Clarkson University is a nationally ranked research university and the institution of choice for more than 4,000 enterprising, high-ability scholars from diverse backgrounds who embrace challenge and thrive in a rigorous, highly collaborative learning environment. We add value to our students’ education by partnering with leading businesses, industries, and thought leaders to bring relevance to the challenges and needs of a modern world in which the boundaries of knowledge, discipline, nations, and cultures blur. We encourage students to question the status quo, push the limits of what is known, and to apply their ingenuity to develop fresh solutions to real-world challenges. For more than 100 years, our graduates have achieved extraordinary professional success, risen to societal challenges, and advanced the global economy ethically and responsibly. Among our 38,000 alumni, one in five is a CEO, senior executive or owner of a company.

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

The University also includes The Capital Region Campus for graduate education in Schenectady, New York, and The Beacon Institute for Rivers and Estuaries for environmental research and education in Beacon, New York.

Clarkson's educational strengths include:
- rigorous professional preparation
- dynamic, real-world learning
- highly collaborative community
- teamwork that spans disciplines

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

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.

Courses
Typical courses for each department are listed in this catalog, but not all courses are offered each year. Descriptions of courses and terms in which specific course are offered are accessible in PeopleSoft. Viewing Clarkson’s searchable course catalog will give up-to-date course descriptions, pre- or co-requisites, course attributes, and other information pertaining to all courses offered. Clarkson’s browse course catalog can be viewed through Clarkson’s website. There is no login required - just select the term and year that you are interested in viewing.

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 David D. Reh School of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB), and 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 has been granted Candidacy Status by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA). Clarkson University is currently pursuing accreditation of its educator preparation programs by the Association for Advancing Quality in Educator Preparation (AAQEP). Pursuant to §52.21 of the Regulations of the Commissioner of Education, the educator preparation programs offered by Clarkson University are considered to be continuously accredited for purposes of meeting the New York State requirement that all such programs maintain continuous accreditation. Additionally, the University’s 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.
## CONTENTS

GRADUATE ADMISSIONS .............................................................................................................. 6
A BRIEF HISTORY OF CLARKSON .............................................................................................. 7
GRADUATE DEGREE AND ADVANCED CERTIFICATE PROGRAMS .......................................... 9
ACADEMIC AFFAIRS ..................................................................................................................... 11
  The OFFICE of the PROVOST .................................................................................................. 11
  Clarkson Ignite ......................................................................................................................... 11
  The Associated Colleges Consortium ...................................................................................... 11
  University Libraries ................................................................................................................. 13
THE GRADUATE SCHOOL ............................................................................................................. 14
  Graduate School Admissions .................................................................................................. 14
  Admission Graduate School Policy for Current Undergraduate Clarkson Students ............. 14
  International Applicant Language Verification Requirements ............................................... 15
  Degree Requirements and Academic Policies for Graduate Students ................................. 15
  Grading System ....................................................................................................................... 19
  Graduate Student Academic Standing and Separation Policy .............................................. 20
    Minimum Cumulative GPA Standards .................................................................................. 21
  Graduate Health Sciences Student Academic Standing and Separation Policy ..................... 22
  Graduate Student Degree Conferral and Commencement Policies ...................................... 23
  Expenses, Financial Assistance, Student Status ...................................................................... 25
CHIEF INCLUSION OFFICE ......................................................................................................... 33
GRADUATE STUDENT AFFAIRS ................................................................................................. 33
  Clarkson Regulations ............................................................................................................. 33
  Orientation .............................................................................................................................. 33
  Clarkson University Graduate Student Association (CUGSA) ............................................. 34
  Graduate Housing and Dining ............................................................................................... 34
  Extracurricular Activities, Cultural, and Recreational Opportunities .................................. 34
  Religious and Spiritual Life ..................................................................................................... 34
  Student Center & Graduate Student Lounge/ Atriums ......................................................... 34
  Cheel Arena on the Potsdam Campus .................................................................................... 35
  Student Success Center ......................................................................................................... 35
  Health & Counseling Center ................................................................................................. 35
  Office of AccessABILITY Services ....................................................................................... 36
CAREER CENTER & EXPERIENTIAL LEARNING .................................................................. 36
INTERNATIONAL CENTER ........................................................................................................ 37
CAMPUS SAFETY AND SECURITY ......................................................................................... 39
ALUMNI ASSOCIATION ............................................................................................................ 40
ATHLETICS ................................................................................................................................ 41
OFFICE OF INFORMATION TECHNOLOGY .......................................................................... 42
SCHOOL OF ARTS & SCIENCES ............................................................................................... 43
  Basic Science Program ......................................................................................................... 43
    Biology Option .................................................................................................................... 43
    Robotics and Intelligent Systems Option .......................................................................... 44
  Chemistry Programs ............................................................................................................ 47
  Computer Science Program ................................................................................................. 50
  Mathematics Program ........................................................................................................... 53
Physics Programs ........................................................................................................... 57
DAVID D. REH SCHOOL OF BUSINESS GRADUATE PROGRAMS ........................................... 60
The Master of Business Administration (MBA) Programs ........................................... 61
  Residential MBA ........................................................................................................ 61
  Online MBA Program ......................................................................................... 64
MBA – Healthcare Management Program ................................................................. 65
Healthcare Data Analytics MS .................................................................................. 67
Clinical Leadership MS ........................................................................................... 68
Master of Science in Supply Chain Management Program ......................................... 69
Joint Programs: Clarkson University Capital Region Campus .................................... 71
  Accelerated BA or BS at Union College and MBA Program (with Union College) ... 71
  Four-Year JD/MBA Program (with Albany Law School) ......................................... 71
  Joint PharmD /MBA in Healthcare Management .................................................. 71
  Joint BS Pharmaceutical Science /MBA in Healthcare Management ................... 71
  Joint PharmD / MS in Clinical Leadership ............................................................ 72
  Joint BS Pharmaceutical Science / MS in Clinical Leadership ............................ 72
  Leadership in Medicine (LIM) / MBA in Healthcare Management ..................... 72
  Leadership in Medicine (LIM) / MS in Clinical Leadership ................................... 73
  Joint MD/MBA in Healthcare Management ........................................................... 74
Certificates of Advanced Study – Online and Capital Region Campus ....................... 75
  Certificate Pathway to MBA Admission ................................................................. 75
  Certificate in Global Supply Chain Management ................................................. 75
  Certificate in Human Resource Management ...................................................... 76
  Certificate in Management and Leadership ......................................................... 76
  Certificate in Healthcare Management ................................................................. 77
  Certificate in Business Fundamentals ................................................................. 77
The Reh Center for Innovation and Entrepreneurship ................................................. 78
WALLACE H. COULTER SCHOOL OF ENGINEERING .......................................................... 79
  Biomedical Engineering Masters of Science ......................................................... 81
  Chemical and Biomolecular Engineering Graduate Programs ............................ 84
  Civil and Environmental Engineering (CEE) Programs ......................................... 89
  Construction Engineering Management (CEM) ..................................................... 94
  Electrical and Computer Engineering (ECE) Programs ......................................... 96
  Mechanical Engineering Programs ....................................................................... 102
  Energy Systems Programs ..................................................................................... 108
  Engineering & Management Systems Program .................................................... 111
  Business of Energy Programs ................................................................................ 113
  Master of Science in The Business of Energy Program ......................................... 114
INSTITUTE FOR A SUSTAINABLE ENVIRONMENT .......................................................... 116
  MS and PhD in Environmental Science and Engineering ....................................... 117
  MS in Environmental Policy .................................................................................. 119
INSTITUTE FOR STEM EDUCATION AND DEPARTMENT OF EDUCATION .................... 121
  Masters of Arts in Teaching ..................................................................................... 121
  Master of Arts in Teaching Business and Marketing ........................................... 125
  Pre-Teaching Program ........................................................................................... 125
THE EARL R. and BARBARA D. LEWIS SCHOOL of HEALTH SCIENCES ......................... 126
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Occupational Therapy</td>
<td>126</td>
</tr>
<tr>
<td>Masters of Science Physician Assistant Studies Program</td>
<td>135</td>
</tr>
<tr>
<td>Doctor of Physical Therapy Program</td>
<td>143</td>
</tr>
<tr>
<td>INTERDISCIPLINARY PROGRAMS</td>
<td>148</td>
</tr>
<tr>
<td>Bioethics Program</td>
<td>148</td>
</tr>
<tr>
<td>Interdisciplinary Bioscience and Biotechnology Programs</td>
<td>151</td>
</tr>
<tr>
<td>MS in Computer Science Program</td>
<td>154</td>
</tr>
<tr>
<td>Data Analytics MS</td>
<td>156</td>
</tr>
<tr>
<td>Master of Science in Data Analytics (MSDA) degree/Master of Business Administration (MBA)</td>
<td>158</td>
</tr>
<tr>
<td>Engineering Science Programs</td>
<td>162</td>
</tr>
<tr>
<td>Master of Science in Engineering Management</td>
<td>164</td>
</tr>
<tr>
<td>Materials Science &amp; Engineering PhD Program</td>
<td>166</td>
</tr>
<tr>
<td>Master of Science in Environmental Policy (MS)/Master of Business Administration Dual Degree</td>
<td>168</td>
</tr>
<tr>
<td>SPONSORED RESEARCH SERVICES</td>
<td>171</td>
</tr>
<tr>
<td>The Shipley Center for Innovation</td>
<td>171</td>
</tr>
<tr>
<td>ACADEMIC CENTERS</td>
<td>172</td>
</tr>
<tr>
<td>Center for Advanced Materials Processing (CAMP)</td>
<td>172</td>
</tr>
<tr>
<td>Center for Air and Aquatic Resources Engineering and Sciences (CAARES)</td>
<td>173</td>
</tr>
<tr>
<td>Center for Rehabilitation Engineering, Science, and Technology (CREST)</td>
<td>174</td>
</tr>
<tr>
<td>Center for Identification Technology Research (CITeR)</td>
<td>175</td>
</tr>
<tr>
<td>Center for Metamaterials</td>
<td>176</td>
</tr>
<tr>
<td>Center for Complex Systems Science</td>
<td>177</td>
</tr>
<tr>
<td>Center for Electric Power Systems</td>
<td>179</td>
</tr>
<tr>
<td>THE REGISTER</td>
<td>180</td>
</tr>
<tr>
<td>Board of Trustees</td>
<td>180</td>
</tr>
<tr>
<td>Members of the Board of Trustees</td>
<td>180</td>
</tr>
<tr>
<td>Administration</td>
<td>183</td>
</tr>
<tr>
<td>Faculty Directory</td>
<td>191</td>
</tr>
<tr>
<td>ACADEMIC CALENDARS</td>
<td>212</td>
</tr>
<tr>
<td>Semester Programs</td>
<td>212</td>
</tr>
<tr>
<td>The Earl R. and Barbara D. Lewis School of Health Sciences</td>
<td>215</td>
</tr>
<tr>
<td>Quarter Programs</td>
<td>217</td>
</tr>
<tr>
<td>POLICIES</td>
<td>219</td>
</tr>
<tr>
<td>Clarkson University Non-Discrimination Policy</td>
<td>219</td>
</tr>
<tr>
<td>Student Complaint Process (HEOA)</td>
<td>219</td>
</tr>
<tr>
<td>Campus Crime Statistics</td>
<td>219</td>
</tr>
<tr>
<td>Protection of Privacy</td>
<td>220</td>
</tr>
<tr>
<td>Nonimmigrant Students</td>
<td>220</td>
</tr>
<tr>
<td>Student Regulations</td>
<td>220</td>
</tr>
<tr>
<td>LIST OF GRADUATE PROGRAMS/CERTIFICATES &amp; HEGIS CODES</td>
<td>221</td>
</tr>
</tbody>
</table>
GRADUATE ADMISSIONS
Clarkson University Graduate School Admissions
518-631-9831
graduate@clarkson.edu

School of Arts & Sciences Programs
315-268-3802
sciencegrad@clarkson.edu

David D. Reh School of Business Programs
315-268-6613
busgrad@clarkson.edu

Wallace H. Coulter School of Engineering Programs
315-268-7929
enggrad@clarkson.edu

Institute for a Sustainable Environment (ISE) Programs
315-268-3856
ise@clarkson.edu

Institute for STEM Education
315-268-6544
csmith@clarkson.edu

Physician Assistant Studies Program
315-268-2161
athompso@clarkson.edu

Physical Therapy Program
315-268-3786
bashley@clarkson.edu

Occupational Therapy Program
315-268-4476
jzoanett@clarkson.edu
A BRIEF HISTORY OF CLARKSON
(The following summary has been excerpted largely from *A Clarkson Mosaic*, a history written by Professor Emeritus Bradford B. Broughton in conjunction with the institution’s 1996 Centennial.)

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

Choosing as their rationale a phrase which his sisters and nieces felt aptly described their brother-Thomas’ favorite Biblical quotation, A workman that needeth not to be ashamed- the family opened the Thomas S. Clarkson Memorial School of Technology in September 1896, in the Main Building (“Old Main”) which they commissioned to be built on Main Street. To the five young men in the preparatory class, eight men and four women in the freshman class, six courses of instruction were offered: electrical engineering, domestic science, art, machine work and smiting, woodwork and pattern making, and normal manual training. By 1907 the school was offering additional bachelor’s degrees in mechanical, civil, and chemical engineering.

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

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

Hockey began in 1919 on a rink behind Old Main, and soon moved to a bigger rink built by the students in Ives Park. Not until the hockey arena was completed on land across the river in 1938 did the team have a building in which to play. That facility was later named for the founding force behind Clarkson hockey, Murray Walker, owner of Weston’s Bookstore. Walker Arena provided home ice for Clarkson teams, which have frequently achieved national ranking, until Chee1 Arena was completed in 1991. The Women’s Hockey Team is 3 time NCAA national champions in 2014, 2017, and 2018.

Thomas Clarkson’s nieces, Miss Annie Clarkson and Miss Emily Moore, tried to have the entire school moved to a new campus on a hill outside of Potsdam (hence the nickname, the “hill campus”), with a gift of $1.5 million in 1929. However, because that money shrank to half a million within a year due to the stock market crash, the plans for the move had to be shelved for over 30 years. Since then, the campus has moved almost entirely to the hill, although some administrative offices and the programs in health sciences remain on the original downtown Potsdam campus.

Responding to a plea from New York Governor Thomas Dewey after World War II, Clarkson admitted hundreds of returning veterans. Having no space to house or teach them by 1946, Clarkson rented the New York State School for the Deaf in Malone, N.Y., 40 miles east of Potsdam. For the next five years,
freshmen and many sophomores spent their first two years in Malone before moving to the Potsdam campus for the remainder of their Clarkson education. That branch closed in 1951.

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

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

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

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

In the spring of 1999, Clarkson Hall was renovated and rededicated as the Center for Health Sciences, now known as The Earl R. and Barbara D. Lewis School of Health Sciences. This downtown facility now houses the University’s programs in Occupational Therapy, Physical Therapy, and Physician Assistant Studies. The newest academic building, Bertrand H. Snell Hall, opened on the hill campus for the fall 2000 semester. A wing of biochemistry laboratories was added to the Cora and Bayard Clarkson Science Center and opened in fall 2005. The Technology Advancement Center (TAC), an 18,000-square-foot addition connecting the Schuler Educational Resources Center and the Cora and Bayard Clarkson Science Center, was completed in fall 2008. A new Student Center was completed in August 2010 and connects all academic buildings. In 2017, #ClarksonIgnite was introduced as a new approach and catalyst for exploring, creating and achieving what’s next. Through a renovation to the Schuler Educational Resource Center, an Innovation Hub was created to ignite connections across academic disciplines, cultures and industries to create the entrepreneurial mindset, knowledge and intellectual curiosity needed to innovate world relevant solutions.

In 2016 The University welcomed a Graduate School campus in Schenectady, New York that takes advantage of all that New York’s Capital Region has to offer. Like Potsdam, Schenectady has a large collegiate presence (Union College and Schenectady Community College in the same city) as well as many other educational institutions, research institutes and government think tanks.
GRADUATE DEGREE AND ADVANCED CERTIFICATE PROGRAMS
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.

Clarkson University offers the following:

Adolescence Education 7-12 MAT
Basic Science MS
Bioethics MS
Biomedical Engineering MS
Business Administration MBA
Business and Marketing Education MAT
Business of Energy MS
Chemical Engineering MS, PhD
Chemistry MS, PhD
Civil & Environmental Engineering MS, PhD
Clinical Leadership in Healthcare Management MS
Computer Science MS, PhD
Data Analytics MS
Electrical and Computer Engineering PhD
Electrical Engineering MS
Energy Systems MS
Engineering and Management Systems MS
Engineering Management MS
Engineering Science MS, PhD
Environmental Policy MS
Environmental Science & Engineering MS, PhD
Healthcare Data Analytics MS
Healthcare Management MBA
Interdisciplinary Bioscience & Biotechnology MS, PhD
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
Supply Chain Management MS
Teaching of English to Speakers of Other Languages MAT
Technology Education K-12 MAT
Certificates
Bioethics Certificate
Business Fundamentals Certificate
Business of Energy Certificate
Construction Engineering Management Certificate
Environmental Management Certificate
Global Supply Chain Management Certificate
Healthcare Management Certificate
Human Resource Management Certificate
Innovation and New Venture Management Certificate
Management and Leadership Certificate
National Board Certification and Teacher Leadership
Power Systems Engineering Certificate
Six Sigma Certificate
Supply Chain Management
Teaching English to Speakers of Other Languages Certificate
Teacher Leadership and Service Learning
Teacher Leadership and Mentoring
ACADEMIC AFFAIRS

The OFFICE of the PROVOST
Robyn Hannigan, Provost
Amanda Pickering, Executive Director of Academic Affairs
Christopher Robinson, Associate Provost for Faculty Achievement

The Office of the Provost supports the many functions that contribute to the academic mission of the University through teaching, research and scholarship, and academic service. Fostering a vibrant academic community that promotes learning, inspires innovation and entrepreneurship, and actively seeks diversity across the portfolio, the Office is responsible for vision and guidance in ensuring excellence in academic programs, standards, and processes. The Provost Office ensures the presence of the highest quality faculty, relevant academic program offerings with the highest standard of student learning outcomes, and develops leadership at various levels of the academic organization.

Clarkson Ignite
Erin Draper, Managing Director
draper@clarkson.edu
Ann Barrett, Program Coordinator
abarrett@clarkson.edu

Clarkson Ignite serves the entire campus as an innovation ecosystem that connects students, faculty, staff, alumni, and community leaders to gain critical hands-on creative experience. How? Through shared spaces and programming aimed at stimulating intellectual curiosity, developing entrepreneurial mindsets and skillsets, expanding firsthand learning and making experiences, and forging social and professional connections.

Clarkson Ignite works to instill new ways of thinking and doing in all Clarkson students. The Ignite ecosystem encompasses five key elements: curriculum, extracurricular activities, research, making, and business incubation through the Shipley Center for Innovation. The ecosystem includes the Innovation Hub located in the Andrew S. Schuler Education Resources Center home of group collaboration space, the Makerspace, the Digital Making Suite, and the Studio which is located in Bertrand H. Snell Hall.

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, and 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. Graduate students must receive a grade equivalent to a B (3.000) or higher at Clarkson. Grades in such courses are not used in computing a student’s GPA. If cross-registration credits results in a course load requiring additional tuition charges, the student is responsible for those additional charges.
University Libraries
Michelle L. Young, Dean of Libraries/ Associate Professor
myoung@clarkson.edu office 315-268-4268, mobile 315-323-7910

The University Libraries supports Clarkson University’s mission by promoting academic excellence through the implementation of programs, policies, and strategies geared towards the innovative vision of libraries in the 21st century in support of teaching and research. To achieve excellence, we provide high-level information literacy instruction, reference and research assistance, and run a robust access services model allowing our clientele to access resources both inside and outside of our collection. All of the University Libraries resources and services are available to all students, faculty, staff, or other affiliated persons regardless of their location as we serve a distance and local clientele who interact with the Potsdam and capitol region campuses as well as other affiliate locations.

The Harriet Call Burnap Memorial Library is the main library located on the Potsdam hill campus in the Educational Resources Center (ERC). Its collection is comprised of materials in various formats including journals, books, audio visual materials, government documents and reports, Clarkson University dissertations, and archival materials. The Health Science Library is the University Libraries’ branch library and is located in the The Earl R. and Barbara D. Lewis School of Health Sciences (Clarkson Hall) on the downtown Potsdam campus. This unique collection serves the University’s allied health programs as well as the local health industry.
THE GRADUATE SCHOOL
Clarkson offers programs of study during the regular academic year leading to the Master of Business Administration, Master of Engineering, Master of Science, Master of Arts in Teaching, 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.

Graduate School Admissions
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 NYS Office of Professions (http://www.op.nysed.gov/prof/pels/) for more information.

Applicants for most graduate programs in science, engineering and interdisciplinary programs are required to take the Graduate Record Examinations (GRE); some programs including those in the David D. Reh School of Business may require a Graduate Management Admission Test (GMAT) score.

All admission decisions must be approved by the applicant’s departmental graduate representative, by the director of the program and/or the dean of the appropriate school. While there is a rolling admission policy, and all applications will be reviewed up to a reasonable time prior to the beginning of classes, it is recommended that students requesting financial aid apply by January 30 for the fall 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 students applying to the one-year MAT program which begins in the summer, complete applications must be received no later than April 1st. For students applying for the two-year MAT program that begins in the Fall term, applications are due by June 1st. For applications and other inquiries about the status of an application, contact the specific department 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. Such students would likely participate in undergraduate research experiences and would have identified a graduate advisor prior to baccalaureate graduation. These students may accelerate their undergraduate course of study to graduate early and begin their graduate work as soon as possible. Please contact Graduate Admissions at graduate@clarkson.edu or (518) 631-9831 for further instructions. Superior Clarkson undergraduate students, with the
permission of their department chair and the dean of the appropriate School, may enroll in graduate courses. When such courses are completed with a grade of C or better beyond the normal credit hour requirements for the bachelor’s degree, credit may be applied toward a graduate degree.

**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](http://www.toefl.org)
- DET (Duolingo English Test): [https://englishtest.duolingo.com/](https://englishtest.duolingo.com/)

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
- ELTS band score of 6.5
- PTE score of 56
- DET score of 115 (or 61 on pre-July 2019 exam scoring)

A TOEFL/IELTS/PTE/DET 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 official 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. Applications to the MAT program may be required to complete an additional English language proficiency interview.

**Degree Requirements and Academic Policies for Graduate Students**

**Requirements for the Master’s Degree**

*Note: This section does not apply to students in The Earl R. and Barbara D. Lewis School of Health Sciences Programs (MS in Physician Assistant Studies and MS in Occupational Therapy) or to the*
Masters of Arts in Teaching. 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 department office for details.

1. A minimum of 30 credit hours of graduate coursework, as follows
   a. At least 20 credit hours of course and seminar work. The balance of coursework must be consistent with the research or professional experience component.
   b. Only courses numbered 500 and above are accepted for graduate credit.
   c. 10 credit hours of transfer credit (B grade or better) may be accepted, 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 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. After approval by the examining committee, a thesis requires signature approval by the Dean of The Graduate School, and two copies of the thesis will be deposited in the University Library.
   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.

Requirements for the Doctoral Degree
The minimum requirements for all students in Doctor of Philosophy (PhD) degree programs are described below. Please consult your departmental 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 department chair and dean of the respective school. The committee will consist of a minimum of five members. The members should include at least four Clarkson faculty of assistant professor rank or higher and possessing an earned doctoral degree. At least one of the members must be from a department other than the candidate’s major department. With the approval of the Provost, an external examiner with appropriate credentials from another University or industry may also be appointed to serve as one of the five committee members. This committee will judge the technical competence of the dissertation and the oral presentation. Final completion paperwork and an electronic copy of the accepted dissertation (on CD) must be received in the student’s School office no later than 10 working days before commencement to confer degrees to qualify a student to receive a degree at the end of the spring semester. Before final submission of the PhD dissertation, each student will be responsible for submitting their dissertation for publication, and paying any associated fees.*

*For information and assistance, contact the Graduate Coordinator in your school's office.
Grading System
The grades A+, A, A-, B+, B, B-, C+, C, and P are acceptable for credit toward the degree. For graduation, an average of B or better must be earned in non-dissertation courses and seminar work. The grade of P will not affect the average. Students failing to perform satisfactorily will be separated from the University (see Graduate Student Academic Standing and Separation Policy).

