due	March 5	March 6
Spring Recess	March 15 - 19	March 13 - 17
Classes Resume	March 22	March 20
Enrollment For Fall Classes Begin	March 29	April 5
Classes End	April 23	April 28
Reading Days	April 26 - 27	May 1 - 2
Final Exams	April 28 - May 4	May 3 - 9
Final Grades Due (by 9am)	May 7	May 12
Spring 7.5 Week Residential MBA Module Session 1		
Classes Begin	January 7	January 13
Classes End	March 2	March 7
Final Exams	March 3 - 4	March 8 - 9
Final Grades Due (by 9am)	March 9	March 14

Graduate Health Sciences

The academic calendar for The Earl R. and Barbara D. Lewis School of Health Sciences programs includes the Doctor of Physical Therapy program, the Master of Science in Occupational Therapy program, and the Master of Science in Physician Assistant Studies program. Students should refer to their program handbook for specific information about clinical rotation or fieldwork schedules.

Fall Trimester 2026	
Occupational Therapy	
New Student Orientation	August 20-21
Classes Begin	August 24
Fall Recess	October 12 - 13
Classes Resume	October 14
Midterm Grades Due (12pm)	October 14
Thanksgiving Recess	November 26-28
Classes Resume	November 30
Last Day of Classes	December 4
Final Exams	December 7-11
Fall December Recognition Ceremony	December 12
Final Grades Due (9am)	December 14
Physician Assistant	
Clinical Begins	August 31
Classes Begin	September 8
Fall Recess	October 8 -12
Classes Resume	October 13
Thanksgiving Recess	November 26-28
Classes Resume	November 30
Last Day of Classes	December 4

Final Exams	December 7-11
Final Grades Due (9am)	December 14
Physical Therapy	
New Student Orientation	August 20-21
Classes Begin	August 24
Fall Recess	(2029 Cohort) October 12 - 13
Fall Recess	(2027 & 2028 Cohorts) October 15-16
Classes Resume	(2029 Cohort) October 14
Classes Resume	(2027 & 2028 Cohorts) October 19
Midterm Grades Due (12pm)	October 19
Thanksgiving Recess	November 26 - 28
Classes Resume	November 30
Last Day of Classes	(2028 & 2029 Cohorts) - December 11
Last Day of Classes	(2027 Cohort) - December 18
Final Exams	(2028 & 2029 Cohorts) - December 7-11
Final Grades Due (9am)	December 14

Spring Trimester 2027	
Occupational Therapy	
Classes Begin	January 4
Winter Recess	February 18-19
Classes Resume	February 22
Midterm Grades Due (12pm)	March 2
Spring Recess	March 15 – 19
All Classes Resume	March 22
Last Day of Classes (first years)	March 26
Last Day of Classes (second years)	April 23
Final Exams (second years)	April 26 - 30
Graduate Commencement Ceremony	May 6
Final Grades Due (9am)	May 7
Physician Assistant	
Orientation	January 5 - 6
Classes Begin	January 7
Clinical Rotation 1	February 8
Spring Recess	March 15 - 19
Classes Resume	March 22
Last Day of Classes	April 16
Final Exams (first years)	April 19 - 23
Final Grades Due (9am)	May 7
Physical Therapy	
Classes Begin	January 7
Winter Recess	February 4 - 5

Classes Resume	February 8
Midterm Grades Due (12pm, noon)	March 5
Spring Recess	March 15 - 19
Classes Resume	March 22
Last Day of Classes	April 30
Final Exams	May 3 - 5
Graduate Commencement Ceremony	May 6
Final Grades Due (9am)	May 7

DEGREE PROGRAMS AND HEGIS CODES

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

Graduate Degree Programs

Program	Degree(s)	HEGIS Code
Applied Data Science	MS	0702
Basic Science	MS	4902
Biomedical Engineering	MS	0905
Bioscience & Biotechnology (Interdisciplinary)	MS, PhD	0499
Business Administration	MBA	0506
Business Analytics	MBA	0503
Chemical Engineering	MS, PhD	0906
Chemistry	MS, PhD	1905
Construction Engineering Management	MS	0908
Civil and Environmental Engineering	MS, PhD	0908
Computer Science (Interdisciplinary)	MS, PhD	0701
Electrical and Computer Engineering	MS, PhD	0909
Engineering Management (Interdisciplinary)	MS	0913
Engineering Science	MS, PhD	0901
Environmental Policy (Interdisciplinary)	MS	0420
Environmental Science & Engineering (Interdisciplinary)	MS, PhD	0922
Global Supply Chain Management	MBA	0506
Healthcare Data Analytics	MS	1202
Healthcare Management	MBA	1202

Leadership in Medicine- Clinical Leadership in Healthcare Management	MS	1202
Leadership in Medicine - Healthcare Management	MBA	1202
Materials Science and Engineering	PhD	0915
Mathematics	MS, PhD	1701
Mechanical Engineering	MS, PhD	0910
Occupational Therapy	MS	1208
Physical Therapy	DPT	1212
Physician Assistant Studies	MS	1299.1
Physics	MS, PhD	1902

Advanced Certificate Programs

Program	HEGIS Code
Bioethics	0499
Business Fundamentals	0506
Business of Energy	4904
Construction Engineering Management	0908
Environmental Management	0501
Global Supply Chain Management	0501
Healthcare Management	1202
Human Resource Management	0515
Innovation and New Venture Management	0501
Management and Leadership	0506
Power Systems Engineering	0909

Undergraduate Degree Programs

Program	Degree	HEGIS Code
Aerospace Engineering	BS	0902
Applied Mathematics and Statistics	BS	1703
Biochemistry	BS	0499
Biology	BS	0401
Business Administration	BS	0501
Business Analytics	BS	0503
Business of Biotechnology	BS	0499
Chemical Engineering	BS	0906
Chemistry	BS	1905
Civil Engineering	BS	0908
Communication	BS	0601
Computer Engineering	BS	0999
Computer Science	BS	0701
Data Science	BS	1703
Digital Arts and Sciences	BS	0605
Electrical Engineering	BS	0909
Engineering and Management	BS	4904
Environmental Engineering	BS	0922
Environmental Science and Sustainability	BS	0420
Financial Information and Analysis	BS	0504
Global Supply Chain Management	BS	0509
Healthcare	BS	1201

Healthcare Business	BS	1202
History	BS	2205
Individually Designed Program	BPS	4999
Innovation and Entrepreneurship	BS	0506
Interdisciplinary Liberal Studies	BS	4901
Interdisciplinary Social Sciences	BS	2201
Literature	BS	1501
Mathematics	BS	1701
Mechanical Engineering	BS	0910
Neuroscience	BS	0425
Physics	BS	1902
Political Science	BS	2207
Psychology	BS	2001
Sociology	BS	2208
Software Engineering	BS	0999