Graduate Grade Definitions

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Passed with 4.000 quality points per credit hour</td>
</tr>
<tr>
<td>A</td>
<td>Passed with 4.000 quality points per credit hour</td>
</tr>
<tr>
<td>A-</td>
<td>Passed with 3.667 quality points per credit hour</td>
</tr>
<tr>
<td>B+</td>
<td>Passed with 3.334 quality points per credit hour</td>
</tr>
<tr>
<td>B</td>
<td>Passed with 3.000 quality points per credit hour</td>
</tr>
<tr>
<td>B-</td>
<td>Passed with 2.667 quality points per credit hour</td>
</tr>
<tr>
<td>C+</td>
<td>Passed with 2.334 quality points per credit hour</td>
</tr>
<tr>
<td>C</td>
<td>Lowest passing grade with 2.000 quality points per credit hour</td>
</tr>
<tr>
<td>F</td>
<td>Failed with 0.000 quality points per credit hour</td>
</tr>
<tr>
<td>P</td>
<td>Passing: this grade may be employed for seminar courses and other courses for which P/NC grading has been designated. It may also be employed for special projects, and under limited circumstances for MS thesis credits. Approval for a P grade for project or thesis credit requires the approval of the department chair, (or comparable administrative unit), Dean of the school, and the Dean of the Graduate School or Provost.</td>
</tr>
<tr>
<td>NC</td>
<td>No credit. This grade is used in seminar courses and other cases for which P/NC grading has been designated. It indicates performance below the level required to maintain progress toward completion of degree requirements.</td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory progress towards the completion of on-going project, thesis, or dissertation work for the semester. The S grade is removed and replaced with a P grade when the final report, thesis or dissertation is accepted by the Graduate School.</td>
</tr>
<tr>
<td>U</td>
<td>Unsatisfactory progress towards the completion of on-going project, thesis, or dissertation work for the semester. The U grade is removed and replaced with a P grade when the final report, thesis or dissertation is accepted by the Graduate School.</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete grade: given only in cases described in the paragraph below. An I grade must be replaced by one of the above letter grades as required by the rules in the paragraph below.</td>
</tr>
<tr>
<td>Z</td>
<td>Course Audit. Audited courses carry no grade points or credits, and cannot be used to satisfy degree requirements.</td>
</tr>
<tr>
<td>W</td>
<td>Course withdrawal. A grade of W indicates the course was dropped during weeks 5 through 10 of the regular fall and spring semesters. The Registrar sets comparable dates for Summer school and other terms that are not a regular fall and spring semester.</td>
</tr>
<tr>
<td>LW</td>
<td>Late Course Withdrawal. A grade of LW indicates the course was dropped during weeks 10 through 15 of the regular fall and spring semesters. The Registrar sets comparable dates for Summer school and other terms that are not a regular fall and spring semester.</td>
</tr>
<tr>
<td>WA</td>
<td>Waived Course with credits</td>
</tr>
<tr>
<td>WR</td>
<td>Waived with replacement, no credit or quality points</td>
</tr>
</tbody>
</table>

Incomplete Grades
The grade of incomplete (I) is a temporary grade given when a student is unable to complete a course by the end of the academic term due to circumstances that are considered extenuating and beyond the student's control, and can be documented. Incomplete grades can only be given in all of the following conditions have been met:

1. The student has documented extenuating circumstances;
2. The student has completed at least 75% of the course, and has no academic integrity violations for the current term;
3. The student's academic performance to date indicates an ability to pass the course, and;
4. The student has submitted their request for an incomplete grade no later than the last day of the academic term in which they wish to take an incomplete.

Incomplete grades are contingent upon instructor approval, and instructors are under no obligation to grant them. In cases where an incomplete grade is to be considered, the following provisions apply:

1. The student must submit a request for an incomplete (I) grade to the course instructor no later than the last day of the term on an Incomplete Grade Request Form. If a student is unable to submit a request for an incomplete (I) grade, the Dean of Students may submit the request on the student's behalf.
   a. In cases where normal practice requires extension of course requirements beyond the end of the term (such as travel, fieldwork, or professional experience), a grade of incomplete may be assigned without need for individual student request, with instructor and department chair approval.

2. Instructors who approve of the request for an incomplete grade must outline the work required to successfully complete the course, as well as designate a deadline for the work to be completed. Whenever possible, the deadline should be no later than two weeks into the following term.
   a. If the faculty member disapproves the request, they shall submit the grade earned for the student at the end of the term.

3. All students seeking more than two incomplete (I) grades in the same semester must consult with the Dean of Students and, if directed to do so, with the Director of University Advising and/or their SAS Rep, prior to seeking faculty approval for their requests.
4. The assignment of an incomplete (I) grade will be made by the Registrar's office upon receipt of a complete and approved Incomplete Grade Request form. The form must be received by the Registrar's office before the grading due-date, otherwise the course instructor shall submit the grade earned by the student.

To remove an incomplete (I) grade, the instructor shall submit a completed Change of Grade form to their department chair (or comparable administrative officer), and upon approval, it is sent to Student Administrative Services. Then the specified grade shall replace the "I" grade in the term in which the student registered for the course.

1. If a Change of Grade form is not received within five (5) business days from the deadline specified on the Incomplete Grade Request form, then a grade of "F" is recorded.

If the student does not complete the work required to resolve the incomplete grade by the deadline specified on the Incomplete Grade Request form, then a grade of "F" is recorded.

**Graduate Student Academic Standing and Separation Policy**

**Note:** This section applies to students in graduate Business, Engineering, and Interdisciplinary programs. Students in other degree programs should consult their program handbooks for the policy and procedures regarding academic standing and separation.

Clarkson graduate students are regarded as in “academic good standing” if they satisfy two conditions:

1. A minimum Cumulative Grade Point Average (GPA) (see below section) and,
2. Satisfactory progress toward the degree (see below section).
### Minimum Cumulative GPA Standards

<table>
<thead>
<tr>
<th>Academic good standing</th>
<th>Students are in academic good standing if they have a minimum 3.000 Cumulative GPA. The Cumulative GPA is calculated at the end of each term.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic warning</td>
<td>Students in good academic standing whose Cumulative GPA falls below a 3.000 will be placed on academic warning. Students on academic warning whose Cumulative GPA is 3.000 or higher at the end of their next term will return to academic good standing. Students on academic warning whose Cumulative GPA falls between a 2.700 and 2.999 at the end of their next term will remain on academic warning.</td>
</tr>
<tr>
<td>Academic separation</td>
<td>Students on academic warning whose Cumulative GPA is below a 2.700 at the end of their next term will be separated from the University, and this separation will be recorded on the official transcript.</td>
</tr>
</tbody>
</table>

Academic standing status for past terms is not modified based on future GPA changes due to courses being repeated or omitted from the cumulative GPA.

### Continuance

Students who are separated from the University by the process described above, may not enroll in future terms until so approved by the Graduate School’s Readmission and Continuance Committee. Appeals to this committee for continuance must be made in writing by the student, following the guidelines and deadlines set forth in the Notice of Academic Separation sent to the student. The decision must be given to the student and the Registrar within the published time frame. If continued, students are placed on academic warning for the term into which they are continued.

### Satisfactory Progress

In addition, graduate students are required to maintain satisfactory academic progress. In order to maintain satisfactory academic progress, students must be able to complete their degree within the published maximum timeframe allowed for that particular degree. Multiple factors determine this:

1. The courses and other academic requirements remaining to complete the degree program.
2. The time remaining to complete these.
3. Other program/degree requirements.
4. The mathematical possibility of achieving the 3.000 Cumulative GPA required for graduation.

Academic progress is evaluated at the end of each term by the appropriate Graduate Coordinator and Program Administrator(s).

Students who are determined not to be maintaining satisfactory academic progress will be separated from the University.

Thesis-based students who have completed all coursework and received two consecutive terms of unsatisfactory progress may be dismissed following evaluation by the Graduate School’s evaluation committee.

The designated responsible administrator shall notify the students and the Registrar of separations within 5 business days of the decision. Separation will be recorded on the official transcript.
Graduate Health Sciences Student Academic Standing and Separation Policy

Academic standing in the The Earl R. and Barbara D. Lewis School of Health Sciences programs (MS in Occupational Therapy, DPT in Physical Therapy, MS Physician Assistant Studies) at Clarkson University encompasses academic course work, clinical skills, and professional behaviors.

Clarkson graduate students in the The Earl R. and Barbara D. Lewis School of Health Sciences program are regarded as in “academic good standing” if they satisfy two conditions:

1. A minimum Cumulative Grade Point Average (GPA) (see below section) and,
2. Satisfactory progress toward the degree (see below section).

Minimum Cumulative GPA Standards

<table>
<thead>
<tr>
<th>Academic good standing</th>
<th>Students are in academic good standing if they have a minimum 3.000 Cumulative GPA. The Cumulative GPA is calculated at the end of each term.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic warning</td>
<td>Students in good academic standing whose Cumulative GPA falls below a 3.000 will be placed on academic warning. Students may also be placed on academic warning for not meeting department professional behavior standards. Students on academic warning whose Cumulative GPA is 3.000 or higher at the end of their next term will return to academic good standing.</td>
</tr>
</tbody>
</table>
| Academic separation    | Students will be separated from the University for any one or more of the following:

1. The student is on academic warning and has a Cumulative GPA below 2.700 at the end of the term following initial placement on academic warning.
2. The student receives a grade below a C in any course.
   a. Students in the Physician Assistant Studies program may receive a grade below a C on 1 full-time clinical education course. In this case, students must petition the department to continue in the program and will need to retake the full-time clinical education course.
3. The student receives a grade of No Credit (NC) in a full time or integrated clinical education course.
4. The student demonstrates professional behaviors that violate the profession’s code of ethics.
5. The student is on academic warning for more than a total of 2 semesters.
6. The student withdraws from a course because he/she will not be able to satisfactorily pass the course. |

Continuance

Academic progress is evaluated at the end of each term and/or course by the appropriate program faculty. Students are notified as to their academic standing within 5 business days of completion of the semester or course by the appropriate department.
Students who are determined not to be meeting minimum GPA requirements or not maintaining satisfactory academic progress will be separated from the University. Students and the Registrar will be notified within 5 business days of completion of the academic term or course by the appropriate department. Students who are separated from the University by the process described above may not enroll in future terms.

Students who are separated from the University may appeal the decision in writing to the Graduate School’s Readmission and Continuance Committee within 3 business days of receiving notification of separation from the University. For students in the professional The Earl R. and Barbara D. Lewis School of Health Sciences programs, the committee shall consist of the Dean or Associate Dean of Arts and Sciences or Dean of Students (or his/ her designee), and one faculty member from each of the graduate professional Health Science programs. The chair of the program in which the student was enrolled will serve on the committee to provide information, but will not be a voting member. The committee will review all appropriate information and provide a decision to the student regarding the appeal within 5 business days of receipt of the appeal. If allowed to continue in the program, the student is placed on academic warning for the term into which they are continued and may need to develop an approved action plan to support their academic progress in subsequent terms. Academic standing status for past terms is not modified based on future GPA changes due to courses being repeated or omitted from the Cumulative GPA.

**Satisfactory Progress**

Graduate health science students are required to maintain satisfactory academic progress. In order to maintain satisfactory academic progress, students must be able to complete their degree within the published maximum timeframe allowed for that particular degree. Multiple factors determine this:

1. Professional behavior standards of the programs.
2. Safety with clinical skills.
3. The courses and other academic requirements remaining to complete the degree program.
4. The time remaining to complete these.
5. Other program/ degree requirements.
6. The feasibility of achieving the 3.000 Cumulative GPA required for graduation.

Students in the Physician Assistant Studies program must have a Cumulative GPA of 3.000 at the end of the didactic portion of the curriculum to proceed to clinical internships.

**Graduate Student Degree Conferral and Commencement Policies**

In order for a graduate student to have their degree conferred, the following have to be met:

1. All coursework and seminar credits must be completed as specified by the degree requirements.
2. Master’s theses or Doctoral dissertations must be approved by the student’s research committee, department, school, and Dean of the Graduate School. All associated final and signed copies and paperwork must be submitted to the appropriate school office by the published deadline. This deadline is generally 10 working days before commencement.
3. Projects for non-thesis Master’s students must be approved by the advisor and department. All associated paperwork must be submitted to the appropriate school office by the published deadline. This deadline is generally two working days before the faculty vote on degree candidates.
Students who do not meet these requirements and deadlines may be considered a conditional degree candidate if:

1. They are in the Reh MBA Program at Clarkson and are registered for up to three hours of coursework in the Clarkson international Summer program, OR
2. They are enrolled in the Doctor of Physical Therapy program for the final three hours of coursework that is not complete at the time of the faculty vote.

Requests for conditional degree status must be approved by the Dean of the appropriate school or comparable unit administrator and submitted to the Dean of the Graduate School at least 10 working days before the faculty vote on degree candidates.

For students voted “on condition,” the degree will be conferred when the respective School receives a final grade for the remaining course(s), as appropriate. All conditions for graduation must be met prior to the reporting of graduates to the New York State Education Department; otherwise degrees will be conferred in the next semi-annual commencement ceremony.

**Commencement Participation Policy**

A student may participate in commencement if:

1. The student is in good academic standing, and
2. The student has defended his or her dissertation, thesis or presented their project, yet has failed to meet the published deadline for the final signed copies and completed paperwork, OR
3. The student is in a research based Master’s degree program, has submitted an approved and signed thesis or project report, and requires no more than 6 additional credits of coursework, OR
4. The student is in a course-based or project-based Master’s degree program and is within 6 credits of completing their degree, OR
5. The student has completed all required classroom work and has Clarkson educational commitments that would preclude being on campus for the next scheduled graduation ceremony.

Students who have not completed all graduation requirements may request to participate in the graduation ceremony, which requires explicit approval by their Dean or Institute Director, with the approved request submitted to the Dean of the Graduate School at least 10 working days before the faculty votes to confer degrees at commencement.

In the case of an incomplete dissertation, thesis or project, the petition must be initiated by the thesis or project advisor and be approved by the department or program chair, and the Dean of the respective school or comparable unit administrator. This petition should:

1. Certify that a successful presentation or defense of thesis had occurred prior to the published deadlines, and
2. Carry the signatures of the thesis or project advisor, and all other members of the thesis examining committee indicating that they are confident that the remaining corrections to the thesis or dissertation can be completed by the student.
Students who are allowed to participate in the graduation ceremony under these conditions will receive their diploma and be counted as graduates at the next graduation ceremony following the completion of their degree requirement.

**Expenses, Financial Assistance, Student Status**

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

**Tuition and Fees**
Tuition costs for 2020-2021 graduate programs vary and are charged per credit hour basis. Residential program graduate students are subject to a Residential Program Health, Wellness & Recreation Facilities Fee each term and non-residential program graduate students are subject to a Non-Residential Program Resource Fee each term as defined below.

In order to remain a candidate for a graduate degree, a graduate student not on campus who has not completed all degree requirements must continue to register for one credit hour each semester until all degree requirements have been completed. These students are not required to pay a Residential Program Health, Wellness & Recreation Fee or 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 Dean of the respective school upon written request or personal interview.

**University Graduate Program Charges**
The summary of annual fixed University charges for the 2020-2021 academic year follows:

<table>
<thead>
<tr>
<th>Per Credit Hour</th>
<th>Program Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,606</td>
<td>Interdisciplinary</td>
</tr>
<tr>
<td>$1,388</td>
<td>School of Arts &amp; Sciences</td>
</tr>
<tr>
<td>$1,388</td>
<td>School of Engineering</td>
</tr>
<tr>
<td>$1,388</td>
<td>Residential MBA</td>
</tr>
<tr>
<td>$1,388</td>
<td>Institute for Sustainable Environment</td>
</tr>
<tr>
<td>$1,174</td>
<td>Hybrid MBA, Healthcare MBA, On-line MBA</td>
</tr>
<tr>
<td>$998</td>
<td>Bioethics</td>
</tr>
<tr>
<td>$961</td>
<td>Education</td>
</tr>
<tr>
<td>Varies</td>
<td>Non-Degree (determined by plan)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flat Rate per term</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15,441</td>
<td>Physician’s Assistant Program</td>
</tr>
<tr>
<td>$16,349</td>
<td>Physical Therapy Program</td>
</tr>
<tr>
<td>$15,441</td>
<td>Occupational Therapy Program</td>
</tr>
</tbody>
</table>
Other expenses, such as travel, books, and spending money, vary. An estimated figure is approximately $3,694 for one academic year.

**Residential Program Health, Wellness & Recreation Facilities Fee**
The $460 per term Residential Health, Wellness & Recreation Facilities Fee is charged to each full-time residential program graduate student. The funds are nonrefundable and are applied toward expenses incurred in the operation of the Student Health Center and the recreational facilities available to students.

**Non-Residential Program Resource Fee**
The $75 per term Non-Residential Program Resource Fee is nonrefundable and assessed to cover expenses for guest speakers, lecturers, computer lab resources, related software, free transcripts for life, and other like services. CRC students admitted prior to Spring 2016 Quarter, Union College undergraduates, and Leadership in Medicine (LIM) students are grandfathered into pre-merger regulation, and excluded from this fee. For further inquiries about the resource fee, contact Student Administrative Services at sas@clarkson.edu.

**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 2020-2021 is $3,291 for coverage from 8/1/20 – 7/31/21. To assure clearance for check-in, students need to complete an activity guide in their Tasks & Holds Tile in myCU 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. Enrollment indicates that the student agrees to pay all attorney's fees and other reasonable collection costs necessary for the collection of any amount not paid when due and will be added to the unpaid balance. It is the University’s policy to withhold transcripts and diplomas until the balance of the account is paid in full.

**Tuition and Fees Refund Policy**
Adjustments are based on the last recorded day of the student’s University attendance as determined by and attested to by the Student Administrative 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:

<table>
<thead>
<tr>
<th>Prior to the start of the term</th>
<th>100%</th>
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<tbody>
<tr>
<td>1st week of the term</td>
<td>90%</td>
</tr>
<tr>
<td>2nd week of the term</td>
<td>75%</td>
</tr>
<tr>
<td>3rd week of the term</td>
<td>50%</td>
</tr>
<tr>
<td>4th week of the term</td>
<td>25%</td>
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</tbody>
</table>
Complete Withdrawal for students enrolled in a Quarter (Summer, Fall, Winter & Spring) based program:

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 until the end of the term 0%

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

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 until the end of the term 0%

Adjustments will be made only to the tuition cost associated with the withdrawn credit(s).
*A Partial Withdrawal consists of a student withdrawing from one or more of his/her enrolled credits within a term, but still remains enrolled in at least one credit for the term.
The corresponding refund calculation above will be applied to Tuition, Residential Program Health, Wellness & Recreation Facilities Fee, Non-Residential Program Resource Fee, Room (if applicable) and Meals (if applicable).
*There will be no refund of the student health insurance premium if coverage is in force.

Official Date of Withdrawal
The official date of withdrawal is established upon receipt of written notice of withdrawal from the academic department.

Financial Assistance
Graduate students enrolled in Master’s and PhD level programs may finance their education through a combination of university awards (assistantships, fellowships, and scholarships) and student loans. University awards are granted by each graduate school. US students and permanent residents who are enrolled on at least a half-time basis are eligible to apply for federal student loans. Students must file a FAFSA annually. Refer to the Student Administrative Services website for more information on federal loan programs and application procedures.

University aid is awarded by each academic department. Not all types of University awards are available in all programs. University awards currently available include the following:

| Teaching Assistantships | Teaching Assistantships (TA) provide a stipend plus full tuition. Instructional requirements are up to 20 hours of service per week in laboratory or other designated work for the University during the academic year, or 12 hours of service per week in the above designations during the calendar year. |
### Research Assistantships
Research Assistantships (RA) permit concentration in the student’s research field during the period of study, do not require teaching responsibilities, and provide a standard stipend plus full tuition. Forty hours of service per week, inclusive of classroom work and research duties, are required.

### Industrial and Governmental Fellowships
Fellowships permit concentration on the student’s research problem during the entire period of study. Funding may cover full or partial tuition and/or a stipend. The stipend must be at least minimum wage and duties may not exceed 40 hours per week including time to attend classes.

### Graduate Assistant
Funding may cover full or partial tuition and/or a stipend. The stipend must be at least minimum wage and duties may not exceed 40 hours per week including time to attend classes.

### Partial Tuition Scholarships/Assistantships (PTS/PTA)
A number of partial tuition scholarships-assistantships are made available each year. These scholarships may be awarded to deserving students on a merit basis, and may be in addition to other types of financial assistance.

### Financial Aid Types and Work Hours Restriction

<table>
<thead>
<tr>
<th>Financial Aid Type</th>
<th>Work Hours Restriction</th>
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| Full Teaching/Research Assistantship (TA/RA) | 1. 20 Hours per week work; 20 hours per week study (total 40 hours).  
2. May NOT accept work in any other department. |
| Graduate Assistantship (GA) | 1. Up to 20 hours per week work (stated in contract); 20 hours per week study (total variable).  
2. May work in other departments- total work hours can NOT exceed 20 hours. |
| Partial Tuition Scholarship (PTS) | 1. No work hours; 20 hours per week study (total 20 hours).  
2. May work in other departments up to 20 hours per week. |
| Partial Tuition Assistantship (PTA) | 1. Up to 4 hours per week (stated in contract); 20 hours per week study (total variable).  
2. May work in other departments- total work hours can NOT exceed 20 hours. |

### Vacation
All graduate students, appointed for one year under a Research Assistantship, Teaching Assistantship, or Fellowship are entitled to receive two weeks of vacation plus all holidays when the University is officially closed.

### Satisfactory Academic Progress for Federal Financial Aid
Federal regulations require that schools monitor the academic progress of every federal financial aid recipient and certify that the student is making satisfactory academic progress towards earning his/her degree. This policy governs federal financial aid only. Institutional awards, scholarships and assistantships may have other requirements. Students may only receive federal aid for courses that are required for degree completion.

Satisfactory academic progress is evaluated at the conclusion of each term and include, per federal regulation both quantitative and qualitative measures. These measures include:
1. **Cumulative Grade Point Average (GPA).**
   a. A Cumulative GPA of 3.000 is required. Students with a Cumulative GPA less than 2.700 are not eligible for federal aid (see section below).

2. **PACE.**
   a. A minimum percentage of attempted credit hours must be earned every semester. PACE is determined by:
      i. Cumulative number of earned hours
      ii. Cumulative number of attempted hours
   b. Students must maintain a minimum PACE of 50%.

3. **The maximum time frame for meeting degree requirements.**
   a. Students must complete their degree within 150% of the published length of the program. All graduate credits attempted at Clarkson are applied to the maximum time frame. There is no appeal of the maximum time-frame standard.
   b. Attempted credits for PACE and the maximum time frame 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” or “LW”.
      iv. Failure - F
      v. Incomplete- I
      vi. All accepted transfer - T
      vii. All graduate courses attempted at Clarkson, even if they are not used to meet degree requirements.
   c. Earned credit hours for PACE:
      i. Grades of A,B,C or P (with credit)
      ii. All accepted transfer credits (T)

**Financial Aid Warning**
A student whose cumulative GPA is between 2.700 and 2.999 and/or whose PACE is less than 50% is not making Satisfactory Academic Progress for Federal Financial Aid. The student is notified by the Financial Aid Office via email to the student’s Clarkson email address that he/she is on Financial Aid Warning for the subsequent term of attendance. During the Financial Aid Warning term, the student retains eligibility for federal financial aid.

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

A student who does not meet both the PACE and GPA standards at the conclusion of the Financial Aid Warning term is notified by the Financial Aid Office via email to the student’s Clarkson email address that he/she is not making Satisfactory Academic Progress for Federal Financial Aid and is ineligible for federal aid for subsequent terms. A student may not have two consecutive Financial Aid Warning terms.
Financial Aid Appeal Process
A student who does not meet the federal financial aid satisfactory academic progress standards at the conclusion of the warning term or a student whose GPA is less than 2.7 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 or other situations specific to the individual student.

There are four required elements of an appeal:

1. A completed and signed appeal form.
2. A written statement from the student.
   a. Federal regulations require a student who is requesting an appeal to submit a written statement explaining:
      i. Why the student was not able to meet the satisfactory academic progress standards.
      ii. What has changed that will allow the student to meet the standards at the conclusion of the academic plan and the supporting (see below).
   a. A student requesting an appeal must submit supporting documentation such as:
      i. A physician’s written statement to substantiate illness or accident
      ii. A copy of a death certificate or newspaper obituary
      iii. A written statement from clergy, family member(s), or other third party familiar with the student’s situation, OR
      iv. A written statement from an academic advisor, professor or counselor.
4. Development of an academic plan.
   a. As part of the appeal, the student must work with the Financial Aid Office and their Department 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.
   b. An academic plan may entail one to four terms and includes specific requirements the student must achieve. Although the student is not making satisfactory academic progress, federal aid is reinstated on a term by term basis.

Students eligible to submit an appeal are notified via email at the conclusion of the SAP evaluation that occurs at the end of each term or at the time of readmission to the University. Appeals must be submitted at least two weeks prior to the beginning of the term he/she wishes to receive federal financial aid. 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 Assistant/Associate Director of Financial Aid and the Graduate Student Services Representative in conjunction with faculty members and advisors from the student’s program of study as well as other Clarkson University personnel as necessary.

The Office of Financial Aid will notify the student by e-mail of the final decision. If the appeal is approved the student will work with the Financial Aid Office and their Department to create an academic plan. Once the Academic Plan has been designed and required signatures have been obtained the student will be placed on Financial Aid Probation and federal aid eligibility will be reinstated for the term.
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 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 federal 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 aid at Clarkson until both standards are met. Students who are ineligible for aid may regain eligibility by taking courses at Clarkson without receiving federal aid that raises their GPA to the minimum standards and/or increases earned hours to the minimum PACE requirements.

Financial Aid with Repeated Courses
Courses in which a grade of F, W or LW 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.

Additionally, federal regulations allow a student to repeat a course once if the student previously earned credit for the course (A, B, or C). 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. 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 Federal Financial Aid
For purposes of determining satisfactory academic progress for federal and institutional financial aid, all grade changes including incompletes must be submitted to Student Administrative Services prior to the 10th day of the subsequent term. This deadline may differ from academic departmental guidelines.

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

If the student is determined to meet satisfactory progress, federal aid will be offered provided the student meets all other eligibility requirements. If it is determined that the student is not meeting satisfactory progress, the student will be notified by email to the student’s Clarkson email address of his/her status and the appeal process.

Enrollment Status
A graduate student will be classified as full-time in any term in which he or she is enrolled in at least nine credit hours per semester or six credit hours per quarter. When such degree requirements have been met, the student will be required to register for at least one credit hour of project/thesis, be in
residence, and be actively engaged full-time in completing the project/thesis in order to be classified as a full-time student.

A graduate student will be classified as half-time in any term in which he or she is reenrolled in at least 4.5 credits hours per semester or 3 credit hours per quarter.

**Student Leave**
Graduate students planning to exit the University, whether permanently or for a leave of absence, must initiate the process in the appropriate academic school or institute.

A leave of absence for a graduate student is permitted at the discretion of the graduate coordinator, department chair, or Dean of the school. The University may require a written statement from the student, and other documentation as may be appropriate, to support a leave of absence or withdrawal request.

If a student’s intent is to permanently leave the University or the student is not in good academic standing, the student will be withdrawn from the University. The effect of a withdrawal on a student’s transcript and finances is based on the date of the withdrawal. For information on grading policies relating to withdrawal, contact the Student Administrative Services office at sas@clarkson.edu or refer to the Clarkson Regulations. Refund policies for withdrawals may be located in this catalog and can also be found in the Clarkson Regulations.

**Veterans Benefits**
In addition to participation in various GI Bill educational programs, Clarkson University is partners with the VA in the Post-9/11 GI Bill Yellow Ribbon Program, which provides full tuition benefits to qualified veterans.

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 will not:

- 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.
CHIEF INCLUSION OFFICE
Jennifer Ball, Associate Professor of History and Social Documentation/Chief Inclusion Office title VI, IX, ADA/504 Coordinator
jball@clarkson.edu

The Chief Inclusion Office oversees strategic planning for inclusion and provides dynamic programs and training for Clarkson’s students, faculty, and staff. These include ongoing opportunities to learn with and from our team through a range of methods including speakers, open dialogues, cultural festivities and more.

The Chief Inclusion Office at Clarkson University is a student’s home away from home. Our team members aim to create and support an inclusive campus community for employees and students. It is our goal to cultivate an environment that educates, empowers, and celebrates all of our students and employees.

Working in partnership with other departments, offices, institutions, and the surrounding community, it is our responsibility to recognize the diversity represented on our campus. We believe that continuously advocating for diversity and inclusion is necessary to achieve academic and institutional success and to prepare our students to be Global Citizens.

GRADUATE STUDENT AFFAIRS
Student affairs is a catalyst for bridging diverse academic, cultural, professional and social experiences. Graduate students are provided with a variety of support services dedicated to meeting the needs of those pursuing advanced education.

Student affairs leadership also works closely with the Graduate Student Association (GSA) to support and to provide an engaging experience that complements campus-based programs. Student affairs staff and services are available for all graduate students, including online programs.

Clarkson 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 / requirements. For a link to the Clarkson student 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 gives the Clarkson graduate 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 your program’s specific orientation. Program coordinators and staff are available throughout the year to assist students.

Clarkson University Graduate Student Association (CUGSA)
The GSA is an organization that directly represents the interests of the graduate student body and provides a variety of social and professional development programs during the entire year for students on all campuses. Sample events from the past year include recognition dinners, social hours, athletic events, grant writing seminars, and much more. This group works closely with the Student Affairs Division and the Graduate School to ensure the needs and interests of graduate students are met.

Graduate Housing and Dining
A wide range of housing accommodations are available near Clarkson campuses. For detailed information or for copies of the listings of off-campus private rentals of rooms, apartments, or houses, contact the graduate coordinators for each program or visit the online orientation portal. The Graduate Student Association (GSA) is also a great resource for students seeking accommodations.

Residence halls at the Potsdam campus are primarily for single undergraduate students; however, graduate housing is available on a limited basis. Potsdam campus graduate students may contract for meals in any of the University dining halls on a term basis even though they do not reside in a residence hall. They may also elect to eat on a cash basis in the Student Center, Cheel Campus Center, or one of the campus cafés on the Potsdam campus.

Extracurricular Activities, Cultural, and Recreational Opportunities
There are many opportunities to enhance the educational experience through participation in a range of extracurricular activities. The Clarkson community has easy access to many cultural and recreational facilities throughout New York State, New England, and Canada, as well as on each campus.

Religious and Spiritual Life
Although it is not a church-affiliated university, Clarkson is interested in the moral and spiritual development of its students. Some students pursue their spiritual development in personalized ways, while others attend services of organized religious groups near our respective campuses.

Student Center & Graduate Student Lounge/ Atriums
The Student Center is the focal point of activities on the Potsdam Hill campus. Students in The Earl R. and Barbara D. Lewis School of Health Sciences Programs have an open atrium to socialize, study, and space to eat meals in an open atrium 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 the atrium 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.
Also, at the Potsdam campus and available to students in the Student Center is the Forum, an innovative auditorium in the form of a stairwell equipped with a massive video wall. The space is often used for large events such as lectures, showcases, comedians, pre-released movie showings, and dances. In addition to being a great place to connect with your classmates, the Student Center is the home of many departments and services on campus. On the ground level of the Student Center you will be able to visit the Graduate Student Lounge, Student Center Info Desk, Student Organizations office, JAVA City, Bar 9, and even get money through our North Country Savings Bank ATM. On this level you will find the traditional game room with Pool, Darts, Foosball, Bubble Hockey and Ping Pong games all free for student usage.

**Cheel Arena on the Potsdam Campus**

Cheel Campus Center boasts a 3,000 seat multipurpose arena. The Arena, home of men’s and women’s Golden Knights Hockey, is also the place to attend University Convocation, University Recognition Day, Commencement, and other large-scale events.

**Student Success Center**

The Student Success Center facilitates and supports student educational, personal and professional growth with provision of Academic Support and Preparation, Student Engagement and Enrichment, Access and Opportunity, Retention Initiatives and Graduation School Awareness and Planning. For Graduate students specifically, Academic skills and Student Retention specialist are on staff to assist with needs related to academic preparedness. Also, the English language corner provides students with an appropriate framework for English grammar, vocabulary, basic sentence structures, idioms, and cultural elements that allow students to communicate more effectively and confidently in an English speaking work environment.

**Health & Counseling Center**

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

**Health Services – Potsdam Campus**

The University has forged a partnership with Canton-Potsdam Hospital (CPH) who provides professional staffing and services at the University’s Student Health Center located on the Potsdam campus. Through this partnership, students enjoy a comprehensive health care program and the broad professional capacities provided by the hospital and its highly trained staff. At the Student Health Center (centrally located in the Educational Resources Center) CPH provides clinical services to include basic medical care, preventative care, general physicals for student-related activities and limited urgent care. Students also have access to CPH’s state-of-the-art lab services.

Most visits to Health Services and many of its services are free of charge. Health Services is open weekdays from 8:00 a.m. – 4:30 p.m. during the academic year. After hours emergencies are handled
at CPH itself which is located approximately one mile from campus. There is also an Urgent Care Center on Lawrence Avenue in Potsdam.

Students attending classes at our CRC or Beacon campuses should consult their graduate program coordinators for questions pertaining to local health services.

Office of AccessABILITY 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 contact the Office of AccessABILITY Services prior to the beginning of each term at Clarkson. The student will meet with the Director of the Office of AccessABILITY Services to review documentation and determine appropriate accommodations. The Office of AccessABILITY Services will assist the student with faculty and staff notifications requesting appropriate accommodations. Appropriate accommodations will be provided to students who have followed the procedures as developed by the Office of AccessABILITY Services. Services may include short-term arrangements for students who have become temporarily disabled. Office staff is available for consultation via conferencing software for students enrolled at CRC, Beacon, or in an online program.

CAREER CENTER & EXPERIENTIAL LEARNING
The Career Center assists all Clarkson students in career preparation, providing options for entry level and mid-level employment, with experiential learning opportunities available. Assistance with pursuing post-college employment and furthering graduate study is also central to the mission of the Center. It is also a primary focus of the Center to develop relationships with business and industry that recruit or could potentially recruit our graduates, assuring that these organizations include Clarkson among their primary college relations and recruiting universities.

Career Center and Job Search Services
Individual career coaching appointments are available through the Career Center to discuss concerns such as career direction and choice, skills identification, employment opportunities, and job search techniques. A dedicated graduate student career specialist is available to help students develop strategies to address career-related concerns. The Center facilitates a wide number of career-oriented workshops and programs for graduate-level students including alumni connections, resume preparation, interviewing techniques, and job-search strategies.

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 and permanent job opportunities through the following means: employer access at both Capital Region and Potsdam campuses, recruiting program with business, industry and government; Career Fairs; a web-based resume database system that enables the Center to provide students’ resumes to employers; a job-listing and networking service online called CareerShift; and a network of thousands of Clarkson alumni who can be accessed at any point in the students’ time at the University and beyond.
Clarkson’s reputation with hundreds of companies across the country, combined with a comprehensive Career Center, has resulted in positive outcomes for the graduates consistently over the years. Specific employment and salary statistics for recent classes are available upon request from the Center.

**Experiential Education Program**

**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 graduate program, as well as some unique study/internship programs that are offered during the semesters. Most internships are paid; in some cases, students receive a stipend and may receive academic credit, and some internships are for credit only.

Internships are available with business and industry across the country; with local, state, and federal government agencies; and with other agencies, non-profits, and educational institutions. Students work closely with the Center and their academic advisors to select an internship that best suits their needs.

**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 across the globe – short-term/faculty led programs – or – international internships.

Study Abroad provides an excellent opportunity for graduate 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 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. Students go through an application process to be considered for the program. Clarkson University has articulated exchange agreements with many universities around the world. Specific opportunities for graduate students vary by country and academic program. Please consult the staff at the International Center.

In addition to the semester or year-long exchange opportunities, Clarkson offers students the option to participate in short-term summer programs or faculty led trips. The short-term summer programs are 2-8 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. The International Center works with all disciplines to ensure all students in all majors that require or want a global experience have the opportunity.
Financial Policies and Exchange
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.

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 and Exchange
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 a 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 coordinates services and benefits available to the international population and facilitates international cultural events within the Clarkson community to promote global diversity.
CAMPUS SAFETY AND 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.
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 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.
ATHLETICS
Scott Smalling, Director of Athletics
ssmallin@clarkson.edu

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. Additional information on Clarkson Athletics may be found on the Clarkson website.

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.
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**

Because 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.
The School of Arts & Sciences has graduate programs in the disciplines of Biology, Chemistry, Computer Science, Mathematics, Physics; and professional graduate programs in Occupational Therapy, Physical Therapy and Physician Assistant Studies. Faculty and students also participate in the interdisciplinary Data Analytics, Engineering Science, Environmental Science and Engineering, Environmental Policy and Governance, and Materials Science and Engineering graduate programs, as well as the graduate Master of Arts in Teaching. More information can be found in the Institute for a Sustainable Environment, Institute for STEM Education and the Interdisciplinary Program sections of the catalog.

Basic Science Program

**Biology option:** Thomas Lufkin, Professor and Bayard and Virginia Clarkson Endowed Chair of Biology
tlufkin@clarkson.edu

**Robotics option:** Sean Banerjee, Assistant Professor of Computer Science
sbanerjee@clarkson.edu

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. Currently, many students choose to focus on biosciences or robotics, and advising information regarding these two options is listed below. Other options will be described from time to time.

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”.

**MS degree in 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. 3 semesters of biology including genetics
2. 4 semesters of chemistry including organic chemistry
3. 2 semesters of physics, and
4. 2 semesters of mathematics including calculus

**Degree Requirements for the Basic Science MS**

1. A minimum of 30 credit hours of graduate coursework, as follows:
   1. At least 20 hours of course and seminar work. The balance of coursework must be consistent with the research or professional experience component.
   2. Only courses numbered 500 and above are accepted for graduate credit.
3. 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:
   1. A written thesis based on independent research;
   2. A comprehensive examination; or,
   3. 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 2 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 Chair. 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 Chair. 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.

Faculty
Professors Alan Christian, Tom Langen, Thomas Lufkin, Michael Twiss, Ken Wallace; Associate Professors Ali Boolani, Damien Samways, Shantanu Sur; Assistant Professors Susan Bailey, Andrew David, Beatrice Hernaut, Ginger Hunter, Petra Kraus, Stefanie Kring, Michelle Yoo.

MS degree in Basic Science (thesis and non-thesis options) –
Robotics and Intelligent Systems Option

Prerequisites for Admission
Applicants must possess a baccalaureate (4-year) degree in computer science or a relevant major (e.g., computer engineering, mechanical engineering, electrical engineering, mathematics, and software engineering).

Program Type
The MS in Basic Science for Robotics and Intelligent Systems degree consists of three options: Thesis, Project, and Course Only. The Project and Course Only options can be taken either online or on campus at Clarkson University.
# Courses

## Required Core Courses for All Options:
Core Courses (15 credits or 5 courses are required)

### Robotics Foundation (one from following):
- Introduction to Mobile Robotics (EE555)
- Introduction to Robotic Manipulators (EE556)

### Perception (one from following):
- Computer Vision (CS652)
- Cognition (one from following):
  - Computational Learning (CS549)
  - Artificial Intelligence (CS551)
  - Deep Learning (CS570)

### Action (one from following):
- Control Systems (EE550)
- Digital Control (EE551)
- Linear Control System (EE657)
- Advanced Modeling and Simulation of Dynamic Systems (ME580)

### Mathematical Foundation (one from the following)
- Matrix Theory and Computations (MA573)
- Numerical Analysis (MA578)
- Introduction to Applied Optimization (MA579)
- Probability (MA581)
- Probability and Statistics for Analytics (IA530) - (for Project and Course Only students)

## Elective Courses:

**Thesis Option:** Minimum 6 credits or 2 courses  
**Project Option:** Minimum 12 credits or 4 courses  
**Course Only Option:** Minimum 15 credits or 5 courses

- Introduction to Mobile Robotics (EE555, if not taken as a Robotics Foundation Core Course)
- Introduction to Robotic Manipulators (EE556, if not taken as a Robotics Foundation Core Course)
- Computer Vision (CS652, if not taken as Perception Core Course)
- Computational Learning (CS549, if not taken as Cognition Core Course)
- Artificial Intelligence (CS551, if not taken as Cognition Core Course)
- Deep Learning (CS570, if not taken as Cognition Core Course)
- Control Systems (EE550, if not taken as Action Core Course)
- Digital Control (EE551, if not taken as Action Core Course)
- Linear Control System (EE657, if not taken as Action Core Course)
- Advanced Modeling and Simulation of Dynamic Systems (ME580, if not taken as Action Core Course)
- Natural Language Processing (CS668)
- Computer Graphics (CS552)
- Mixed Reality (CS561)
Human-Robot Interaction: Taken as part of the Human-Computer Interaction course (CS559). Focus will be on developing robotic user interfaces.

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<tr>
<th>Course Name</th>
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<tr>
<td>Parallel Programming (CS543)</td>
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<td>Advanced CAD Design (ME544)</td>
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FOR THESIS OPTION ONLY:
Thesis course (Minimum of 7 credits)
Thesis (CS634)
Seminar course (2 credits)
Seminar (CS707)

FOR PROJECT OPTION ONLY:
Project Course (Minimum of 3 credits)
Robotics Project (CS616)

Program Length
The Thesis option can be completed in either 1.5 years or 2 years, while the Project and Course Only option can be completed in 1, 1.5 or 2 years.

Faculty
Assistant professors Sean Banerjee, Natasha Banerjee
Chemistry Programs
Silvana Andreescu, Egon Matijevic Endowed Chair and Chair of Chemistry & Biomolecular Science
eandrees@clarkson.edu

For specific questions regarding the Chemistry, MS, PhD programs, chemgrad@clarkson.edu

The Chemistry & Biomolecular Science department 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

Requirements for a MS Degree in Chemistry

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 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 (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

Requirements for a PhD Degree in Chemistry
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 Department Chair and Dean of the school.
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 student’s advisor and influenced by 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.

Additional information about the Chemistry Graduate Program can be found at https://www.clarkson.edu/graduate/chemistry

Chemistry Faculty
Professors Silvana Andreescu, Evgeny Katz, Devon Shipp; Associate Professors, Daniel Andreescu Costel Darie, Artem Melman, Galina Melman, James Peploski, Mario Wriedt; Assistant Professors Ryan Brown, Xiaocun Lu, Jingyun Ye; Emeritus Professors Phillip Christiansen, Richard Partch; Distinguished Emeritus Professor: Petr Zuman
Computer Science Program

Natasha K. Banerjee, Chair of the Graduate Committee of the Department of Computer Science
nbanerje@clarkson.edu

Christopher A. Lynch, Chair of the Department of Computer Science
clynch@clarkson.edu

The Department of Computer Science offers graduate programs leading to degrees of Master of Science (offered interdisciplinary with the Department of Electrical and Computer Engineering) and Doctor of Philosophy in Computer Science. These programs are designed to increase the student’s fundamental knowledge and to give the student guidance and experience in research. A graduate student pursues these objectives by taking advanced courses, participating in seminars, and carrying out and reporting on a research project. The department provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests. The department has strengths in theory, artificial intelligence, software, graphics & visualization, security, systems, and networks. An overview of research areas in which department members perform research can be found [here]. Please see requirements for MS in Computer Science in the Interdisciplinary Programs Section of the Catalog.

Requirements for PhD in Computer Science

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 a copy deposited in the university library.
Additional Program Requirements and Procedures

Students must complete a minimum of 36 credits of computer science related coursework including:

1. 4 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.

Computer Science Faculty
Professors Daqing Hou, Christopher Lynch, Jeanna Matthews, Christina Tamon, Chuck Thorpe; Associate Professors Natasha Banerjee, Sean Banerjee, Alexis Maciel; Assistant Professors Shafique Chaudhry, Soumyabrata Dey, Faraz Hussain
Mathematics Program
Joe Skufca, Chair
jskufca@clarkson.edu
Marko Budisic, Graduate Committee Chair
mbudisic@clarkson.edu

The Department of Mathematics offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees in Mathematics. These programs are designed to increase the student’s fundamental knowledge and to give the student guidance and experience in research. A graduate student pursues these objectives by taking advanced courses, participating in seminars, and carrying out and reporting on a research project. The department provides the advantage of close personal association between graduate students and faculty, giving special attention to individual needs and interests.

Faculty members are engaged in research over a wide range of subjects in the mathematical sciences. Current research interests include: dynamical systems, chaos, nonlinear dynamics, complex networks, critical phenomena and statistical mechanics, imaging science, functional analysis, numerical analysis, computational applied mathematics, reaction-diffusion equations, population dynamics, inverse problems, optimization, hybrid and derivative-free optimization, sensitivity analysis, finite-element and multigrid methods, fluid dynamics, atmospheric models, regional climate dynamics, computational geosciences, applied probability and statistics, multivariate and inferential statistics, application of nonparametric statistics, and biostatistics and biomathematics.

Prerequisites
Applicants must possess a baccalaureate degree in mathematics or a relevant major. Submitted application materials must include:

1. An official undergraduate transcript
2. Statement of purpose
3. 3 letters of recommendation, and
4. Score results of the Graduate Records Examination (GRE) aptitude test

The GRE requirement may be waived for students with a Clarkson BS degree at the discretion of the Program Coordinator. All international students for whom English is not a first language must submit a TOEFL score unless their undergraduate or Master of Science degree was in the English language. The admissions committee will select candidates on the basis of aptitude, programmatic needs, and overall excellence of academic qualifications.
Requirements for MS in Mathematics

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 his/ her 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. 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 chair of the department
   b. Pass 2 qualifying exams described under the requirements for the PhD degree. The choices must be approved by the student’s advisor and the Graduate Committee.
   c. Pass 1 exam from either of the categories (I or II) listed in the PhD requirements (see below), plus 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 at the discretion of the student’s advisor.
Requirements for PhD in Mathematics
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. The coursework presented for the PhD must include at least 15 credit hours in the major field, at least nine credit hours in a minor field, and at least six credit hours from out-of-department courses. Beyond the 39 required hours of coursework, six credit hours in seminar work are required, and the remaining 45 hours is thesis or coursework. A comprehensive examination based on general preparation in the major field is required. 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
Students must:
1. Take at least 39 credit hours of approved course work (30 of which may be those taken for the MS degree). As required by University regulations, the course work must contain a minimum of 15 hours in his/ her major area, a minimum of 9 hours in a minor area, and a minimum of 6 hours of work outside the department. Cross registered graduate level courses from other institutions are acceptable. The major area and minor area will be identified by the candidate’s advisor and must be approved by the Graduate Committee.
2. Have a Cumulative Grade Point Average (GPA) of at least 3.000 in his/ her course work.
3. By the end of the second semester (not including Summer), every PhD student must pass a General Comprehensive Examination. The purpose of this exam is to determine whether a student possesses the fundamental knowledge and skills to pursue PhD level course content. The exam is offered in August, January, and May. The topics covered are the undergraduate-level contents of:
   a. Calculus
   b. Differential Equations
   c. Linear Algebra
   d. Advance Calculus
   e. Probability and Statistics
4. By the fourth semester (Summer not included), every PhD student must pass two additional written comprehensive examinations, demonstrating knowledge and skills sufficient to pursue original PhD-level research. 1 exam will be from Category I, and 1 from Category II. The choices must be approved by the student’s advisor and the Graduate Committee. In the even that a student has not satisfied these conditions within the time limit allowed, they must petition the Graduate Committee in order to continue their studies. The categories are:
   a. Category I: Real Analysis, Complex Analysis, Sets and Topology, Numerical Analysis
   b. Category II: Matrix Theory and Computations, Partial Differential Equations, and Boundary Value problems, Ordinary Differential Equations, Probability and Measure Theory, or Statistics
5. Acquire at least 6 hours of seminar credit. A seminar is a course in which the student is expected to make presentations to the class. This is in addition to the minimum of 39 credit hours of approved coursework above. 1 hour of seminar credit may be earned by either attending a regular scheduled seminar and making 1 presentation, or attending all colloquia for 1 semester and giving 1 presentation at a Department of Mathematics seminar (which would be scheduled
6. Have made a formal presentation of a proposed thesis topic to his/her thesis committee within 1 year of passing his/her comprehensive exam. The topic must be acceptable to the committee.

7. Write and defend (to his/her thesis committee) a dissertation, which embodies the results of his/her original research. In association with this work, the student must obtain at least 21, but no more than 45, hours of thesis credit. The thesis committee consists of at least 5 Clarkson faculty members, of whom at least 1 is from another department.

8. Complete a total of 90 hours graduate credit. The satisfaction of these requirements will be certified by the thesis committee.

**Program Length**
The typical length of the Mathematics MS program is 2 years and between 5 and 6 years for the PhD program.

**Mathematics Faculty**
*Professors* Daniel ben-Avraham, Erik Bollt, Scott Fulton, Brian Helenbrook, Kathleen Kavanagh, Chris Lynch, Joseph Skufca, Christina Tamon; *Associate Professor* Sumona Mondal, Guangming Yao; *Assistant Professors* Kumudu Arachchi, Prashant Athavale, Marko Budišić, James Greene, Jonathan Martin, Diana White; *Emmanuel Asante-Asamani; Bin Xu; Instructors, Christopher Martin, Sara Morrison. *Emeritus Professors* Lawrence Glasser, Abdul Jerri, David Powers
Physics Programs
Prof. Dipankar Roy, Chair, Physics Department
droy@clarkson.edu

MS and PhD Prerequisites
For both graduate degrees, undergraduate preparation is expected in the following subjects (at the levels of the textbooks indicated):

1. Classical Mechanics (Symon or Becker)
2. Quantum Mechanics (Anderson or Griffiths)
3. Modern Physics (Krane)
4. Thermal Physics (Baierlein or Kittel)
5. Electricity and Magnetism (Griffiths, or Reitz, Milford and Christy);
6. Optics (Bennett or Hecht), and
7. Fluency in data analysis and computer programming.

Requirements for MS in Physics
The Master's program has a non-thesis option and a thesis option. To maintain qualification for study towards a Master's degree, the student must, no later than the end of the second semester of study, select a general topic of research-interest, and find a research advisor. This requirement applies to both thesis- and non-thesis options.

Additional Requirements and Procedures for MS in Physics
30 credit hours are required as follows for the Master’s degree:

1. At least 18 credits of coursework, including successful completion of appropriate courses from the PH 661, PH 663, PH 669 sequence
2. At least 6 credits of thesis research in Physics, PH699, and
3. At least 2 credits of seminar, including 1 credit of PH 683 or PH 684 (Graduate Seminar).
4. A minimum of 19 out of 30 credit hours must be taken in Physics (coursework, seminars, and thesis credits)
5. Students taking the thesis option are required to complete at least one of the following courses with a minimum grade of B:
   a. PH 661
   b. PH 663
   c. PH 669
6. Students taking the non-thesis option are required to complete all 3 of the following courses with a minimum grade of B in each:
   a. PH 661
   b. PH 663
   c. PH 669

The student’s advisor may authorize, with the approval of the department chair, replacement of at most one of these courses with another advanced physics or other course appropriate for the student’s program (the grade requirement of B or above still applies).

Non-thesis option students, who do not take and pass the Comprehensive Examination (usually taken as part of the Ph.D. track), must carry out a professionally oriented Special Project as part of their research (PH 699) and coursework. The completion of the Project is verified by a Faculty Committee.
(as per University regulations) and certified by the student’s academic advisor in a notice to the Department Chair describing the Project’s topic.

Each Spring or Fall semester that they are registered for credit hours, those students who at the time receive any financial support via the University, such as full- or part-time teaching or research assistantship, tuition discount, etc., must take at least one credit of PH 699.

**Requirements for PhD in Physics**

To maintain qualification for study toward the PhD beyond the first year, the student must, no later than the end of the second semester of study, select a general thesis topic and be assigned to a suitable research advisor. The appointment of the advisor must be approved by the Physics Department Chair. For interdisciplinary research projects to be supervised primarily outside the Physics Department, a physics co-advisor will be assigned to the student. To maintain qualification for study toward the Ph.D. beyond the second year, the student must pass the Physics Comprehensive Examination and obtain at least a grade of B in each of these courses: PH661, PH663 and PH669.

The Physics Comprehensive Examination consists of two parts, each part four hours long, usually given during the first two weeks of the Spring semester. The topical coverage will be as follows:

Part I: (A) Classical Mechanics; 5 problems. (B) Electricity & Magnetism, Optics; 5 problems. Part II: (A) Thermal Physics; 3 problems. (B) Quantum Mechanics; 3 problems. (C) Modern Physics (relativity, nuclear, solid state); 4 problems.

Unless a special need arises, the examination will be offered annually. The level will correspond to the material of senior- and earlier-year undergraduate Physics courses at Clarkson. The Physics Chair will assign the task of preparing, proctoring and grading the examination to a committee, to be appointed every year.

Each student will have at most two tries to pass the exams. A student failing to pass on the first attempt must take the full examination (both parts, I and II) anew on his/her second attempt. Students entering in the fall semester must take the first-try exam during their first spring semester at Clarkson. Students accepted for graduate studies at any other time, as well as students taking an approved academic leave of semester or longer, will have their exam schedule determined by the Graduate Committee. The final decision on the student’s passing/failing the examination will be taken at a meeting of physics faculty.

By the end of the third year of study, to qualify for continuing in the Ph.D. program, the student is required to write a PhD Research Proposal and defend the doctoral topic before a thesis committee. The proposal defense will consist of an oral presentation of the proposed thesis topic. The thesis committee members must be confirmed and they must receive copies of the student’s Research Proposal at least 10 working days before the oral defense. At the conclusion of the defense, the thesis committee must be satisfied 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.
Out of the total 90 credit hours for Ph.D., the specific Physics requirements for graduation include at least 33 credit hours of courses. The courses taken in Physics must include PH 661, PH 663, PH 664, PH 669, PH 670. The requirement for PH 664 and PH 670 (passing grade) 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.

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). Each spring or fall semester that they are registered for credit hours, those students who at the time receive any financial support via the University, such as full- or part-time teaching or research assistantship, tuition discount, etc., must take at least one credit of PH 699. Oral presentation and defense of the written doctoral dissertation before a thesis committee are required. The thesis committee members must be confirmed, and must receive Research Proposal copies at least 10 working days before the oral defense.

**Program Length**

Typical length of the Physics MS Program is 2 years, although well-prepared students may find it possible to complete the requirements for the Master’s degree in an academic year. Doctoral candidates should expect to spend a minimum of 2 years beyond the Master’s in meeting degree requirements. Typical length of the Physics Ph.D. Program varies between 5 and 6 years.

**Physics Faculty**

Professors Danial ben-Avraham, Erik Bollt (courtesy appointment), Ming-Cheng Cheng (courtesy appointment), Lawrence Glasser (Emeritus), Dipankar Roy, Lawrence Schulman (Emeritus); Associate Professors Maria Gracheva, Michael Ramsdell, Jan Scrimgeour; Assistant Professors Arzu Çolak, Dmitriy Melnikov, Joshua Thomas, Dhara Trivedi; Research Associate Professor David Wick; Adjunct Research Associate Professor Monique Tirion.
The David D. Reh School of Business offers the following graduate programs:
1. Master of Business Administration (MBA)
2. Master of Business Administration-Healthcare Management (MBA)
3. Master of Science in Healthcare Data Analytics (MS)
4. Master of Science in Clinical Leadership (MS)
5. Master of Science in Supply Chain Management (MS)

The programs offer a variety of options in terms of both mode of delivery (classroom, online, or a mix of classroom and online chosen by the student) and time of completion (full time or part time).

The MBA program consists of two programs:
1. Residential MBA
2. Online MBA

The Residential MBA is offered at the Potsdam campus. All classes are taken in the classroom and follow the semester calendar. The Online MBA is offered fully online and follows the quarter calendar (four terms per year).

The Healthcare MBA program 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 classes are offered in the evening at the Capital Region Campus (CRC) in Schenectady.

The Master of Science in Healthcare Data Analytics is an online program and follows the quarter calendar.

The Master of Science 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 Master of Science in Supply Chain Management is an online program and follows the quarter calendar.

No specific undergraduate major is required for admission; however, applicants must demonstrate high promise for success as indicated by several components of student’s application profile which include (but is not limited to) undergraduate grade point average, score on GMAT or the GRE, work experience, and references. Students with extensive work experience may be considered for admission without GMAT or GRE. Qualified students may also 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 allows students to gain admission based on performance in certificate courses without requiring the GMAT or GRE.
A typical graduate class includes recent college graduates, people with work experience, and men and women from many geographic regions of the world. The breadth and diversity of the student body serve to enrich the educational experience. Merit based scholarships are awarded on a competitive basis. Full time residential MBA students are also eligible to apply for a graduate assistant position working with a faculty/staff member.

Faculty and students also participate in the interdisciplinary Data Analytics and Environmental Policy and Governance graduate programs. More information can be found in the section for Institute for a Sustainable Environment and the Interdisciplinary Program sections of the catalog.

The David D. Reh School of Business at Clarkson is accredited by the Association to Advance Collegiate Schools of Business (AACSB), an internationally recognized accrediting agency for graduate and undergraduate programs in business administration. In addition, the Healthcare Management MBA is accredited by the Commission on the Accreditation of Healthcare Management Education (CAHME).

**The Master of Business Administration (MBA) Programs**

*Joshua LaFave, Director, Graduate Business Programs*

*jlafave@clarkson.edu*

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

1. Residential MBA at the Potsdam campus
2. Online MBA, and
3. MBA in Healthcare Management, which allows students to freely mix classes at the Capital Region Campus (Schenectady) with online classes

Although the MBA programs offer distinct choices, all programs share the hallmarks of a Clarkson MBA small class sizes and close student interaction with renowned faculty.

**Residential MBA**

The Residential MBA consists of foundation courses in ten specified areas and 38 credit hours of advanced graduate work. The foundation includes courses from the following subjects: financial and managerial accounting, information technology, corporate finance, microeconomics, macroeconomics, ethics, organizational behavior, marketing, operations and production management, quantitative methods/statistics. Students with undergraduate business majors will waive most or all of the foundation. Through careful planning, students with backgrounds in engineering, liberal arts, or science may complete the foundation courses as part of an undergraduate minor or through pursuing the Summer Business Concepts program offered online in the summer, 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.

Beyond the foundation, the 38 credits of the Residential MBA degree program consist of ten two-credit interrelated core modules, five three-credit graduate elective courses, and a three credit experiential course. The core modules stress business functions, emphasizing the development of communication, interpersonal, and managerial skills.
The core module titles are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 603</td>
<td>Management Accounting</td>
</tr>
<tr>
<td>OM 606</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>EC 604</td>
<td>Applied Economics</td>
</tr>
<tr>
<td>OS 608</td>
<td>Organizational Behavior and Performance Management</td>
</tr>
<tr>
<td>FN 607</td>
<td>Financial Management</td>
</tr>
<tr>
<td>OS 610</td>
<td>Strategic Planning</td>
</tr>
<tr>
<td>IS 605</td>
<td>Information Systems</td>
</tr>
<tr>
<td>MK 609</td>
<td>Marketing Management</td>
</tr>
<tr>
<td>OM 602</td>
<td>Decision Analysis and Supply Chain Modeling</td>
</tr>
<tr>
<td>SB 609</td>
<td>Corporate Ethical Decision Making</td>
</tr>
</tbody>
</table>

A Strategic Planning module (2 credits) is offered as a 12 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.

Graduate elective courses in the residential program are available in several functional areas, and they include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 623</td>
<td>Financial Statement Analysis</td>
</tr>
<tr>
<td>AC 636</td>
<td>Auditing</td>
</tr>
<tr>
<td>AC 648</td>
<td>Seminar in Accounting Information Systems and Auditing</td>
</tr>
<tr>
<td>AC 650</td>
<td>Accounting Research and Theory</td>
</tr>
<tr>
<td>EC 660</td>
<td>Environmental Economics</td>
</tr>
<tr>
<td>EC 651</td>
<td>Industrial Organization in Supply Chain</td>
</tr>
<tr>
<td>FN 655</td>
<td>Venture Capital and Private Equity</td>
</tr>
<tr>
<td>FN 672</td>
<td>Investments</td>
</tr>
<tr>
<td>FN 680</td>
<td>Strategic Financial Management</td>
</tr>
<tr>
<td>IS 629</td>
<td>Global Outsourcing of Information Systems and Services</td>
</tr>
<tr>
<td>MK 689</td>
<td>New Product Marketing</td>
</tr>
<tr>
<td>MK 696</td>
<td>Marketing Methods</td>
</tr>
<tr>
<td>OM 676</td>
<td>Developing and Managing Technology</td>
</tr>
<tr>
<td>OM 680</td>
<td>Strategic Project Management</td>
</tr>
<tr>
<td>OM 685</td>
<td>Quality Management and Process Improvement</td>
</tr>
<tr>
<td>OM 671</td>
<td>Supply Chain Environmental Management</td>
</tr>
<tr>
<td>OS 657</td>
<td>Leading Organizational Change</td>
</tr>
<tr>
<td>OS 666</td>
<td>Negotiations and Relationship Management</td>
</tr>
<tr>
<td>SB 611</td>
<td>Clarkson Consulting Group</td>
</tr>
<tr>
<td>SB 658</td>
<td>Bridging the Innovation Gap</td>
</tr>
<tr>
<td>SB 678</td>
<td>Inventive Practices</td>
</tr>
<tr>
<td>SB 693</td>
<td>Seminar in International Business</td>
</tr>
<tr>
<td>SB 696</td>
<td>Advanced Topics in Supply Chain Management</td>
</tr>
</tbody>
</table>

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 is a strong part of Clarkson's culture so each student participating in the Residential MBA program is required to take a three credit hour experiential course. Currently, the experiential requirement can be satisfied by participating in Global Business Program, or by taking the SB 696 Global Business Strategies course. Through the Global Business Programs, there are several options that are designed to give you knowledge and new perspectives regarding international business, helping you develop critical skills necessary to compete and succeed in the global market. The most popular Global Business Program option is the course that includes a 2-3 week trip to an international destination, often led by the faculty from that area. This course offers a unique opportunity to explore business outside the traditional classroom boundaries and to provide a unique experience to your resume. This course also helps students explore the global management issues facing business leaders and organizations in different parts of the world.

**Length of Program**

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

1. The Accelerated One-Year study plan, with all 38 credits completed over the course of 2 consecutive semesters
2. One and one half years study plan with core modules and electives completed over the 3 consecutive semesters
3. Two years, with core modules and electives completed over the 4 consecutive semesters

While most students begin the Residential MBA program in the Fall semester, Spring starts can be accommodated. Students starting in the Spring have their choices of elective courses in that first semester limited to those that do not have core modules as pre-requisites, and the Strategic Planning module cannot be taken during the first spring semester.

**The Residential Master of Business Administration**

**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 Residential MBA program, with students completing up to six courses over the spring semester at one of the partner institutions. The courses taken at the partner institutions need to be approved by the Graduate 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.

The current choices of AACSB accredited partner institutions include the Bordeaux School of Management, in Bordeaux, France and Griffith University, in Brisbane, Australia. These elective classes meet the elective requirement and experiential unit requirement of the Residential MBA program. Students starting in the Spring semester cannot participate in the Global Track program in their first semester.
Online MBA Program
The online MBA program is a 42 credit hour program (a total of 14 three credit courses). This program is designed to be completed part time, taking up to 2 courses during each of the four 11 week periods. 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 12 credits comprises 4 elective courses.

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 42 to 33) with course transfers. Articulation agreements have been established with a number of universities in the United States and Canada. These agreements specify which combinations of undergraduate classes at the partner schools will allow courses in the Online MBA program at Clarkson to be waived.

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>OM 607</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>EC 605</td>
<td>Managerial Economics</td>
</tr>
<tr>
<td>FN 608</td>
<td>Financial Management</td>
</tr>
<tr>
<td>OS 681</td>
<td>Strategic Management</td>
</tr>
<tr>
<td>IS 606</td>
<td>Business Information Systems</td>
</tr>
<tr>
<td>MK 610</td>
<td>Marketing Management</td>
</tr>
<tr>
<td>OM 603</td>
<td>Decision Analysis and Supply Chain Modeling</td>
</tr>
<tr>
<td>SB 610</td>
<td>Corporate Ethical and Social Responsibility</td>
</tr>
<tr>
<td>OS 603</td>
<td>Leadership and Organizational Behavior</td>
</tr>
</tbody>
</table>

Graduate elective courses in the on-line MBA program include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC 652</td>
<td>Industrial Organization in Supply Chain</td>
</tr>
<tr>
<td>OM 681</td>
<td>Strategic Project Management</td>
</tr>
<tr>
<td>MK626</td>
<td>Market Research</td>
</tr>
<tr>
<td>OM 686</td>
<td>Quality Management and Process Improvement</td>
</tr>
<tr>
<td>OS 656</td>
<td>Leading Organizational Change</td>
</tr>
<tr>
<td>OS 667</td>
<td>Negotiations and Relationship Management</td>
</tr>
<tr>
<td>SB 640</td>
<td>Advanced Topics in Supply Chain Management</td>
</tr>
<tr>
<td>OS 654</td>
<td>Labor Relations</td>
</tr>
<tr>
<td>OS651</td>
<td>High Performance Leadership</td>
</tr>
<tr>
<td>SB 651</td>
<td>Communicating Globally</td>
</tr>
<tr>
<td>IS 642</td>
<td>Applications in Business Analytics</td>
</tr>
</tbody>
</table>

Program Length
Full time students can complete the program in as little as 1 year; part-time students complete in 2 to 5 years with an average completion of 3 years.
The primary purpose of the MBA Program in Healthcare Management is to prepare its graduates for management positions in health service delivery organizations (e.g. hospitals, managed care organizations, group practice, long-term care) and in related organizations (e.g. consulting, government, corporate benefits). A successfully prepared graduate will be able to obtain a professional management position in a healthcare organization, competently perform the duties of that position, and advance and grow professionally in a career.

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. The program provides its education in an environment that fosters a high level of interaction among and between students and faculty, both in and out of the classroom. Faculty and students value this small-class environment.

The MBA–Healthcare Management program is a 48 credit hour program (a total of 16 3-credit hour courses). The program includes 7 required core courses and 9 advanced courses (7 required; 2 elective). As with the Online and Hybrid MBA programs, 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 or graduate work and apply only to required 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 nine credit hours (from 48 to 39) with course waivers alone. Program requirements may be reduced by up to twelve credit hours (from 48 to 36) with a combination of course waivers and transfers.

The Healthcare MBA has a strong internship program and an internship is required. This requirement may be waived for students with relevant healthcare or professional business experience.

The seven required core courses are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>HC 600</td>
<td>Introduction to Health Systems</td>
</tr>
<tr>
<td>HC 605</td>
<td>Healthcare Operations</td>
</tr>
<tr>
<td>HC 626</td>
<td>Healthcare Marketing</td>
</tr>
<tr>
<td>HC 651</td>
<td>Health Systems Management</td>
</tr>
<tr>
<td>HC 657</td>
<td>Healthcare Leadership Proseminar</td>
</tr>
<tr>
<td>IS 647</td>
<td>Statistical Methods for Data Analytics</td>
</tr>
</tbody>
</table>
The seven required advanced courses are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC 617</td>
<td>Healthcare Finance</td>
</tr>
<tr>
<td>HC 620</td>
<td>Healthcare Economics</td>
</tr>
<tr>
<td>HC 648</td>
<td>Health Informatics</td>
</tr>
<tr>
<td>HC 650</td>
<td>Structural Dynamics in Healthcare</td>
</tr>
<tr>
<td>HC 674</td>
<td>Legal Aspects of Healthcare</td>
</tr>
<tr>
<td>HC 680</td>
<td>Healthcare Policy and Managerial Epidemiology</td>
</tr>
<tr>
<td>HC 681</td>
<td>Strategic Issues for Healthcare Organizations (Health Capstone)</td>
</tr>
</tbody>
</table>

Two electives can be chosen from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC 601</td>
<td>Swiss Healthcare Study Tour</td>
</tr>
<tr>
<td>HC 607</td>
<td>Healthcare Operations Research</td>
</tr>
<tr>
<td>HC 656</td>
<td>Group Practice Administration</td>
</tr>
</tbody>
</table>

Or, any elective offered as part of the Online MBA program

**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 3 years.
Healthcare Data Analytics MS

Peter Otto, Director
potto@clarkson.edu

The purpose of the MS - 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 program is fully online with two weekends onsite component required for two of the required courses. The MS – Healthcare Data Analytics program is a 36 credit hour program (a total of 12 3-credit hour courses). The program includes 9 required core courses and 3 electives. As with the Online and Hybrid MBA programs, 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 or graduate work and apply only to required 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 6 credit hours (from 36 to 30) with any combination of course waivers and transfers.

The nine required core courses are:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC 600</td>
<td>Introduction to Health Systems</td>
</tr>
<tr>
<td>HC 602</td>
<td>Advanced Statistics and Data Visualization</td>
</tr>
<tr>
<td>HC 603</td>
<td>Data Architecture</td>
</tr>
<tr>
<td>HC 610</td>
<td>Healthcare Accounting and Finance</td>
</tr>
<tr>
<td>HC 642</td>
<td>Data Analytics and Business Intelligence</td>
</tr>
<tr>
<td>HC 647</td>
<td>Statistical Foundations of Data Analytics</td>
</tr>
<tr>
<td>HC 648</td>
<td>Health Informatics</td>
</tr>
<tr>
<td>HC 657</td>
<td>Healthcare Leadership Proseminar</td>
</tr>
<tr>
<td>HC 643</td>
<td>Advanced Applications in Data Analytics</td>
</tr>
</tbody>
</table>

Three electives can be chosen from:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC 604</td>
<td>Hospital Analytics</td>
</tr>
<tr>
<td>HC 606</td>
<td>Payer Analytics</td>
</tr>
<tr>
<td>HC 607</td>
<td>Healthcare Operations Research</td>
</tr>
<tr>
<td>HC 609</td>
<td>Healthcare Customer Relationship Management</td>
</tr>
<tr>
<td>IA 626</td>
<td>Big Data Processing and Cloud Services</td>
</tr>
<tr>
<td>IA 640</td>
<td>Information Visualization</td>
</tr>
</tbody>
</table>

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

Completing both the MBA – Healthcare Management and the MS – Healthcare Data Analytics
Students may complete both the MBA-Healthcare Management and the MS-Healthcare Data Analytics programs by taking a total of 21-3 credit courses rather than the aggregate total of 28 courses for the two programs taken separately. This is made possible by shared courses and synergies between the programs.
Clinical Leadership MS
John Huppertz, PhD., Associate Professor and Director
jhuppert@clarkson.edu

The 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 is a 36 credit program (a total of 12 3-credit courses). There are eleven required courses and one elective course. The eleven required courses are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>HC 600</td>
<td>Introduction to Health Systems</td>
</tr>
<tr>
<td>HC 605</td>
<td>Healthcare Operations</td>
</tr>
<tr>
<td>HC 617</td>
<td>Healthcare Finance</td>
</tr>
<tr>
<td>HC 620</td>
<td>Healthcare Economics</td>
</tr>
<tr>
<td>HC 651</td>
<td>Health Systems Management</td>
</tr>
<tr>
<td>HC 656</td>
<td>Group Practice Administration</td>
</tr>
<tr>
<td>HC 674</td>
<td>Legal Aspects of Healthcare</td>
</tr>
<tr>
<td>HC 680</td>
<td>Healthcare Policy and Managerial Epidemiology</td>
</tr>
<tr>
<td>HC 681</td>
<td>Strategic Issues for Healthcare Organizations (Capstone)</td>
</tr>
<tr>
<td>IS 647</td>
<td>Statistical Methods for Data Analytics</td>
</tr>
</tbody>
</table>

The elective may be any Healthcare or Hybrid MBA elective.

Program Length
Part-time students may complete the program in 2 to 3 years.
Master of Science in Supply Chain Management Program
Farzad Mahmoodi, Chair Professor and Director
fmahmood@clarkson.edu

The Online Master of Science in Supply Chain Management is an interdisciplinary program designed for high-performing professionals who have an established track record of success in one or more of the functions included in supply chain management. The Master of Science in Supply Chain Management prepares professionals who strive to gain advanced expertise needed to lead companies to world class supply chain management status. The program provides an integrated set of learning opportunities for those interested in becoming proficient in effectively managing complex supply chains, and prepare them to be purchasing managers, supply managers, or directors of materials management.

Requirements for Admission
Applicants must have earned a Bachelor of Science degree in an engineering or business field or show the equivalent thereof.

Coursework
This 30-credit hour program is composed of eleven required / core courses:

1. OS602 Leadership Development I
2. IA505 Applied Data Analytics
3. OM607 Global Supply Chain Management
4. OM672 Supply Management Strategy and Analysis
5. OM603 Decision Analysis & Supply Chain Modeling
6. OS667 Negotiations & Relationship Management
7. SB611 Supply Chain Ethics
8. EC652 Industrial Organization in the Supply Chain
9. OM686 Quality Management & Process Improvement
10. SB682 Logistics Strategies
11. SB640 Advanced Topics in Supply Chain Management
# Full-Time Study Plan

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Winter</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS602 Leadership &amp; Development I</td>
<td>1.5</td>
<td>SB682 Logistics Strategies</td>
<td>3</td>
</tr>
<tr>
<td>OM607 Global Supply Chain Management</td>
<td>3</td>
<td>SB640 Advanced Topics in Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>OM686 Quality Management &amp; Process Improvement</td>
<td>3</td>
<td>OS667 Advanced Topics in Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>IA505 Applied Data Analytics</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10.5</strong></td>
<td><strong>Total</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OM672 Supply Chain Management Strategy &amp; Analysis</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC652 Industrial Organization in the Supply Chain</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SB 611 Supply Chain Ethics</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OM 603 Decision Analysis &amp; Supply Chain Modeling</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10.5</strong></td>
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</table>

# Part-Time Study Plan

<table>
<thead>
<tr>
<th>Fall Quarter</th>
<th>Credits</th>
<th>Winter Quarter</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS602 Leadership Development I</td>
<td>1.5</td>
<td>IA505 Applied Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>OM607 Global Supply Chain Management</td>
<td>3</td>
<td>OM603 Decision Analysis &amp; Supply Chain Modeling</td>
<td>3</td>
</tr>
<tr>
<td>OM686 Quality Management &amp; Process Improvement</td>
<td>3</td>
<td>OS667 Negotiations &amp; Relationship Management</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>7.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring Quarter</th>
<th>Credits</th>
<th>Summer Quarter</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM672 Supply Management Strategy and Analysis</td>
<td>3</td>
<td>SB682 Logistics Strategies</td>
<td>3</td>
</tr>
<tr>
<td>EC652 Industrial Organization in the Supply Chain</td>
<td>3</td>
<td>SB640 Advanced Topics in Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>SB611 Supply Chain Ethics</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>7.5</strong></td>
<td><strong>Total Credits</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

## Program Length

Expected program length is One Year though it can be completed within 9 months with a full-time study.

## Supply Chain Management Faculty

*Professors, Farzad Mahmoodi, Augustine Lado; Associate Professors, Dennis Yu, Santosh Mahapatra, Stephen Sauer, Luciana Echazu, Cecilia Martinez; Assistant Professors, Ha Ta, Chester Xiang, Floyd Ormsbee, William MacKinnon.*
Joint Programs: Clarkson University Capital Region Campus
The Clarkson University David D. Reh School of Business Capital Region Campus has several joint programs with organizations located in the Capital Region. These programs are described in the following sections.

Accelerated BA or BS at Union College and MBA Program (with Union College)
Union College students considering entrance into the accelerated Bachelor’s/MBA program should consult with an MBA program advisor and apply for admission during the sophomore, junior, or first term of the senior year. Joint degree students must complete 16 graduate courses, 3 of which may, with undergraduate advisor approval, count toward Bachelor’s degree requirements. Graduate courses may not be taken until the junior year and are typically completed during the senior and fifth years. Students may choose either the MBA or the MBA in Healthcare Management degree. There is a limit of five undergrads in each graduate level course.

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. 3 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
(with Albany College of Pharmacy and Health Sciences, ACPHS)
John Huppertz, Ph.D. Associate Professor and Chair
jhuppert@clarkson.edu

The MBA in Healthcare Management degree is a 16 course program. 3 designated Pharmacy courses transfer into the MBA degree, reducing the number of MBA courses in the PharmD/MBA joint program to 13. In addition, PharmD students may meet the MBA Internship Requirement with the selected practicum experiences which are part of the PharmD program 6th year curriculum at ACPHS. Most joint program students complete the MBA course requirements on a part-time basis over a 3 year period (years 4-6 at ACPHS).

Joint BS Pharmaceutical Science /MBA in Healthcare Management
(with Albany College of Pharmacy and Health Sciences)
John Huppertz, Ph.D. Associate Professor and Chair
jhuppert@clarkson.edu

The MBA in Healthcare Management degree is a 16 course program. The BS/MBA in Healthcare Management joint program reduces the number of MBA courses needed from 16 to 13. Up to three required 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.
Joint PharmD / MS in Clinical Leadership  
(with Albany College of Pharmacy and Health Sciences)  
John Huppertz, Ph.D. Associate Professor and Chair  
jhuppert@clarkson.edu

The MS in Clinical Leadership is a 12 course program. The PharmD/MS joint program reduces the number of required MS courses to 9. Up to three required courses from the MBA curriculum are waived based on courses taken in the PharmD program at ACPHS.

Joint BS Pharmaceutical Science /MS in Clinical Leadership  
(with Albany College of Pharmacy and Health Sciences)  
John Huppertz, Ph.D. Associate Professor and Chair  
jhuppert@clarkson.edu

The MS in Clinical Leadership is a 12 course program. The PharmD/MS joint program reduces the number of required MS courses to 9. Up to three required courses from the MBA curriculum are waived based on courses taken in the BS program at ACPHS.

Leadership in Medicine (LIM) / MBA in Healthcare Management  
(with Union College and Albany Medical College)  
John Huppertz, Ph.D. Associate Professor and Chair  
jhuppert@clarkson.edu

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 from Clarkson University, and an MD from Albany Medical College. The MBA in Healthcare Management degree is a 16 course program. Students choosing this option take graduate MBA courses while fulfilling all other requirements of the program at Union College and Albany Medical College throughout the 8 years of the program. 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. There is an additional charge for the LIM MBA degree. 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.

The LIM MBA in Healthcare Management requires 16 courses plus an internship as listed below:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>HC 605</td>
<td>Healthcare Operations</td>
</tr>
<tr>
<td>HC 626</td>
<td>Healthcare Marketing</td>
</tr>
<tr>
<td>HC 651</td>
<td>Health Systems Management</td>
</tr>
<tr>
<td>HC 617</td>
<td>Healthcare Finance</td>
</tr>
<tr>
<td>HC 630</td>
<td>Introduction to Health Systems</td>
</tr>
<tr>
<td>HC 633</td>
<td>Healthcare Leadership</td>
</tr>
<tr>
<td>HC 634</td>
<td>Health and Human Values I</td>
</tr>
</tbody>
</table>
An approved internship is required for the MBA in Healthcare Management. HC637 Clinical Leadership Practicum fulfills the internship requirement.

Students who elect to take the additional courses to achieve an MBA will be charged additional tuition by Clarkson University:

1. 3 courses tuition - Spring of Senior Year
2. 1 course tuition - Summer following Senior Year

Leadership in Medicine (LIM) / MS in Clinical Leadership

John Huppertz, Ph.D. Associate Professor and Chair
jhuppert@clarkson.edu

Students in the 8-year LIM program jointly offered by Union College, Albany Medical College and Clarkson University might earn an MS in Clinical Leadership from Clarkson University. The MS in Clinical Leadership degree is a 12 course program. Students choosing this option take graduate Healthcare Management courses while fulfilling all other requirements of the program at Union College and Albany Medical College throughout the eight years of the program. Students choosing this option take additional courses while fulfilling all other requirements of the program. Students in this program must meet admission requirements of Union College, Clarkson University, and Albany Medical College.

The LIM MS in Clinical Leadership requires 12 courses as listed below:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604</td>
<td>Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>HC 605</td>
<td>Healthcare Operations</td>
</tr>
<tr>
<td>HC 651</td>
<td>Health Systems Management</td>
</tr>
<tr>
<td>HC 617</td>
<td>Healthcare Finance</td>
</tr>
<tr>
<td>HC 630</td>
<td>Introduction to Health Systems</td>
</tr>
<tr>
<td>HC 634</td>
<td>Health and Human Values I</td>
</tr>
<tr>
<td>HC 635*</td>
<td>Economics of Health (* or HCM 620, Health Economics)</td>
</tr>
<tr>
<td>HC 656</td>
<td>Group Practice Management</td>
</tr>
<tr>
<td>HC 674</td>
<td>Legal Aspects of Healthcare</td>
</tr>
<tr>
<td>HC 684</td>
<td>Strategic Issues for Healthcare Organizations (Capstone)</td>
</tr>
<tr>
<td>IS 647</td>
<td>Statistical Methods for Data Analytics</td>
</tr>
<tr>
<td>HC 637</td>
<td>Clinical Leadership Practicum</td>
</tr>
</tbody>
</table>
Joint MD/MBA in Healthcare Management
(with Albany Medical College)
John Huppertz, Ph.D. Associate Professor and Chair
jhuppert@clarkson.edu

The Clarkson University MBA in Healthcare Management/Albany Medical College MD is designed to provide students with a business understanding specific to healthcare and move them on to their medical education quickly. While many other medical schools offer a generic MBA, the Clarkson University MBA in Healthcare Management is focused on the healthcare environment. Students study alongside others with a passion for healthcare, and 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 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.
Certificates of Advanced Study – Online and Capital Region Campus
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.

Certificate 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.

Certificate in 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.

<table>
<thead>
<tr>
<th>Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM 607 Global Supply Chain Management</td>
</tr>
<tr>
<td>SB 640 Advanced Topics in Supply Chain Management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty Courses (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM 686 Quality Management and Process Improvement</td>
</tr>
<tr>
<td>OS 667 Negotiations and Relationship Management</td>
</tr>
<tr>
<td>EC 652 Industrialization Organization in the Supply Chain</td>
</tr>
</tbody>
</table>
Certificate in 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.

<table>
<thead>
<tr>
<th>Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS 603</td>
</tr>
<tr>
<td>OS 675</td>
</tr>
<tr>
<td>OS 676</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty Courses (3)</th>
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<tbody>
<tr>
<td>OS 677</td>
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<tr>
<td>OS 651</td>
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<td>OS 656</td>
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<td>OS 659</td>
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<tr>
<td>OS 654</td>
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<tr>
<td>OS 650</td>
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<tr>
<td>OS 660</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

Certificate in 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.

<table>
<thead>
<tr>
<th>Required Courses</th>
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</thead>
<tbody>
<tr>
<td>OS 603</td>
</tr>
<tr>
<td>OS 651</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty Courses (4)</th>
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</thead>
<tbody>
<tr>
<td>AC 604</td>
</tr>
<tr>
<td>OS 660</td>
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<tr>
<td>OS 656</td>
</tr>
<tr>
<td>OS 659</td>
</tr>
<tr>
<td>OS 676</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>
Certificate in 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.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Specialty Courses (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC 600 Introduction to Health Systems</td>
<td>HC 605 Health Operations Management</td>
</tr>
<tr>
<td>HC 651 Health Systems Management</td>
<td>HC 657 Proseminar in Healthcare Leadership</td>
</tr>
<tr>
<td></td>
<td>HC 626 Health Systems Marketing</td>
</tr>
<tr>
<td></td>
<td>HC 617 Healthcare Finance</td>
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<td></td>
<td>HC 620 Health Economics</td>
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<td></td>
<td>HC 648 Health Informatics</td>
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<td>HC 650 Structural Dynamics in Healthcare Systems</td>
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<td>HC 656 Group Practice Administration</td>
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<td></td>
<td>HC 674 Legal Aspects of Healthcare</td>
</tr>
<tr>
<td></td>
<td>HC 680 Health Policy and Managerial Epidemiology</td>
</tr>
<tr>
<td></td>
<td>IS 647 Statistical Methods for Data Analytics</td>
</tr>
<tr>
<td></td>
<td>AC 604 Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td></td>
<td>OS 675 Human Resource Management Systems</td>
</tr>
</tbody>
</table>

Certificate in 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 Hybrid MBA.

<table>
<thead>
<tr>
<th>Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 604 Financial and Managerial Accounting for Decision Making</td>
</tr>
<tr>
<td>FN 608 Financial Management</td>
</tr>
<tr>
<td>IS 606 Business Information Systems</td>
</tr>
<tr>
<td>MK 610 Marketing Management</td>
</tr>
<tr>
<td>OM 607 Global Supply Chain Management</td>
</tr>
<tr>
<td>OS 603 Leadership and Organizational Behavior</td>
</tr>
</tbody>
</table>

Most candidates complete their certificate program in 9 months to 1.5 years.
The Reh Center for Innovation and Entrepreneurship
A resource center located within the Clarkson University David D. Reh School of Business, the Entrepreneurship Center helps small business owners and entrepreneurs develop and manage sustainable micro enterprises through partnerships with universities and government support programs.

The Center builds upon the University's nationally recognized expertise in entrepreneurial education and long-standing commitment to boost regional economies through small business development.

The goal of the Center is to serve as a national model for enhancing regional economic development by focusing on micro enterprises. Additionally, increased hands-on learning opportunities provide students with tremendous learning opportunities in marketing, management and finance.

Faculty for the David D. Reh School of Business
Consumer and Organizational Studies
Professor Augustine A. Lado; Associate Professors Jay Carlson, Tyson Mackey, Floyd Ormsbee, Zhaleh Semnani-Azad, Anju Sethi, Iman Paul; Participating Professors Mel Chudzik, Alan Belasen.

Economics and Financial Studies
Professors Diego Nocetti; Associate Professors Bebonchu Atems, John DeJoy Luciana Echazu, Zhilan Feng, Martin Heintzelman, Allan Zebedee; Assistant Professors, Wentao Wu Instructors Gasper Sekelj

Engineering & Management
Professor Michelle Crimir; Associate Professors R. John Milne, H. Cecilia Martinez Leon; Assistant Professors Golshen Madraki, Seyedamirabbas Mousavian, Ha Ta; Instructor Marshall Issen

Healthcare Management
Associate Professors John Huppertz, Peter Otto; Assistant Professors Amber Stephenson, Ohbet Cheon; Participating Professors Rob Smith, Carl Strang

Operations and Information Systems
Professors Alan Bowman, Boris Jukic, Weiling Ke, Farzad Mahmoodi; Associate Professors Santosh Mahapatra, Dennis Yu; Assistant Professors William MacKinnon, Chester Xiang, Jane Oppenlander; Participating Professors Bret Kauffman
In our modern technological society, engineers and scientists must work together with a variety of other professionals in seeking solutions to complex problems. Revolutionary advances in applied science and technology have broadened the horizons of engineering. At the same time, these advances have created a multitude of challenging multidisciplinary problems in virtually every sphere of human activity.

The role of engineers in today’s society has become more and more critical. Engineers require not only a knowledge of fundamentals for finding solutions to problems, but they must be aware of the broad social, economic, political, and environmental implications of their ventures. The engineering programs at Clarkson are designed to provide students with a foundation in science, engineering, humanities, and management. Our goal is to make sure Clarkson graduates are highly competent in their chosen fields while at the same time they are alert to their responsibilities to society and truly practice “technology serving humanity.”

Clarkson’s School of Engineering has been named the Wallace H. Coulter School of Engineering in recognition of the Foundation’s generous gift and the late Wallace Coulter’s dedication to the University as a trustee. Wallace H. Coulter was a renowned inventor and entrepreneur. He became acquainted with Clarkson through his collaboration with colloid scientists on the faculty. In 1979 he received an honorary doctorate, and he served as a trustee of the University from 1983 to 1989. Through the years he maintained close connections with Clarkson, supporting research projects and establishing an endowed scholarship.

The grant funded 5 key areas: team project-based learning activities; endowed chairs and endowed fellowships; new programs in biomedical engineering; upgrades of laboratory facilities; and scholarships for both minority students and women pursuing a degree in engineering. Growth in these evolving areas will complement and reinforce the programs and curricula described in this catalog.

The Coulter School of Engineering comprises the Departments of Chemical and Biomolecular, Civil and Environmental, Electrical and Computer, and Mechanical and Aeronautical Engineering.
Graduate Programs in Engineering
The Coulter School of Engineering offers Master of Science and Doctor of Philosophy degrees in each department. There is also an interdisciplinary Engineering Science graduate program managed by the Dean of the School of Engineering.

Faculty and students also participate in the interdisciplinary Data Analytics, Environmental Science and Engineering, and Materials Science and Engineering graduate programs. More information can be found in the section on the Institute for a Sustainable Environment and the Interdisciplinary Programs section of the catalog.

The graduate programs are designed to prepare students for careers in research, development, design, and education. Admission to graduate study will be granted to qualified applicants who hold a baccalaureate degree in engineering from an accredited institution or who have equivalent qualifications.

Program Length in School of Engineering
1. PhD program students complete up to 7 years after they pass the qualifying exam
2. MS Students complete within 5 years
Biomedical Engineering Masters of Science
William D. Jemison, Dean of Engineering
graduate@clarkson.edu

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—the 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 of the 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 Chair. 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.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative Human Physiology &amp; Lab</td>
<td>4</td>
</tr>
<tr>
<td>Pick 2 of:</td>
<td>6</td>
</tr>
<tr>
<td>(CORE) EE 585 Neural Engineering</td>
<td></td>
</tr>
<tr>
<td>(CORE) BME 587 Advanced Biomechanics</td>
<td></td>
</tr>
<tr>
<td>(CORE) ES 552 Biomaterials and Biomedical Engineering Applications</td>
<td></td>
</tr>
<tr>
<td>(Depth Electives) Two biomedical electives from an approved list *</td>
<td>6</td>
</tr>
<tr>
<td>(Breadth Elective) Any 500 or 600 level math, science, engineering, or business graduate course with technical content</td>
<td>3</td>
</tr>
<tr>
<td>Bio-entrepreneurship &amp; FDA Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>Clinical Immersion &amp; Bioethics</td>
<td>2</td>
</tr>
<tr>
<td>Capstone Experience I, II, and III***:</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
</tr>
</tbody>
</table>

*Approved biomedical breadth elective courses - see attached list

REQUIRED COURSES
BME 500 CLINICAL IMMERSION & BIOETHICS
BME 510 QUANTITATIVE HUMAN PHYSIOLOGY & LAB

CORE - Pick two of:
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 - BIOMED. ENGINEERING
BME 600 -- SELECTED TOPICS IN BIOMEDICAL ENGINEERING
BR500-- BIOMEDICAL ENGINEERING FUNDAMENTALS
ES 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.
Graduate education in Chemical and Biomolecular Engineering (ChBE) concentrates in the following specialties:

1. Functional Polymers and Nanocomposites
2. Electrochemical Processing
3. Chemical Reaction Engineering and Catalysis
4. Energy Technologies
5. Aerosols and their Impact on the Environment
6. Multi-component Mass Transfer Separations
7. Molecular Simulations
8. Plasma Processing
9. Modeling and Control of Biomedical Systems

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, 460, or their equivalent.

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

Requirements for MS in Chemical Engineering:
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 CH610 (Seminar). (While in residence, all students are required to attend seminar, whether they are registered for CH610 or not).

4. 10 credit hours of CH611 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.”
The Master of Science is a thesis-based degree; each student is required to complete and defend a research-based thesis.

Requirements for MS in Chemical Engineering for BS Chemists and/or Physicists
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:

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CH 501</td>
<td>3</td>
<td>CH 502</td>
<td>3</td>
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<tr>
<td>Directed Study in Chemical Engineering Principles I (CH 220, 320, 330)</td>
<td></td>
<td>Directed Study in Chemical Engineering Principles II (CH 260, 360, 370)</td>
<td></td>
</tr>
<tr>
<td>CH 561</td>
<td>3</td>
<td>CH 571</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Engineering Analysis (OR CH611 Thesis)</td>
<td></td>
<td>Advanced Chemical Engineering Thermodynamics (OR CH611 Thesis)</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
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<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>Graduate Elective</td>
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<td>Graduate Elective</td>
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</tr>
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<td>CH 610</td>
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<td>CH 610</td>
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<td>Total</td>
<td>10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Third Semester</th>
<th>Credits</th>
<th>Fourth Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 560</td>
<td>3</td>
<td>CH 546</td>
<td>3</td>
</tr>
<tr>
<td>Transport Phenomena</td>
<td></td>
<td>Chemical Reactor Analysis II</td>
<td></td>
</tr>
<tr>
<td>CH 611</td>
<td>3</td>
<td>CH 611</td>
<td>3</td>
</tr>
<tr>
<td>Thesis (OR CH561 Chemical Engineering Analysis)</td>
<td></td>
<td>Thesis (OR CH571 Advanced Chemical Engineering Thermodynamics)</td>
<td></td>
</tr>
<tr>
<td>CH611 Thesis</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>Total</td>
<td>6 or 4</td>
</tr>
</tbody>
</table>

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, 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. A student who violates the 18 month time limit will not be eligible for tuition support until qualifying examination is passed
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 department 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, whichever is longer. 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 purpose of the preliminary meetings, presentation, and the defense is three-fold:
1. To determine whether the student is capable and qualified for the PhD program
2. To acquaint the members of the committee with the subject of the student’s research and to elicit their suggestions on and criticisms of the proposed approach
3. To ensure that adequate progress is being made throughout the 18-month period toward defining a PhD research program

Each of these items requires the student to have a comprehensive understanding of the PhD project.

A student who violates the 18-month time limit will not be eligible for tuition support until qualifying examination is passed.

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 Department 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.

The Chair of the Examining Committee will be responsible for conducting the meeting and for reporting to the Graduate Committee the Examining Committee’s recommendation on the entrance of the student into the PhD program. The day following the examination, the Chair will receive from each person on the Committee her/his written vote on the student. The vote will be one of the following:

1. Pass. The student is clearly of PhD caliber
2. Fail. The student is clearly not of PhD caliber

The Chair of the Examining Committee will collect and summarize the vote for the other members of the Committee. The summary will be forwarded by the Chair to the Graduate Committee within 2 days. The Chair of the Graduate Committee will inform the student, in writing, of the decision of the Examining Committee. The student may retake the exam within one month if the final vote is “Fail”.

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.

ChBE Faculty
Elizabeth Podlaha-Murphy Chair; Professors: Sitaraman Krishnan, Selma Mededovic; Distinguished University Professor S. V. Babu; Liya Regel and Bill Wilcox Distinguished Professor of Engineering Ross Taylor; Assistant Professors: Joshua Bennett, Yuncheng Du, Taeyoung Kim, Simona Liguori, Ian McCrum, Shunsuke Nakao, Eunsu Paek; Emeritus Professors: Ruth Baltus, Richard McClusky, John McLaughlin, Shankar Subramanian
Civil and Environmental Engineering (CEE) Programs

John Dempsey, Chair
jdempsey@clarkson.edu

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

1. Environmental Engineering
2. Geotechnical Engineering
3. Structural and Materials Engineering
4. Water Resources Engineering
5. Construction Engineering Management (ME degree only)

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 departmental 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.

Requirements for MS in Civil and Environmental Engineering Program

1. The following are minimum requirements:
   a. 30 credit hours with all coursework approved at the graduate level
   b. 6 credit hours of thesis
   c. 18 credit hours of coursework
   d. 2 credit hours of seminar work
   e. 20 of the 30 credit hour minimum must be earned in residence
   f. 1 academic year of full time study beyond the BS
   g. Maximum of 10 transfer credit hours (grade B or better)
   h. All students must complete a thesis and defend it orally to a committee consisting of a minimum of 3 faculty members

*In consultation with his/her advisor, students should consider taking ES 542 (Fundamentals of Research and Graduate Study), when offered by the University.

2. Pass a group of core courses in 1 of the following professional concentrations comprising a minimum of 15 credit hours:
   a. Environmental
   b. Geotechnical
   c. Structural
   d. Water Resources

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)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 510</td>
<td>Sustainable Infrastructure and Building</td>
</tr>
<tr>
<td>CE 591</td>
<td>Special topics in Construction Engineering Management</td>
</tr>
<tr>
<td>CE 506</td>
<td>Advanced Construction Engineering</td>
</tr>
</tbody>
</table>

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

**ME 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 departmental 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.

**Requirements for ME in Civil and Environmental Engineering**
(Specialties other than Construction Engineering Management)

1. The following are minimum requirements:
   a. 30 credit hours
   b. 18 credit hours of graduate coursework at least 12 credits of these within engineering
   c. 1 credit hour of project work
   d. 2 credit hours of seminar
   e. 2 semesters in residence
   f. One-half of the total course credits at graduation must have a CE prefix
2. Pass a group of core courses in 1 of the following professional specialty areas comprising a
   minimum of 15 credit hours:
   a. Environmental
   b. Geotechnical
   c. Structural
   d. Water Resources

Projects must be completed and approved by the student’s advisor and Department Chair by filling out
a completion memo.
For projects completed at the beginning of a new semester, the final approval of the project and
completion forms must be received in the Graduate School no later than the second week of classes
(last day to register) or the student must register and pay tuition for one credit hour of project.

**Requirements for ME in Civil and Environmental Engineering**
Focus in Construction Engineering Management
30 credit hours
Completion of three (3) core Construction Engineering Management Courses (totaling 9 credit hours):
- CE506 Advanced Construction Engineering Management
- CE510 Sustainable Infrastructure and Building
- CE591 Special Topics in Construction Engineering Management

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.

Completion of three (3) courses (totaling 9 credit hours) offered by the Reh School of Business through their MBA program(s)

Completion of a Master of Engineering 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.

**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 departmental 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.

**Requirements for PhD in Civil and Environmental Engineering**

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

*In consultation with your advisor, students should consider taking ES 542 (Fundamentals of Research and Graduate Study), when offered by the University.

2. A maximum of 30 transfer credit hours (grade of B or better)
3. All work to be completed within 7 years after the candidacy procedure is completed
4. Pass a group of core courses in 1 of the following professional specialties comprising a minimum of 15 credit hours:
   a. Environmental
   b. Geotechnical
   c. Structural
   d. 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 to the Department Chair and the Dean of Engineering for their approval. The committee must be appointed prior to the comprehensive examination. The Advisory Committee and the Research Advisor will approve the courses required to satisfy the students’ minor. This committee must consist of five members qualified to sit on such a committee, at least one of which must be from outside the candidate’s department. Normally, the Research Advisor will not act as Chair of the committee. The purpose of the committee is to provide guidance to the student for the course work and research.

PhD Comprehensive Examination
Satisfactory completion of this examination must be done within two years of full-time study after admission to the PhD program. In CEE the PhD Comprehensive Examination consists of two parts: a comprehensive examination and a research proposal defense. The comprehensive examination should be taken within 18 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 or 24 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 15 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 15 credit hours:

<table>
<thead>
<tr>
<th>Environmental Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water and Wastewater Engineering: satisfied by an appropriate course as an undergraduate or:</td>
</tr>
<tr>
<td>CE 579</td>
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<tr>
<td>CE 580</td>
</tr>
<tr>
<td>CE 584</td>
</tr>
<tr>
<td>CE 582</td>
</tr>
<tr>
<td>And one of the following:</td>
</tr>
<tr>
<td>CE 681</td>
</tr>
<tr>
<td>CE 682</td>
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<tr>
<td>ES 534</td>
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### Geotechnical Engineering

**Choose 3 from the following list:**

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CE 512</td>
<td>Structural Dynamics</td>
</tr>
<tr>
<td>CE 513</td>
<td>Elastic Waves and Non-Destructive Tests</td>
</tr>
<tr>
<td>CE 515</td>
<td>Foundations, Stability, and Retaining Structures</td>
</tr>
<tr>
<td>CE 516</td>
<td>Advanced Soil Mechanics</td>
</tr>
<tr>
<td>CE 527/ME 527</td>
<td>Advanced Fluid Mechanics</td>
</tr>
<tr>
<td>CE 538</td>
<td>Finite Element Method</td>
</tr>
<tr>
<td>CE 551</td>
<td>Theory of Elasticity</td>
</tr>
<tr>
<td>CE 554</td>
<td>Continuum Mechanics</td>
</tr>
<tr>
<td>CE 563</td>
<td>Railroad Engineering</td>
</tr>
<tr>
<td>ME 531</td>
<td>Computational Fluid Dynamics</td>
</tr>
</tbody>
</table>

### Structural and Materials Engineering

**Choose 4 or 5 (dependent on degree type) from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 501</td>
<td>Fracture Mechanics of Concrete Structures</td>
</tr>
<tr>
<td>CS 512</td>
<td>Structural Dynamics</td>
</tr>
<tr>
<td>CE 520</td>
<td>Computational Methods of Structural Analysis</td>
</tr>
<tr>
<td>CE 521</td>
<td>Analysis of Advanced Composite Structures</td>
</tr>
<tr>
<td>CE 538</td>
<td>Introduction to Finite Element Method</td>
</tr>
<tr>
<td>CE 549</td>
<td>Experimental Methods in Structures</td>
</tr>
<tr>
<td>CE 551</td>
<td>Theory of Elasticity</td>
</tr>
<tr>
<td>CE 553</td>
<td>Properties and Performance of Concrete Materials</td>
</tr>
<tr>
<td>CE 554</td>
<td>Continuum Mechanics</td>
</tr>
<tr>
<td>CE 556</td>
<td>Engineering Analysis</td>
</tr>
<tr>
<td>CE 563</td>
<td>Railroad Engineering</td>
</tr>
<tr>
<td>CE 622</td>
<td>Uncertainty Quantification and Optimization in Computational Mechanics</td>
</tr>
<tr>
<td>CE 631</td>
<td>Cement Chemistry</td>
</tr>
<tr>
<td>CE 633</td>
<td>Plasticity</td>
</tr>
</tbody>
</table>

### Water Resource Engineering

**Choose 4 from the following list:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 527/ME 527</td>
<td>Advanced Fluid Mechanics</td>
</tr>
<tr>
<td>CE 554</td>
<td>Continuum Mechanics</td>
</tr>
<tr>
<td>CE 569</td>
<td>Watershed Analysis</td>
</tr>
<tr>
<td>CE 570</td>
<td>Stream Riparian System and Fluvial Morphology</td>
</tr>
<tr>
<td>CE 571</td>
<td>Computational River Dynamics</td>
</tr>
<tr>
<td>CE 572</td>
<td>Advanced Open Channel Hydraulics</td>
</tr>
<tr>
<td>CE 573</td>
<td>Sediment Transport</td>
</tr>
<tr>
<td>CE 574</td>
<td>Ecohydraulics</td>
</tr>
<tr>
<td>CE 575</td>
<td>Coastal Engineering</td>
</tr>
<tr>
<td>CE 576</td>
<td>Hydraulic Engineering in Cold Regions</td>
</tr>
<tr>
<td>ME 531</td>
<td>Computational Fluid Dynamics</td>
</tr>
</tbody>
</table>
Construction Engineering Management (CEM)

Erik Backus, Director of CEM

ebackus@clarkson.edu

The Masters of Engineering (ME) degree in Civil and Environmental Engineering with a specialty track in Construction Engineering Management (CEM) is available for students that have a BS in Civil Engineering or from another engineering discipline.

1. The degree requirements are:
   a. A total of 30 graduate credit hours
   b. 3 Core CEM Courses (9 credits)
   c. 3 Civil and Environmental Engineering (CEE) courses taken from an elective list (9 credits)
   d. 3 Business Management Courses (9 credits)
   e. ME Project (3 credits)

2. An average of B or better for all graduate coursework applied toward the M.E. degree is required for graduation.

3. A maximum of 10 credit hours of transfer coursework may be awarded (refer to Section III B).

4. Specific requirements

The CEM track is designed for flexibility giving students the opportunity to choose courses that meet their needs and schedule. The CEM project advisor will be selected through 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. Project credits can be taken in the summer.

### Required core CEM courses (9 credits)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offering Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 506</td>
<td>Advanced Construction Engineering</td>
<td>(even Fall semesters)</td>
</tr>
<tr>
<td>CE 510</td>
<td>Sustainable Infrastructure and Building</td>
<td>(all Fall semesters)</td>
</tr>
<tr>
<td>CE 591</td>
<td>Special Topics in Construction Engineering</td>
<td>(all Spring semesters)</td>
</tr>
</tbody>
</table>

### CEE Electives (9 credits) - 3 are required, which may include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Offering Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 512</td>
<td>Introduction to Structural and Soil Dynamics</td>
<td>(on demand)</td>
</tr>
<tr>
<td>CE 513</td>
<td>Elastic Waves and Non-Destructive Testing</td>
<td>(even Fall semester)</td>
</tr>
<tr>
<td>CE 515</td>
<td>Foundations, Stability, and Retaining Structures</td>
<td>(all Fall semester)</td>
</tr>
<tr>
<td>CE 516</td>
<td>Advanced Soil Mechanics</td>
<td>(odd Fall semester)</td>
</tr>
<tr>
<td>CE 519</td>
<td>Advanced Foundation Design</td>
<td>(odd Spring semester)</td>
</tr>
<tr>
<td>CE 520</td>
<td>Computational Methods of Structural Analysis</td>
<td>(all Spring semester)</td>
</tr>
<tr>
<td>CE 521</td>
<td>Analysis of Advanced Composite Structures</td>
<td>(on demand)</td>
</tr>
<tr>
<td>CE 538</td>
<td>Introduction to Finite Element Method</td>
<td>(all Fall semester)</td>
</tr>
<tr>
<td>CE 549</td>
<td>Experimental Methods in Structures</td>
<td>(all Spring semester)</td>
</tr>
<tr>
<td>CE 553</td>
<td>Properties and Performance of Concrete Materials</td>
<td>(all Spring semester)</td>
</tr>
<tr>
<td>CE 555</td>
<td>Structural Damage: Assessment, Repair, and Strengthening</td>
<td>(odd Spring semester)</td>
</tr>
<tr>
<td>CE 556</td>
<td>Engineering Analysis</td>
<td></td>
</tr>
<tr>
<td>CE 622</td>
<td>Uncertainty Quantification and Optimization</td>
<td></td>
</tr>
<tr>
<td>CE 631</td>
<td>Cement Chemistry</td>
<td>(even Spring semester)</td>
</tr>
</tbody>
</table>
Based on student's interests and approval of the Director of CEM, three courses are selected from the MBA program in the areas of Economics, Ethics, Supply Chain Management, Accounting, Finance, Decision Analysis, Information Systems, and Marketing.

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

**Faculty**

**Environmental Faculty**
*Professors Andrea Ferro, Stefan Grimberg, Thomas Holsen; Associate Professor Shane Rogers; Assistant Professor, Yang Yang*

**Geotechnical Faculty**
*Assistant Professors Suguang Xiao*

**Structures Faculty**
*Professors John Dempsey, Sulapha Peethaparan, Steven Wojtkiewicz; Assistant Professor Pedro Fernández-Cabán, Robert Thomas*

**Water Resources Faculty**
*Professors Weiming Wu, Associate Professors Tyler Smith, Assistant Professors Ian Knack, Abul Baki*

**Transportation Faculty**
*Assistant Professor Behzad Behnia*
Electrical and Computer Engineering (ECE) Programs
Paul McGrath, Chair of Electrical & Computer Engineering
pmgrath@clarkson.edu

The Electrical and Computer Engineering department offers programs of study leading to the degree of Master of Science (MS) in Electrical Engineering on the Potsdam campus, an Electrical Engineering Master of Science (MS) through the Capital Region Campus, and the Doctor of Philosophy (PhD) in Electrical and Computer Engineering. Clarkson University also offers an off-campus PhD option designed to assist qualified non-resident candidates to matriculate at Clarkson University as doctoral degree candidates.

Graduate courses cover a range of specialty areas which may be found in the University Course Catalog on the Student Administrative Services website. The specialty areas include: Power, Communications and Signal Processing, Data Communications and Networks, Electronics, Computer Hardware, Computer Software, Biomedical Engineering, and Biometrics

MS Degree in Electrical Engineering Prerequisites (Potsdam Campus)
BS, BE, or equivalent degree from an accredited program in Electrical, Computer and Software 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 departmental 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.

Requirements for MS Degree in Electrical Engineering (Potsdam 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 course work will be in the chosen research area
   c. 2 credit hours of seminar work
   d. Maximum of 10 credit hours transfer credit (grade of B or better)

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 thesis based on independent research;
      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 two copies of the thesis will be deposited in the University library.
   b. A comprehensive examination;
      A comprehensive examination taken in partial fulfillment of the requirements for the Master of Science degree will be administered by the faculty committee approved by the appropriate academic administrator.
   c. An appropriate, professionally oriented special project.

3. 1-7 credits of 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.

**MS Degree in Electrical Engineering Prerequisites (Capital Region Campus)**
A 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 MS program will be given only after the required prerequisite coursework has been completed.

**Additional Program Requirements and Procedures for MS in Electrical Engineering (Capital Region Campus)**
Students must complete 30 credits of course work and MS Graduate Project EE 699 (see below).

The Master of Science in Electrical Engineering Program requires a total of ten courses. Each student’s program should include at least seven Electrical Engineering courses and up to three electives. The elective courses are selected from Engineering (Mechanical or Electrical), Computer Science, School of Business MBA Program, or from the Business of Energy Program. Not all courses from these areas are satisfactory selections; therefore all course selections must be approved by the graduate advisor before course registration. Each student must submit a program plan of study (to be approved by the advisor) before completion of the first course taken for graduate credit.

An option of replacing two of the ten courses with Research and Thesis courses requires departmental (Associate Dean) approval prior to beginning the program (as these opportunities are limited). Students not completing Research and Thesis courses are required to complete the MS Graduate Project in Electrical Engineering (EE 699). This is a non-credit, no-fee project that serves as the culminating experience of the MS in Electrical Engineering degree.
**EE Courses (Capital Region Campus)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 699</td>
<td>Master of Science Graduate Project in Electrical Engineering</td>
</tr>
<tr>
<td><strong>Power/ Energy Conversion (Energy-Related)</strong></td>
<td></td>
</tr>
<tr>
<td>EE 642</td>
<td>Electronic Power Conversion</td>
</tr>
<tr>
<td>EE 653</td>
<td>Modeling and Control of Energy Conversion</td>
</tr>
<tr>
<td>EE 682</td>
<td>Electromechanical Energy Conversion</td>
</tr>
<tr>
<td><strong>Power Systems (Energy-Related)</strong></td>
<td></td>
</tr>
<tr>
<td>EE 680</td>
<td>Power System Analysis I</td>
</tr>
<tr>
<td>EE 681</td>
<td>Power System Analysis II</td>
</tr>
<tr>
<td><strong>Controls (Energy-Related)</strong></td>
<td></td>
</tr>
<tr>
<td>EE 657</td>
<td>Linear Control Systems</td>
</tr>
<tr>
<td>EE 658</td>
<td>Digital Control Systems</td>
</tr>
<tr>
<td><strong>Special Interest</strong></td>
<td></td>
</tr>
<tr>
<td>EE 645</td>
<td>Super Conductivity</td>
</tr>
<tr>
<td>EE 644</td>
<td>Solid State Electronics</td>
</tr>
<tr>
<td>EE 606</td>
<td>Motor Acoustics</td>
</tr>
<tr>
<td><strong>Misc.</strong></td>
<td></td>
</tr>
<tr>
<td>EE 602</td>
<td>Engineering Statistics</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td></td>
</tr>
<tr>
<td>EE 687</td>
<td>Nuclear Engineering</td>
</tr>
<tr>
<td>EE 640</td>
<td>Fuel Cell Science and Hydrogen Engineering</td>
</tr>
<tr>
<td>EE 643</td>
<td>Photovoltaic Engineering</td>
</tr>
<tr>
<td>EE 683</td>
<td>Turbine Engineering</td>
</tr>
<tr>
<td>EE 685</td>
<td>Solar Energy Engineering</td>
</tr>
<tr>
<td>EE 684</td>
<td>Wind Energy Engineering</td>
</tr>
<tr>
<td>EE 686</td>
<td>Synchronous Generator Engineering</td>
</tr>
<tr>
<td>EE 600</td>
<td>Disruptive Technology (As elective only)</td>
</tr>
<tr>
<td>EE 601</td>
<td>Sustainability (As elective only)</td>
</tr>
<tr>
<td><strong>Sample Electives</strong></td>
<td></td>
</tr>
<tr>
<td>BOE 610, 611, 612, 613, 614, 615</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>OM 607</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>OS 603</td>
<td>Leadership and Organizational Behavior</td>
</tr>
<tr>
<td><strong>Additional School of Business MBA Core Courses and Electives</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Program Length**

One and one-half – Two years (Full-time)
Two and one half – Three years (Part-time)
PHD Degree in Electrical and Computer Engineering Prerequisites (Potsdam Campus)

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.

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

Requirements for PHD Degree in Electrical and Computer Engineering

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
      Students matriculated in the off-campus PhD program are exempt from this residency requirement (see catalog for details of the off-campus PhD program).

2. A maximum of 30 credit hours 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. All students must pass a comprehensive examination within one year after entering the PhD program (see below).

Ph.D. Research Committee

Each Ph.D. 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 Ph.D. 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 Ph.D. comprehensive exam (see below) and is responsible for ensuring that the student has sufficient preparation appropriate for the degree.

The research committee will:

a. Serve as the members of the Ph.D. comprehensive exam
b. Serve as the members of the dissertation proposal defense committee
c. Serve as the final dissertation committee.

The student’s committee has the responsibility to certify that the major field, minor field, and overall coursework is appropriate to the student’s field of study. This must be done by the time of the approval of the student’s research proposal.
**Ph.D. Comprehensive Examination**

All students must pass a comprehensive examination within one year of entering the Ph.D. program or after the completion of 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 Ph.D. 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 and pertinent literature review and a broad overview of possible research topics. The student should demonstrate an ability to:

i. Identify a number of relevant research papers,
ii. Grasp key ideas in the papers, and
iii. Replicate important results (derivation of equations, developing computer models, etc.).
iv. 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:

i. Pass
ii. 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 case of a fail, 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 time limits specified, the student will be required to withdraw from the program. In this case, the student can be granted the option of pursuing 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 Department of ECE at Clarkson University can combine the MS oral defense with the comprehensive exam.

**Transfer of credits**

Within one year of entering the Ph.D. 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 Ph.D. candidacy procedure by defending a Ph.D. research proposal within six months after the successful completion of the comprehensive examination or two years after entering the Ph.D. 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 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 which 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 ECE Dept. Chair, in writing, of the results of the exam. A copy of this memo will be inserted into the student’s file.

In the event that 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 subsequent to passing the candidacy examination, the student or the thesis advisor decide to make a significant change in 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 department chair. This approval must be in writing and inserted into the student’s file.

ECE Faculty
Professors, Ming-Cheng Cheng, David Crouse, William Jemison, Paul McGrath, Stephanie Schuckers, Charles Robinson, Daqing Hou, ; Associate Professors Mahesh Banavar, James Carroll, Abul Khondker, Jack Koplowitz, Chen Liu, ; Assistant Professors, Chee-Keong Tan, Faraz Hussain, Tuyen Vu, Yu Liu, Jianhua Zhang, Yazhou Jiang, Masudul Imtiaz, and Wei Yan
Mechanical Engineering Programs
Dr. Brian Helenbrook, Chair
bhelenbr@clarkson.edu

Graduate education in Mechanical Engineering focus in the following specialties:
1. Fluid mechanics, multiphase flows and thermal sciences engineering
2. Materials and fabrication engineering
3. Energy systems and renewable energy engineering
4. Mechanical systems and design engineering
5. Biomechanical and rehabilitation engineering

MS Prerequisites (Potsdam Campus)
A 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 mechanical engineering may be required to take additional courses for which graduate credit will not be given. Admission to the MS program will be given only after the required prerequisite coursework has been completed.

Requirements for MS Degree in Mechanical Engineering
1. 18 credits of course work
2. 2 credits of seminar
3. Either
   1. 10 credits of ME 614 – Thesis/Dissertation with a MAE faculty advisor.
   2. 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 MAE Chair and CSOE Dean using the CSOE Graduate Committee Appointment form. The committee should be approved before the second semester of graduate study.

Or

4 credits of ME 616 – Special Projects with a MAE faculty advisor.
6 credits of additional course work
All students must complete a project with a written report approved by the Chair of the graduate committee. 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

Exceptional students may be invited to proceed directly to the Ph.D.; such students will be awarded the M.S. upon completing 40 credit hours and passing the doctoral candidacy procedure (qualifying exam and proposal defense)
3. One credit of ME614 or ME616 may be replaced by ES 542 – Fundamentals of Research and Graduate Study
4. At least 15 course credit hours must be in engineering. No more than 2 dual numbered courses may be taken for graduate credit
5. A minimum of two ME graduate courses must be taken.
6. At least one mathematics course must be taken. The following is a list of suggested courses:
   - CH561 Engineering Analysis
   - ME515 Finite Element Methods
   - ME529 Stochastic Processes in Engineering
   - ME554 Continuum Mechanics
   - MA514 Sets and Topology
   - MA521 Classical Complex Analysis
   - MA522 Classical Real Analysis
   - MA531 Initial and Boundary Value Problems
   - MA550 Nonlinear Partial Diff Equation
   - MA577 Numerical Methods
   - MA578 Numerical Analysis
   - MA581 Probability

<table>
<thead>
<tr>
<th>No more than 2 courses may be selected from this list</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ME 591</strong></td>
</tr>
<tr>
<td><strong>ME 594</strong></td>
</tr>
<tr>
<td><strong>ME 618</strong></td>
</tr>
<tr>
<td><strong>ME 628</strong></td>
</tr>
<tr>
<td><strong>ME 657</strong></td>
</tr>
</tbody>
</table>

Other courses may also be acceptable with the written approval of the MAE Graduate Committee.

The MS student has the option of continuing towards a PhD degree if accepted into the PhD program by the MAE Graduate Committee.

**Program Length**
One and one-half year (three semesters and summer)

**MS Prerequisites (Capital Region Campus)**
The objective of the Mechanical Engineering (ME) Program is to expand graduates’ understanding and applications of solid mechanics, thermal-fluid systems, materials, and manufacturability to advance career opportunities in power systems, emerging energy technologies, and product design evolution. Students are encouraged to consider MBA and Business of Energy courses as electives to integrate business skills and complement technical expertise.
Requirements for MS in Mechanical Engineering
30 credits of course work and MS Graduate Project ME 599 (see below)

The Master of Science in Mechanical Engineering Program requires a total of ten courses. Two of three core courses must be taken by all ME students: ME 502 (Engineering Analysis) is required by all students and one or both of the following: ME 501 (Transport Phenomena) or ME 500 (Elasticity). Of the remaining courses, six must be in the technical Mechanical Engineering major. The remaining courses are selected from Engineering (Mechanical or Electrical), Computer Science, School of Business MBA program, or from the Business of Energy Program. Not all courses from these areas are satisfactory selections; therefore all course selections must be approved by the graduate advisor before course registration. Each student must submit a program plan of study (to be approved by the advisor) before completion of the first course taken for graduate credit.

An option of replacing two of the ten courses with Master’s Project or Research and Thesis courses requires departmental (Associate Dean) approval prior to beginning the program (as these opportunities are limited). Students not completing Master’s Project or Research and Thesis courses are required to complete an MS Graduate Project in Mechanical Engineering (ME 599). This is a non-credit, no-fee project that serves as the culminating experience of the MS in Mechanical Engineering degree.

<table>
<thead>
<tr>
<th>ME Courses</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 599</td>
<td>Master of Science Graduate Project in Mechanical Engineering</td>
</tr>
<tr>
<td>Core</td>
<td></td>
</tr>
<tr>
<td>ME 500</td>
<td>Elasticity</td>
</tr>
<tr>
<td>ME 501</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>ME 502</td>
<td>Engineering Analysis</td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>ME 506</td>
<td>Mechanical Behavior of Materials</td>
</tr>
<tr>
<td>ME 508</td>
<td>Fracture Mechanics</td>
</tr>
<tr>
<td>ME 513</td>
<td>Processing and Selection of Engineering Materials</td>
</tr>
<tr>
<td>Structural</td>
<td></td>
</tr>
<tr>
<td>ME 509</td>
<td>Current Approach to Fatigue in Design</td>
</tr>
<tr>
<td>ME 516</td>
<td>Finite Element Methods in Engineering</td>
</tr>
<tr>
<td>ME 510</td>
<td>Advanced Dynamics</td>
</tr>
<tr>
<td>ME 512</td>
<td>Vibrations of Discrete Systems</td>
</tr>
<tr>
<td>ME 561</td>
<td>Engineering Optimization</td>
</tr>
<tr>
<td>Me 562</td>
<td>Composites</td>
</tr>
<tr>
<td>Fluids</td>
<td></td>
</tr>
<tr>
<td>ME 563</td>
<td>Dynamics of a Viscous Fluid</td>
</tr>
<tr>
<td>ME 564</td>
<td>Compressible Fluid Flow</td>
</tr>
<tr>
<td>ME 565</td>
<td>Combustion Fundamentals</td>
</tr>
<tr>
<td>ME 566</td>
<td>Fluid Dynamics of Turbo Machinery</td>
</tr>
<tr>
<td>ME 572</td>
<td>Advanced Fluid Dynamics</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>ME 573</td>
<td>Flow and Heat Transfer in Multiphase Systems</td>
</tr>
<tr>
<td>ME 574</td>
<td>Computational Fluid Dynamics</td>
</tr>
<tr>
<td>ME 567</td>
<td>Thermodynamic Analysis</td>
</tr>
<tr>
<td>ME 568</td>
<td>Thermal Energy Processes (Energy-Related)</td>
</tr>
<tr>
<td>ME 569</td>
<td>Conduction Heat Transfer</td>
</tr>
<tr>
<td>ME 570</td>
<td>Superconductivity (Energy-Related)</td>
</tr>
<tr>
<td>ME 571</td>
<td>Convection Heat Transfer</td>
</tr>
<tr>
<td>ME 584</td>
<td>Principles of Thermal Systems (Energy-Related)</td>
</tr>
<tr>
<td>ME 575</td>
<td>Nuclear Engineering and Technology</td>
</tr>
<tr>
<td>ME 581</td>
<td>Fuel Cell Science and Hydrogen Engineering</td>
</tr>
<tr>
<td>ME 582</td>
<td>Photovoltaic Engineering</td>
</tr>
<tr>
<td>ME 583</td>
<td>Turbine Engineering</td>
</tr>
<tr>
<td>ME 586</td>
<td>Welding</td>
</tr>
<tr>
<td>ME 587</td>
<td>Solar Energy Engineering</td>
</tr>
<tr>
<td>ME 588</td>
<td>Wind Energy Engineering</td>
</tr>
<tr>
<td>ME 589</td>
<td>Synchronous Generator Engineering</td>
</tr>
<tr>
<td>ME 600</td>
<td>Disruptive Technology (As elective only)</td>
</tr>
<tr>
<td>ME 601</td>
<td>Sustainability (As elective only)</td>
</tr>
<tr>
<td>BOE 610, 611, 612, 613, 614, 615</td>
<td>Sample Electives</td>
</tr>
<tr>
<td>OM 607</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>OS 603</td>
<td>Leadership and Organizational Behavior</td>
</tr>
</tbody>
</table>

**Sample Electives**

**Additional School of Business MBA Core Courses and Electives**

**Program Length**

One and one-half – Two years (Full-time)
Two and one half – Three years (Part-time)

**Requirements for PhD in Mechanical Engineering (Potsdam Campus)**

1. A minimum of 39 credit hours of course work.

2. At least two additional ME courses beyond the M.S. degree course requirements (part of the 39 course credit hours required).

3. In order to monitor a student's progress toward a Ph.D., the following sequence of examinations and presentations are required (the exact form and timing of these are presented in separate sections of these requirements):
   a. Qualifying Examination
b. Research Proposal Defense Examination

c. Examination on the Dissertation

Note: A student is considered a Ph.D. candidate after passing both the Qualifying and Research Proposal Defense Examinations.

4. A 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 Ph.D. program. M.S. students may take the exam one time prior to completion of their M.S. thesis with written permission from their advisor. This is a written examination covering a general background in the area of mechanical engineering. If a Ph.D. student fails any portion of this exam, studies cannot proceed until approval is obtained from the Department Chairman and from the Dean of the Graduate School. If a Ph.D. student fails the qualifying exam twice, the student will be dropped from the Graduate School.

The Qualifying Examination is composed of two written parts:


   b. Mechanical Engineering Science: Statics, dynamics, fluid mechanics, strength of materials, thermodynamics, heat transfer, vibration and material science/metallurgy.

The exam is closed book. The two parts of the exam are scheduled within a one week time period. Missing an exam counts as failing the exam. The MAE Graduate Committee is responsible for administering and making arrangements for grading the exams.

5. Ph.D. Course Selection: Courses that a Ph.D. student takes to complete course requirements must be mutually agreed upon by the student and advisor. Students and advisors must define the major field of study (15 credits minimum) and minor field of study (9 credits minimum) on the Ph.D. Degree Program Form. Examples of suitable major fields include fluid mechanics, solid mechanics, controls, materials, etc. An example of a minor field could be mathematics, numerical methods, or solid mechanics for a student whose major field is fluid mechanics. A student whose major field is solid mechanics could have a minor field of mathematics, materials, fluid mechanics, controls, etc. There are many possible combinations of major and minor fields of study. However, the choices must be supported by appropriate courses. With the advisor's consent, a student's minor field could be innovation and entrepreneurship. This program, offered by the Clarkson School of Business, consists of three of the following four courses: OM676, Developing and Managing Technology; SB613, Entrepreneurship and New Venture Creation; MK 689, New Product Marketing; and OM680, Strategic Project Management.

6. In order to provide guidance to Ph.D. students, a Degree Committee must be selected within one year of entry into the Ph.D. program and prior to the student's Research Proposal defense. In consultation with the student, the Committee will be selected by the student's Major
Professor, who also serves as the dissertation advisor. Approval for the Degree Committee must be obtained from the MAE Department Chair and the Dean of the Graduate School. 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. 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.

7. A formal 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 this proposal be made at least one year prior to the completion date of the research work. The major purpose of the 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 proposal may be brief, but must describe clearly the proposed research as well as the research carried out so far. It is required that the proposal be distributed to the Degree Committee prior to the formal presentation. The Research Proposal must be accepted by the Degree Committee for successful completion of the proposal defense examination.

8. Before the final dissertation examination can be taken, the candidate must submit at least two research articles to academic journals. At the time of the examination, these papers must be either under review or accepted by the journal.

9. A final dissertation examination must be passed. 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. The final dissertation examination will include, as a minimum, an oral examination based on the dissertation. The candidate will present and defend his/her dissertation. The Degree Committee and the Dean of the Graduate School must approve the dissertation.
Energy Systems Programs
Hugo Irizarry-Quinones, Associate Dean of Engineering
hirizarr@clarkson.edu

MS Prerequisites (Capital Region Campus)
A 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 MS program will be given only after the required prerequisite coursework has been completed.

Program Objectives
The objective of the Master of Science in Energy Systems is to enable students to integrate:

1. Mechanical/Electrical energy related courses
2. Mechanical and Electrical fundamental discipline courses; and
3. Non-technical courses regarding the impact of environmental, economic, and regulatory issues on energy

This is a technical degree focused on energy systems and related technology and the impact of our external changing environment on these technologies.

The engineering profession continues to require the understanding and application of technologies that complement each other in their product, system or service applications. Course offerings that include two disciplines (Mechanical/ Electrical Engineering) provide a student with the technical breadth/depth required to compete in the design, commercialization, and service associated with products related to emerging energy systems. Career growth may be additionally enhanced by a broad understanding of non-technical elements impacting change such as sustainability, the disruptive nature of new technology, and the Business of Energy.

The Master of Science in Energy Systems provides a balanced degree program of energy focused mechanical/electrical courses, fundamental discipline mechanical and electrical courses, and the broad understanding of related environment, economic, and regulatory issues.

Requirements for MS in Energy Systems
The Master of Science in Energy Systems requires a total of 11 courses. Each student’s program will include at least 5 to 9 energy related mechanical or electrical engineering courses, 2 to 3 non-technical Mechanical or Electrical energy-related and/or Business of Energy courses, and 0 to 4 fundamental technical Mechanical or Electrical engineering courses. Course selection should be approved by the graduate advisor before course registration. Each student should submit a program plan of study (to be approved by the advisor) before completion of the first course taken for graduate credit.
Courses taken should be selected from the following groupings:

**Energy Systems Courses (Choose 5-9)**

<table>
<thead>
<tr>
<th>Cross-Listed Courses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 640/ ME 581</td>
<td>Fuel Cell Science and Hydrogen Engineering</td>
</tr>
<tr>
<td>EE 643/ ME 582</td>
<td>Photovoltaic Engineering</td>
</tr>
<tr>
<td>EE 657/ ME 560</td>
<td>Linear Control Systems</td>
</tr>
<tr>
<td>EE 683/ ME 583</td>
<td>Turbine Engineering</td>
</tr>
<tr>
<td>EE 684/ ME 588</td>
<td>Wind Energy Engineering</td>
</tr>
<tr>
<td>EE 685/ ME 587</td>
<td>Solar Energy Engineering</td>
</tr>
<tr>
<td>EE 686/ ME 589</td>
<td>Synchronous Electrical Generators</td>
</tr>
<tr>
<td>EE 687/ ME 575</td>
<td>Nuclear Engineering</td>
</tr>
</tbody>
</table>

**EE Courses**

| EE 642 | Electronic Power Conversion |
| EE 645 | Superconductivity |
| EE 653 | Modeling and Control of Energy Conversion |
| EE 658 | Digital Control Systems |
| EE 680 | Power System Analysis I |
| EE 681 | Power System Analysis II |
| EE 682 | Electromechanical Energy Conversion |

**ME Courses**

| ME 568        | Thermal Energy Processes |
| ME 570        | Superconductivity |
| ME 584        | Principles of Thermal Systems |

**Non-technical Energy Systems Courses (Choose 2-3)**

<table>
<thead>
<tr>
<th>Cross-Listed Courses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 600/ ME 600</td>
<td>Disruptive Technology</td>
</tr>
<tr>
<td>EE 601/ ME 601</td>
<td>Sustainability</td>
</tr>
</tbody>
</table>

**BOE Courses**

| BOE 610 | Fundamentals of the Business of Energy |
| BOE 611 | Planning and Operations of Power Systems |
| BOE 612 | Power Markets |
| BOE 613 | Deregulation & Restructuring |
| BOE 614 | Electric Power Industry Economics and Finance |
| BOE 615 | Challenges to Upgrading Aging Infrastructure |
### Other Fundamental Technical Courses (Choose 0-4)

#### Cross Listed Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 602/</td>
<td>Engineering Statistics</td>
</tr>
<tr>
<td>ME 577</td>
<td></td>
</tr>
<tr>
<td>EE 606/</td>
<td>Motor Acoustics</td>
</tr>
<tr>
<td>ME 579</td>
<td></td>
</tr>
</tbody>
</table>

#### EE Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 644</td>
<td>Solid State Electronics</td>
</tr>
</tbody>
</table>

#### ME Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 500</td>
<td>Elasticity</td>
</tr>
<tr>
<td>ME 501</td>
<td>Transport Phenomena</td>
</tr>
<tr>
<td>ME 502</td>
<td>Engineering Analysis</td>
</tr>
<tr>
<td>ME 506</td>
<td>Mechanical Behavior of Materials</td>
</tr>
<tr>
<td>ME 508</td>
<td>Fracture Mechanics</td>
</tr>
<tr>
<td>ME 509</td>
<td>Current Approaches to Fatigue in Design</td>
</tr>
<tr>
<td>ME 510</td>
<td>Advanced Dynamics</td>
</tr>
<tr>
<td>ME 512</td>
<td>Vibrations of Discrete Systems</td>
</tr>
<tr>
<td>ME 513</td>
<td>Processing and Selection of Engineering Materials</td>
</tr>
<tr>
<td>ME 516</td>
<td>Finite Element Methods in Engineering</td>
</tr>
<tr>
<td>ME 561</td>
<td>Engineering Optimization</td>
</tr>
<tr>
<td>ME 562</td>
<td>Composites</td>
</tr>
<tr>
<td>ME 563</td>
<td>Dynamics of a Viscous Fluid</td>
</tr>
<tr>
<td>ME 564</td>
<td>Compressible Fluid Flow</td>
</tr>
<tr>
<td>ME 565</td>
<td>Combustion Fundamentals</td>
</tr>
<tr>
<td>ME 566</td>
<td>Fluid Dynamics of Turbo Machinery</td>
</tr>
<tr>
<td>ME 567</td>
<td>Thermodynamic Analysis</td>
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<td>ME 569</td>
<td>Conduction Heat Transfer</td>
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<tr>
<td>ME 571</td>
<td>Convection Heat Transfer</td>
</tr>
<tr>
<td>ME 572</td>
<td>Advanced Fluid Dynamics</td>
</tr>
<tr>
<td>ME 573</td>
<td>Flow and Heat Transfer in Multiphase Systems</td>
</tr>
<tr>
<td>ME 574</td>
<td>Computational Fluid Dynamics</td>
</tr>
<tr>
<td>ME 576</td>
<td>System Modeling and Optimization</td>
</tr>
<tr>
<td>ME 586</td>
<td>Welding</td>
</tr>
</tbody>
</table>

### Program Length

- One and one-half – Two years (Full-time)
- Two and one half – Three years (Part-time)
Engineering & Management Systems Program

Program Objectives
The objective of the Engineering and Management Systems program is to integrate engineering and computer science technologies with the components of MBA and/or Business of Energy. Students become architects of a multi-disciplined technical/management degree that provides the skills necessary to quickly develop products and move them toward commercialization.

The engineering professions continue to require the understanding and application of broadening technologies that complement each other in their product, system, or service application. Course offerings from all three disciplines (Electrical Engineering, Mechanical Engineering, and Computer Science) may be required to provide a student with their desired technical growth or parallel the direction of their industrial interests. Technical career growth may be additionally enhanced by supplementing strong technical fundamentals with management disciplines such as finance, marketing, operations, or other related business skills related to the energy industry.

The Master of Science in Engineering and Management Systems provides a balanced degree program of Engineering and Computer Science complimented by School of Business MBA Program and/or Business of Energy courses.

MS Prerequisites (Capital Region Campus)
A 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 MS program will be given only after the required prerequisite coursework has been completed.

Program Length
One and one-half – Two years (Full- time)
Two and one half – Three years (Part- time)

Requirements for MS in Engineering & Management Systems
The Master of Science in Engineering and Management Systems Program requires a total of 11 courses. Each student’s program will include 6 technical courses from School of Engineering and/or Computer Science (see below) and 5 courses from the School of Business MBA and/or Business of Energy programs. Not all courses from these areas are satisfactory selections; therefore all course selections should be approved by the graduate advisor before course registration. Each student should submit a program plan of study (to be approved by the advisor) before completion of the first course taken for graduate credit.
School of Engineering courses should be selected from the Mechanical and Electrical technical courses located in the requirements for the Master of Science Degrees in this catalog and/or the Computer Science courses listed below:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 500</td>
<td>Network &amp; Systems Security</td>
</tr>
<tr>
<td>CS 501</td>
<td>Software Quality Management</td>
</tr>
<tr>
<td>CS 502</td>
<td>Business Intelligence</td>
</tr>
<tr>
<td>CS 503</td>
<td>Systems Analysis &amp; Design Methods</td>
</tr>
<tr>
<td>CS 504</td>
<td>Enterprise Architecture</td>
</tr>
<tr>
<td>CS 505</td>
<td>Business Data Communications and Networking</td>
</tr>
<tr>
<td>CS 506</td>
<td>Engineering Statistics</td>
</tr>
</tbody>
</table>

School of Business Courses should be selected from the MBA Core courses and/or electives. Business of Energy courses should be selected from the Business of Energy Program Courses listed in this catalog.

The Master of Science in Engineering and Management Systems Program will not allow graduate work from another institution to be transferred toward completion of this degree program per the existing transfer policy noted elsewhere in this catalog unless specifically approved by the Dean of the School of Engineering.
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.

Requirements for Graduate Certificate in the Business of Energy Program
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.

<table>
<thead>
<tr>
<th>Business of Energy Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOE 610     Fundamentals of the Business of Energy</td>
</tr>
<tr>
<td>BOE 611     Planning and Operations of Power Systems</td>
</tr>
<tr>
<td>BOE 612     Power Markets</td>
</tr>
<tr>
<td>BOE 613     Deregulations and Restructuring</td>
</tr>
<tr>
<td>BOE 614     Electric Power Industry Economics and Finance</td>
</tr>
<tr>
<td>BOE 615     Challenges to upgrading infrastructure</td>
</tr>
</tbody>
</table>

Program Duration
One– Two years (full time or part-time)
Master of Science in The Business of Energy Program
(Capital Region Campus – Online Program)

Program Objectives
The objective of the Master of Science in The Business of Energy degree program is to combine
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.

The program graduates students with a comprehensive understanding of how business principles
apply to power generation, transmission, distribution and consumption. The program blends
contemporary energy issues and related business principles to create a focused learning experience
designed to increase the student’s competency to generate ideas, solve problems, and manage change
and complexity in the challenging energy industry. It is designed for both working professionals and
recent graduates, and the courses serve 2 functions:

1. Core program courses provide an understanding of the complexity of the integrated functions
   within the energy industry from fuel selection/ power production to end-user consumption;
   and

2. Business courses strengthen the students’ competency in their professional discipline(s) for
   application within the energy industry sector

The program curriculum is delivered entirely online and taught by senior managers with years of
experience in the energy business.

MS Prerequisites
A minimum of a bachelor’s degree. Applications will be handled on a case by case basis. Successful
applicants will have backgrounds in engineering, business, sciences, law, policy or related disciplines
who seek to advance their careers in professions associated with the energy industry.

Requirements for MS in the Business of Energy Programs
The MS-BOE requires a total of 10 courses and a total of 30 credit hours. Each student’s program
should include 5 to 6 Business of Energy courses and 4 to 5 School of Business MBA Program Courses.
The BOE 610 (Fundamentals of the Business of Energy) course must be taken by all students. Not all
MBA Program courses are satisfactory selections; therefore all course selections must be approved by
the graduate advisor before course registration. Each student must submit a program plan of study
(to be approved by the advisor) before completion of the first course taken for graduate credit.

Students are also required to complete an MS Graduate Project in The Business of Energy (BOE 616).
This is a non-credit, no-fee project that serves as the culminating experience of the MS in The Business
of Energy degree.
Business of Energy Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOE 610</td>
<td>Fundamentals of the Business of Energy</td>
</tr>
<tr>
<td>BOE 611</td>
<td>Planning and Operations of Power Systems</td>
</tr>
<tr>
<td>BOE 612</td>
<td>Power Markets</td>
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<td>BOE 613</td>
<td>Deregulations and Restructuring</td>
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</table>

Sample Electives

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<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM 607</td>
<td>Global Supply Chain Management</td>
</tr>
<tr>
<td>OS 603</td>
<td>Leadership and Organizational Behavior</td>
</tr>
</tbody>
</table>

Additional School of Business MBA Core Courses and Electives

Program Length
One and one-half – Two years (Full-time)
Two and one half – Three years (Part-time)
INSTITUTE FOR A SUSTAINABLE ENVIRONMENT

Susan Powers, Director and the Spence Professor in Sustainable Environmental Systems
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Alan Rossner, Associate Director for Education
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Andrea Ferro, Associate Director for Research
aferro@clarkson.edu

About the Institute
The Clarkson Institute for a Sustainable Environment is home to Clarkson's environmental and broader sustainability 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.

Mission Statement
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.

The Clarkson Institute for a Sustainable Environment sponsors workshops, seminars, and student co-curricular activities to foster links among its members and facilitate environmental activities. Faculty and students also participate in the Interdisciplinary Programs: BS-Environmental Science & Policy, BS-Environmental Health Science; MS-Environmental Policy; MS & PhD Environmental Science and Engineering. More information can be found in the Interdisciplinary Program sections of the catalog.

Institute Faculty
The Institute for a Sustainable Environment is comprised of a small group of faculty fully and jointly-appointed in the Institute plus a large number (~70) of affiliated faculty from across the University. The expertise of these faculty spans nearly all fields and disciplines from Engineering, Natural and Physical Sciences, Social Sciences, Business, and the Humanities.
MS and PhD in Environmental Science and Engineering

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 is necessary since the environment comprises complex, interacting biological, chemical, physical and social systems. It is essential to apply an interdisciplinary framework to understand how these systems function and the many ways environmental factors should be integrated into a comprehensive decision-making process. The unusually broad background of 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 completed at least 1 year of calculus, physics, and chemistry, have some background in Fluid Mechanics, and have obtained a BS, BE or equivalent degree from an engineering or science program.

Requirements for MS in Environmental Science and Engineering

Students must take:

1. EV 532 (Risk Analysis),
2. Policy choice: one of - POL 570 (Environmental Policy) or POL571 (Energy Policy) or EC660 (Env. Economics)
3. Systems thinking choice: Either CE 586 (Industrial Ecology) or CE 582 (Environmental Systems Analysis and Design)
4. Two credits of seminar credit (EV610)
5. Elective courses following a theme subject to approval by the student’s advisor AND the chair of the Graduate Committee. At least two of these electives must have an environmental or sustainability focus, as defined in the ISE Graduate Handbook. Thesis students must take at least 3 additional electives (9 credits); Project students must take 4 additional elective classes (12 credits)

Among all of the courses, at least 3 must be designated as Engineering courses. These are either any course offered by the Coulter School of Engineering, or other courses with significant engineering content, as determined by the 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 7 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.

PhD Prerequisites
Students are expected to have completed at least 1 year of calculus, physics, and chemistry. 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.

Requirements for PhD in Environmental Science and Engineering
Students must take:
1. EV 532 (Risk Analysis),
2. Policy choice: One of - POL 570 (Environmental Policy) or POL571 (Energy Policy) or EC660 (Env. Economics)
3. Systems thinking course: Either CE 586 (Industrial Ecology) or CE 582 (Environmental Systems Analysis and Design)
4. Electives: Each student must take at least 5 additional electives (15 credits) following a theme of the student’s choosing, subject to approval by the student’s advisor AND the chair of the Graduate Committee. At least two of these electives must have an environmental or sustainability focus as defined in the ISE Graduate Handbook.
5. Six credits of seminar credit (EV610)

Among all of the courses, at least 3 must be designated as Engineering courses. These are either any course offered by the Coulter School of Engineering, or other courses with significant engineering content, as determined by the Graduate Committee. Details are included in the ISE Graduate Handbook.
PhD students must pass the candidacy exam within 18 mo. to be classified as a PhD candidate. A research proposal is then required within six months 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.

Faculty Affiliates
Any ISE Faculty Affiliates can advise ESE graduate students. Recent advisors include:
Professors Susan Powers, Alan Rossner, Thomas Holsen, Andrea Ferro, Michelle Crimi, Tom Langen; Stefan Grimberg, Michelle Crimi, Michael Twiss, Weiming Wu; Associate Professors Stephen Bird, Shane Rogers, Selma Mededovic, Tyler Smith; Assistant Professors: Beatrice Hernout, Yang Yang, Taeyoung Kim
**MS in Environmental Policy**
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.

**MS 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.

**Requirements for MS in Environmental Policy**
All students must take:
1. POL 570 (Environmental Policy) or POL 571 (Energy Policy)
2. EC 660 Environmental Economics
3. A research methods course: one of SS 580 (Research Methods) OR EC 611 (Econometrics) OR EV 591 Special Topics (Methods) under the direction of the advisor OR other methods course approved by the Graduate Chair
4. Additional elective courses following a theme determined by the student and approved by the advisor and the chair of the graduate committee. At least two of the electives must have an environmental or sustainability focus as defined in the ISE Graduate Handbook. Students completing a thesis must take at least three additional elective courses for a total of at least 18 course credits. Students completing a Project must take at least four additional elective courses for a total of at least 21 credits course work minimum.
5. Two credits of seminar credit (EV610)

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 7 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.

**Options for dual degrees:**
MS-EP and MBA, with 16 credits that count towards both degrees for a total of 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 15-18 months.
Faculty Affiliates
Any ISE Faculty Affiliates can advise ESE graduate students. Recent advisors include:
Professors Susan Powers; Associate Professor Stephen Bird, Christopher Robinson; Assistant Professors Camille Frazier, Courtney Johnson-Woods
The Institute for STEM Education changes the way the world does Science, Technology, Engineering, and Mathematics (STEM) education and views teaching and learning, combining disciplinary rigor with pedagogical science in outreach, teacher training, and graduate student and faculty professional development. Programs include the Master of Arts in Teaching (MAT), advanced certificate programs in teaching, as well as industry-leading institutes for higher education pedagogy training.

**Masters of Arts in Teaching**

*Catherine Snyder, Chair*

csnyder@clarkson.edu, 518-631-9870

The MAT degree is a licensure endorsing program that prepares candidates for New York State certification at the secondary level (7-12 grade) in the following disciplines: biology, chemistry, earth science, physics, technology (K-12), mathematics, business and marketing, computer science, English, social studies, Chinese, French, German, Greek, Latin, Russian, Spanish, and Teaching English to Speakers of Other Languages.

The Department of Education also offers programs for New York State teachers who are already initially certified:

1. **5th and 6th Grade Extension:** 2 courses that extend teachers’ certifications to 5th and 6th Grade in the case of the science, math, social studies, and English
2. **Grades 1-6 Foreign Language in the Elementary School (FLES) Extension:** A 1 course program that extends an already New York State certified foreign language teachers certification to 1st Grade.
3. **Certificate of Advanced Study in Teaching English to Speakers of Other Languages (TESOL):** 6 courses that allow teachers who are already New York State certified a K-12 grade TESOL certification. Some pre-requisites apply including 12 credits of study in a language other than English

With a 30-year history of success, the MAT program offers prospective teacher candidates all the tools they need to be successful secondary classroom teachers. The Clarkson Master of Arts in Teaching program is the right career choice because:

1. **Our graduates have a 95% success rate on the rigorous New York State Teacher Certification Exams**
2. Every student is placed into an individualized full-year teaching residency in a school that matches his or her career goals
3. Every member of the Clarkson University Master of Arts in Teaching faculty has substantial K-12 teaching experience
Most of the students who join the Master of Arts in Teaching program arrive with a bachelor’s degree in the discipline they want to teach. No prior education or pedagogy coursework is necessary.

**MAT Accreditation**
The Master of Arts in Teaching program is accredited by the Association for Advancing Quality in Teacher Education and the New York State Department of Education.

**MAT Prerequisites**
Clarkson undergraduates interested in pursuing an MAT degree will want to consider the Pre-Teaching Program. The Pre-Teaching Program is a special advising option rather than a major. The Pre-Teaching advisor will provide students with guidance in selecting coursework within the candidate’s discipline that meets New York State certification requirements, so that undergraduate courses will count towards both the undergraduate degree and the master’s degree. The Pre-Teaching advisor will help students define career goals, and find opportunities to observe and participate in secondary teaching, so that candidates enter the MAT with strong knowledge of what secondary teachers do. For information on the Pre-Teaching Program, contact Professor Kavanagh at kkavanag@clarkson.edu.

The MAT program requires all candidates to have completed the following prior enrolling:
1. Undergraduate liberal arts core including courses in humanities/arts, writing/communication, social sciences, STEM and 1 semester of foreign language
2. ED 300- Field Experience- 4 days of structured observations in secondary schools or through an online observation protocol. Can be arranged by CRC Department of Education Coordinator. Please call 518-631-9870 (must be completed prior to the summer intensive program for one year candidates; can be completed in fall or spring in year one if student selects the 2 year program. Waived for students who are already initially certified in NY).
3. Educational Psychology (an undergraduate course, or independent study with Clarkson’s CRC Department of Education exam. (Must be completed prior to the summer intensive program for one year candidates; can be completed in fall or spring in year one if student selects the 2 year program. Waived for students who are already initially certified in NY.) Available to Clarkson undergraduates as PY 246.
4. Finally, highly qualified candidates must have at least 24 credit hours of undergraduate study in their major with a GPA of 3.0 or higher at the completion of their undergraduate degree studies. The Pre-Teaching advisor can assist candidates with the selection of appropriate coursework.

**Program Curriculum**
Qualified Clarkson undergraduates are automatically accepted into the MAT program and awarded a two course scholarship. MAT candidates complete the following coursework as part of their 38 credit master’s degree:
Requirements for Master of Arts in Teaching in Secondary Disciplines Degree

<table>
<thead>
<tr>
<th>Required core classes (29 credits)</th>
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<tbody>
<tr>
<td>ED 501</td>
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<td>ED 502</td>
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<td>ED 551</td>
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<td>ED 552</td>
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<td>ED 560</td>
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</tbody>
</table>

**Research Project**
All students complete an independent research project in their certification area:
XX 580 MAT Project (Prefix will listed by discipline ex. HST 580 for MAT Project in History.) (3 credits)

**Subject Area Courses**
Students complete two electives in the subject area in which they will be obtaining certification. (6 credits)

Requirements for Master of Arts in Teaching English to Speakers of Other Languages Degree (13 courses/39 credits):

<table>
<thead>
<tr>
<th>Required core classes (39 credits)</th>
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<td>TE 501</td>
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<td>ED 502</td>
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<td>TE 531</td>
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<td>TE 540</td>
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<tr>
<td>TE 551*</td>
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<tr>
<td>TE 552*</td>
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<tr>
<td>TE 580</td>
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</tbody>
</table>

*TE 553 and TE 554 are summer residency options for NYS teachers obtaining their MAT-ESOL.*
Program Length
Many candidates complete the MAT program in one year (12 months) starting with an intensive summer program, followed by a full-time fall and spring term. Candidates may choose a longer timeline ranging from one and a half years to three years.
Master of Arts in Teaching Business and Marketing
This 38 credit degree offers prospective students the coursework, classroom teaching experience, and New York State Teaching Certification Exam preparation to become successful secondary teachers. The degree may be completed within two years of full-time study starting with the summer term. Or it may be completed over a longer three to four year schedule. This degree is recommended for candidates with bachelor’s degrees in business, marketing, finance, accounting or a related field.

Successful applicants to MAT in Teaching Business and Marketing program must meet the following requirements:
- Successful completion of the GRE with a minimum overall score above the fiftieth percentile (GRE scores must be reported no more than four years old) or successful completion of the Miller Analogies Test (no cut off score at this time)
- Minimum GPA of 3.0 in previous higher
- Bachelor’s degree in a related field (see above)
- 3 credits in a foreign language (including American Sign Language) with a B or better
- 3 letters of recommendation
- Official transcripts from all attended institutions of higher education
- Application essay
- Face-to-face or Skype interview with a passing rating of 3 or better
- Scheduled, on demand writing assignment

International students must refer to additional requirements

Pre-Teaching Program
Students pursuing the pre-teaching track would complete the following course of study:
1. Foreign language elective (3 credits)
2. An Educational Psychology course or the CRC Department of Education independent study
3. COMM 217 Introduction to Public Speaking (3 credits)
4. STEM 530 Analyzing Science and Mathematical Theories from Philosophical and Historical Perspectives (for STEM majors) (3 credits); for other majors, please call the CRC Department of Education at 518-631-9870
5. ED 560 Modern Teacher (3 credits)
6. Educational Field Experience (1 credit)
7. Independent study: Students would observe 25 hours in secondary classrooms and complete a paper

Faculty
Associate Professor: Catherine Snyder, Chair; Assistant Professors: Sherri Duan, Director of the MAT in Chinese Language; Karen Gregory, Director of TESOL programs; Gretchen Oliver, Assistant Director of TESOL Programs, Patti Rand, Seema Rivera. Instructors: Stephanie Conklin, Dan Mattoon, Bryan Mattice, David Besozzi, Becky Remis, Tracy Pontin, Sean O’Connell, Richard Lasselle, Leigh Feguer, Frank Adamo, Jessica Murray, Cesaera Pirrone, Lisa Saccocio, Kelly Mattice, Shannon Hilliker, Mary Sandoval, Judy Morley, Lainie Christou, Erin Blauvelt, Loretta, Robert Buehler, Tracy Farrell, Stephanie Andrejczak, Maria Fielteau, Patricia Kapps.
The Earl R. and Barbara D. Lewis School of Health Sciences

Kerop Janoyan, Interim Dean
kjanoyan@clarkson.edu

The Earl R. and Barbara D. Lewis School of Health Sciences offers 3 entry-level health professions graduate degrees: Doctor of Physical Therapy (DPT), Master of Science in Physician Assistant Studies (MS-PAS), and Masters of Science in Occupational Therapy (MS-OT). The 3 programs are designed to prepare students to become highly skilled, entry-level healthcare providers who take a patient centered approach and value interdisciplinary care and evidence based practice. Students and faculty of the programs contribute to the knowledge of their profession through inter professional scholarship and practice. All three programs are located in the newly renovated Clarkson Hall with state of the art facilities and equipment designed to provide a supportive and innovative learning environment.

Master of Science in Occupational Therapy
Alisha Ohl, PhD, OTR/L, Interim Chair and Program Director
aohl@clarkson.edu or ot@clarkson.edu office 315-268-4413

The Occupational Therapy Department at Clarkson University in Potsdam, N.Y., serves the health needs of the community through preparation of occupational therapy graduates who engineer solutions that enable health and wellbeing throughout an individual’s lifespan. We believe in the right for all individuals to live their lives with dignity regardless of any disability or barriers to living life to the fullest.

Our graduates will use occupations as both interventions and outcomes to promote an individual’s adaptation to biological, psychological and contextual factors that have interrupted the ability to engage in occupations that have meaning and purpose in the individual’s life.

Our program is designed to change the world through occupational therapy. We develop professionals with deep cultural sensitivity toward the unique needs of rural and underserved populations living with disability. Our graduates will have advanced inter-professional competencies in areas of technology, innovation and education.

Our Occupational Therapy Program is committed to graduating therapists who are prepared to respond to both current and emerging societal needs that influence individual’s occupations. We integrate experiential learning to help students develop internalized working models for activating occupational therapy in traditional and innovative practice settings.

The Occupational Therapy Program at Clarkson is committed to expanding the knowledge of the profession through interprofessional scholarship and practice.

Our curricular goals for our program

Goal 1: Students will be able to design and deliver humanistic, ethical and high quality, individualized occupational therapy services to individual clients and their family/caregivers in both individual and group treatment.
Goal 2: Students will understand and be able to respond with occupation based programs to contemporary and global issues affecting a health, wellbeing and disability, with specific focus on unmet and emerging needs in rural and underserved populations.

Goal 3: Students will be able to integrate innovative, technological, imaginative art and educational resources into program planning, design, management and intervention.

Goal 4: Students will demonstrate the ability to reflect on science and technology, including their relationship to society, their impact on the environment and occupation, and demonstrate the capacity and commitment to grow as an individual and as a professional.

Goal 5: Students will collaborate skillfully with clients, inter-professional team members, and non-professional colleagues, families, and community members and demonstrate the important contribution of OT by doing good work.

Curricular Threads
Clarkson's Occupational Therapy Program's "curricular threads" represent the themes that are interwoven throughout all of the coursework. They reflect the values and priorities of our program, as well as the unique philosophy and mission of Clarkson University.

Professional Identity
Students will value and assume an identity of service and contribution, by promoting occupation and participation in multiple contexts through the identification of barriers to and providing supports for occupational roles and performance patterns.

Innovation
Students will develop the ability to meet the needs of local, regional, and global society, including a focus on rural communities, through research and scholarship.

Technology
Students will learn to engineer solutions through technology including telehealth, assistive technology, and virtual contexts.

Education & Research
Students will develop problem-solving abilities through science-driven practice and the use of practice-based evidence, with a focus on occupation as both intervention and outcome.

Inter-professional Practice
Students will exhibit strong leadership and collaborative skills as they assume roles of advocacy and activism for both clients and the profession.
MS Prerequisites
Students must:

1. Complete a baccalaureate degree with a cumulative GPA of 3.00 or higher
2. Take the necessary pre-requisite courses. The overall grade-point average in all pre-requisite courses should be a minimum of 3.20 with no grade lower than a C. See list below for pre-requisite courses
3. Submit documentation of a minimum of 40 hours of observation/volunteer or work experience under the supervision of an occupational therapist or occupational therapy assistant
4. Submit 3 letters of recommendation. At least 1 must be from a faculty member who can speak to your academic or professional character and at least 1 letter must be from an occupational therapy professional. Letters from family, friends or clergy will not be accepted.
5. Satisfactorily complete admissions process

<table>
<thead>
<tr>
<th>Pre-requisite courses for the MSOT Program at Clarkson University</th>
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<tbody>
<tr>
<td><strong>General Psychology (3 credits)</strong></td>
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<tr>
<td><strong>Abnormal Psychology (3 credits)</strong></td>
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<tr>
<td><strong>Development Psychology (3 credits)</strong></td>
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<tr>
<td><strong>Statistics (3 credits)</strong></td>
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<tr>
<td><strong>Biology (in addition to A&amp;P) (3 credits)</strong></td>
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<tr>
<td><strong>Physics or Kinesiology (3 credits)</strong></td>
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<tr>
<td><strong>Human Anatomy (3 credits)</strong></td>
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<tr>
<td><strong>Human Physiology (3 credits)</strong></td>
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<tr>
<td><strong>English Composition/ Critical Thinking (6 credits)</strong></td>
</tr>
<tr>
<td><strong>Social Sciences (Anthropology, Humanities, Philosophy, Sociology) (6 credits)</strong></td>
</tr>
</tbody>
</table>

**Recommended but not required courses:**

- Communication/Public Speaking (3 credits)
- Scientific Writing (3 credits)

Application
Applications are made via the Centralized Application Service for Occupational Therapy (OTCAS) [https://portal.otcas.org](https://portal.otcas.org). A rolling acceptance policy is used. The class size is approximately 30 students.

Program Curriculum
Clarkson's Occupational Therapy Program taps the University's core strengths in engineering, science, entrepreneurship and the arts to provide students with an expansive knowledge base. This specialized Master of Science in Occupational Therapy helps our students embrace the field’s essential points:

- Engaging in meaningful occupation and finding purpose are profound curatives.
- A thorough knowledge of human anatomy and psychology — tied to an appreciation for creativity — lead to recovery and unique paths of productivity.
- Neither disabilities nor perceived differences can violate an individual’s dignity or self-determination.
Specialty Tracks
Students will have the opportunity to pursue one of three Clarkson OT Specialty Tracks of study, which will allow them to become immersed in advanced study in their area of interest.

1. Technology for Health-Related Quality of Life Track: Students will become clinicians who can design and implement new products utilizing cutting edge technology to assist with client participation in desired activities
2. Occupational Therapist as a Researcher Track: Students will become clinicians who can design and implement research studies that enhance the profession
3. Innovative Practitioner Track: Students will become clinicians who can use innovative principles and inter professional collaboration to design new products, new programs, or a new way of delivering occupational therapy services

Fieldwork
At Clarkson University, and experiential learning plays a fundamental role in helping students make connections between the classroom and real-life practice. Initially, this begins informally through service-based learning projects, volunteerism and class assignments. As students enter the second year of the program, they complete several required fieldwork placements that provide them with strategic learning opportunities to prepare them for transitioning from the role of student to that of occupational therapist.

Our students will have the opportunity to complete two Level I Fieldwork placements while completing the didactic portion of the curriculum. Level I Fieldwork is intended to provide exposure to different populations and settings, to further develop professional behaviors, and to build the comfort and confidence that will be essential to success in Level II Fieldwork. Level I assignments may be with an occupational therapist or with other related professionals.

Upon completing all other coursework, students will be required to complete two 12-week Level II Fieldwork placements, which reflect Clarkson’s commitment to innovation. Students will have the opportunity to immerse themselves in OT practice in both traditional settings, as well as those where OT is new or emerging. Students’ unique interests, skills and areas of specialty are taken into account when assigning Level II placements to ensure a good fit.
<table>
<thead>
<tr>
<th>Term I</th>
<th>Credits</th>
<th>Term II</th>
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<tbody>
<tr>
<td>OT 501 Basic Science: Gross Anatomy</td>
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<td>OT 503 Basic Science: Neuroscience</td>
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<td>OT 511 Basic Science: Development and Occupational Performance across the Lifespan</td>
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<td>OT 533 Basic Science: Applied Kinesiology for OT’s</td>
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<tr>
<td>OT 521 Basic Science: Mental Health and Occupational Performance</td>
<td>2</td>
<td>OT 553 Basic Science: Cognition and Occupational Performance</td>
<td>2</td>
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<tr>
<td>OT 531 Foundations in Occupation Based Practice</td>
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<td>OT 563 Bridging Science to Adult Conditions and Assessments</td>
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<td>OT 541 Foundations in Research</td>
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<td>OT 583 Experiential Learning Lab I: Adult Assessment and Intervention Lab</td>
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<td>OT 551 Foundations in Defining and Understanding Occupational Performance</td>
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<td>OT 603 Engineering Health through Creativity, Craft and Analysis of Occupation</td>
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<td>OT 591 Professional Seminar A: Professionalism in Occupational Therapy</td>
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<th>Credits</th>
<th>Term IV</th>
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<tbody>
<tr>
<td>OT 605 Engineering Pathway to Participation through Technology</td>
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<td>OT 537 Bridging Science to Pediatric Assessment</td>
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<td>OT 595 Professional Seminar B: Inter-professional Practice and Emerging Practice</td>
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<td>OT 557 Bridging Science to Upper Extremity Rehabilitation</td>
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<td>OT 630, 631, 632 Engineering your pathway through scholarship I</td>
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<td>OT 567 Bridging Science to Adult Neuro Assessment and Intervention Lab</td>
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<td>OT 700A Fieldwork Experience</td>
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<td>OT 587 Experiential Learning Lab II: Adult Neuro Assessment and Intervention Lab</td>
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<td>OT 597 Professional Seminar C: Specialty seminars in OT</td>
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<td>OT 640, 641, 642 Engineering your pathway through scholarship II</td>
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<td>OT 539</td>
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<td>Professional Practice, Leadership, Management &amp; Activism</td>
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<td>OT 549</td>
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<td>Synthesizing Evidence and Practice to Become an Evidence Based Practitioner</td>
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<td>Experiential Learning Lab III: Group Dynamics across Practice Settings</td>
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<td>Experiential Learning Lab IV: Pediatric Intervention Lab</td>
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<td>Professional Seminar D: Innovation and Advanced Cases</td>
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<td>Fieldwork Level IIB</td>
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**Total Program Credits** 92

**Program Length**
The Clarkson Occupational Therapy Program is a 7-trimester program.

**Program Sequence**
Students are expected to complete the designated professional curriculum in the sequence specified. Each semester’s course work is to be considered pre-requisite to the next semester. In order to be eligible to take a course, a student must pass all courses in the previous semester. There is no opportunity to change the order of the courses or the order of the fieldwork. Students are expected to complete each semester on time as a cohort. Student progression will be a function of successfully passing all required courses in a semester.
**Graduation Requirements**

To graduate from the OT Program, and earn the Master of Science in Occupational Therapy degree (MSOT) candidates must:

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 Chair and Clarkson University Faculty
5. Students must have paid all debts to the school and be in good standing

**Clarkson Pre-OT Plan**

Clarkson University offers a Pre-Occupational Therapy program to highly qualified and motivated incoming high school students who wish to pursue a career in occupational therapy. Students accepted into the Pre-Occupational Therapy program will be invited to participate in activities in the OT department and will be granted preferential consideration for the Master of Science in Occupational Therapy program as long as they demonstrate successful completion of the milestones and MSOT prerequisites, see chart above.

Applicants will signify on their CU application for admission a request to be accepted into the Pre-OT plan. The records/transcripts of those applicants will be forwarded to the OT department for review. The Health Professions Graduate Admissions Coordinator will review the high school records and application and return an acceptance decision to Admissions. Those that matriculate at Clarkson and meet all requirements of this opportunity and formally apply will be granted preferential consideration during the admissions process. Successful applicants will be granted a seat in the next cohort of the Master of Science in Occupational Therapy class following their May graduation from Clarkson University. Those students that accelerate their graduation to December will be considered on a case-by-case basis for the cohort beginning the following Fall semester. Ten seats will be reserved for Clarkson University graduates in each incoming class. Being a Pre-OT student provides a significant advantage in gaining acceptance into Clarkson’s OT program.

Requirements and milestones to be reached:

1. Complete the application and essay (state your interest in the field of Occupational Therapy) for entry into the Pre-OT plan
2. At all times remain in good standing with Clarkson University. This includes disciplinary action and legal action on or off campus
3. The students must have a cumulative GPA of 3.2 or higher at the end of each semester in all prerequisite courses, while maintaining an overall cumulative grade-point average greater than or equal to 3.00.
4. In the first 2 years as a Clarkson University undergraduate, candidates will show satisfactory progress in completing OT prerequisite courses. A minimum of 3 prerequisite courses must be completed by that time. Grades on prerequisite courses shall be C or above
5. The candidate will begin or continue gaining experience related to occupational therapy
6. Meet at least once per academic year with the Health Professions Graduate Admissions Coordinator to gauge progress. The coordinator will review the candidate’s transcripts, review progress experience, and asses the candidate’s aptitude and attitude as a potential OT. Candidates may be released from the plan at any time if requirements have not been met
After completion of their second year as a CU undergraduate, candidates will present themselves to
the OT faculty for review of their progress. Those who have reached the milestones will continue in
the program, then, they must:

1. Continue progress and complete all prerequisite courses with a grade of C or better
2. Complete a minimum of 40 required hours of experience by the time of application
3. Graduate in good standing from Clarkson University
4. Formally apply to the Clarkson University OT program via the Occupational Therapy Centralized
   Application Service (OTCAS) at the appropriate time while meeting all deadlines and
   requirements of the application. A verified application must be ready for review by September
   20th of their senior year (note that it takes approximately 4-6 weeks for OTCAS to verify
   applications)
5. 3 letters of recommendation (letters from a faculty member and an OT professional are
   required)
6. Successfully move through the admissions process

10 seats are reserved in each class for Clarkson University graduates. Clarkson University graduates
not selected for the reserved seats will remain in the applicant pool for any remaining seats in the
cohort

Clarkson undergraduates that are not part of the Pre-OT Plan are also welcome to apply via OTCAS
at the appropriate time with the applicant pool for that cohort. These requirements are in
addition to the major that the student has declared. OT advising is not intended to replace
advising by faculty in the student’s declared major.

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 the program a 7-year, full accreditation in August 2017. The next
evaluation will be in 2022-2023.

ACOTE is located at 6116 Executive Blvd, Suite 200, North Bethesda, MD 20852-4929. 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
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.

Faculty in Occupational Therapy
Clinical Assistant Professors: Brittany DiSalvo, Ashleigh Graveline, Cindy Hammecker-McLean, and Beth Randall. Assistant Professors: Alisha Ohl (Interim PD), David Schelly.
Masters of Science Physician Assistant Studies Program
Joan Caruso, Chair, Clinical Assistant Professor
pa@clarkson.edu

The mission of the Clarkson University Department 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 Department of Physician Assistant Studies will prepare individuals to become valued members of the health care team licensed to practice medicine with physician supervision.

Department motto: a posse ad esse - from possibility to reality.

Application
Applications are made via the Centralized Application Service for Physician Assistants (CASPA) https://portal.caspaonline.org/. A supplemental Clarkson University PA program application will be required for qualified CASPA applicants. Deadline for applications through CASPA is January 15th. A rolling acceptance policy is being used. The class size will be approximately 30 students.

The prerequisites for admission are listed below. Be sure that you meet the Clarkson program prerequisites before submitting your CASPA application. This includes your score on the GRE. Please review the technical standards for the program. Those applicants who are invited to submit a supplemental application will sign a statement in that application that these standards can be met.

Clarkson PA Prerequisites
1. Bachelor’s degree from a regionally accredited college/ university
2. 2 semesters Human/ Animal/ Vertebrate Anatomy & Physiology or 1 semester of Human/ Anima/ Vertebrate Anatomy & 1 semester of Physiology – minimum 6 hours total
3. 2 semesters of Biology – 1 of which must be Microbiology (A&P cannot be used to fulfill the remaining course requirement) – minimum 6 hours total
4. 2 semesters of Chemistry (Organic Chemistry recommended) – minimum 6 hours total
5. 1 semester of Humanities/ Social Sciences – minimum 3 credits
6. 1 semester of Statistics – minimum 3 credits
7. 1 semester of Genetics – minimum 3 credits
8. 1 semester of Psychology (upper level recommended) – minimum 3 credits

GPA for the above courses must be 3.25 or higher

Grades less than C are not accepted for any prerequisite (C minus not accepted). Prerequisite courses must be complete or in progress at the time of application. Overall GPA for all required courses must be 3.000 or higher. All prerequisite coursework must be completed at an accredited institution within the United States or Canada.

Completion of the 10 prerequisites listed below. Each prerequisite course taken needs to be at least a B or higher. A minimum overall, prerequisite and science prerequisite GPA of a 3.25 or higher on a 4.0 scale.

Three letters of reference. One reference needs to be completed by a clinician. It is recommended (but not required) to have a reference from a Professor.

Must have taken the GRE with official results sent to Clarkson University (CASPA code 0285). We do not have a minimum accepted score for the GRE; however, below are scores from our competitive applicants to our program:
   Verbal : 40th or higher percentile
   Quantitative: 40th or higher percentile
   Analytical Writing : 4 or higher

A minimum of 500 hours of patient care experience must be completed, documented and verifiable at the time of application. 700 hours must be completed by the January 15th deadline and 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. Shadowing or observation is not accepted as patient care experience or used towards your required hours.

Completion of the CASPer test that assesses non-cognitive and interpersonal characteristics important for successful students and graduates of the program and is used to complement the other applicant screening tools. Completion of the CASPer test is required; results are valid for one admissions cycle. Plan your test date accordingly. Test dates are limited. Learn more at CASPer.

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 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 Department of PA Studies. Students found to be in violation of Technical Standards are at risk for dismissal from the program. Each standard is defined below and is followed by examples of indicators of minimum competence in that area. Reasonable accommodation for persons with documented disabilities will be considered on an individual basis, but a candidate must be able to perform in an independent manner.

**Observation**
Candidates must have sufficient capacity to observe in the lecture hall, the laboratory, the outpatient setting and the patient's bedside. Sensory skills to perform a physical examination are required. Functional vision, hearing and tactile sensation are required to properly observe a patient’s condition and to perform procedures regularly required during a physical examination such as inspection, auscultation and palpation.

**Communication**
Candidates must be able to communicate effectively in both academic and health care settings. Candidates must show evidence of effective written and verbal communication skills. Candidates must be able to communicate with patients in order to elicit information, describe changes in mood, activity and posture and perceive nonverbal communications.

Candidates must be capable of completing, in a thorough and timely manner, appropriate medical records and documents and plans according to protocol.

**Motor**
The ability to participate in basic diagnostic and therapeutic maneuvers and procedures (e.g., palpation, auscultation) is required. Candidates must have sufficient motor function to execute movements reasonably required to properly care for all patients. Candidates must be able to move freely about patient care environments and must be able to move between settings such as clinics, classroom buildings, and hospitals. In addition, physical stamina sufficient to complete the rigorous course of didactic and clinical study is required. Long periods of sitting, standing, or moving are required in classroom, laboratory and clinical experiences.
Intellectual
Candidates must be able to measure, calculate, reason, analyze and synthesize. Problem solving, one of the critical skills demanded of physician assistants, requires all of these intellectual abilities. Candidates must be able to read and understand medical literature. In order to complete the Physician Assistant Studies program, candidates must be able to demonstrate mastery of these skills and the ability to use them together in a timely fashion in medical problem-solving and patient care.

Behavioral and Social Attributes
Candidates must possess the emotional health and stability required for full utilization of their intellectual abilities, the exercise of good judgment and the prompt completion of all academic and patient care responsibilities. The development of mature, sensitive and effective relationships with patients and other members of the healthcare team is essential. The ability to function in the face of uncertainties inherent in clinical practice, flexibility, compassion, integrity, motivation, interpersonal skills and concern for others, are all required. Candidates must be able to function effectively under stress and have the ability to accept constructive criticism and handle difficult interpersonal relationships during training.

Supplemental Application
Candidates will be required to certify that they have read and understand the Technical Standards of the Department of PA Studies at Clarkson University and attest that they have no condition -as noted above- that would interfere, inhibit, compromise or distract from their participation in the program.

The supplemental application is in addition to the CASPA application. After verification of the CASPA application the program will review and invite qualified applicants to complete a supplemental application. Supplemental applications received that have not been requested by the program will be disregarded and will not be considered for admission to the program. The supplemental application is to be completed only at the request of the program.

For the supplemental application to be completed, it will include:
1. The application form
2. Your personal statement describing how Clarkson’s values and its PA program will influence your PA education
3. Certification of meeting technical standards (form is in the application)
4. Reference letter from a practicing physician, Physician Assistant, or Nurse Practitioner if one was not included in your CASPA application (form is in the application)
5. The CASPA and supplemental application must contain a total of 3 reference letters. If additional letters are needed to meet the minimum requirement, submit additional letters with the supplemental application (form is in the application)
6. Official transcript for all coursework not verified in the CASPA application
7. Documentation of shadowing PA (form is in the application)
8. GRE – school code. Must be official scores reported by ETS directly to CASPA
9. $50.00 application fee (made payable to Clarkson University)

All materials are to be mailed directly to Clarkson University at:
The supplemental application must be returned within 30 days of the request from the program. If the supplemental application is not received within thirty days the entire application will closed and applicant status will be moved to withdrawn. Incomplete applications, applications received after the deadline, or applications received without the application fee will not be considered.

Program Curriculum
The PA Program at Clarkson University is a professional degree program intended to prepare students academically and professionally for responsibilities and services as a Physician Assistant. This entry level master’s degree program consists of 82 credit hours divided into three phases that span 28 consecutive months.

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 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.

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<tr>
<th>Spring I</th>
<th>Credits</th>
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<td>Laboratory &amp; Diagnostics</td>
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<td>Pharmacotherapeutics I</td>
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<td>PA 511</td>
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<td>Patient Assessment I</td>
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<td>PA 514</td>
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<td>PA 516</td>
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<td>Clinical Medicine III</td>
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<td>PA 509</td>
<td>Pharmacotherapeutics III</td>
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<td>PA 512</td>
<td>Patient Assessment III</td>
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<td>PA 515</td>
<td>The Patient and the PA III</td>
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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 to be considered pre-requisite to the next semester.
1. Students may not enter the program with advanced standing
2. Students are required to successfully complete, in sequence, all course work as full-time students
3. There is no opportunity to progress into an advanced semester
4. There is no opportunity to change the order of pre-clinical course work
5. Elective courses are limited to the clinical year

Students are expected to complete each semester on time as a cohort. Student progression will be a function of successfully passing all required courses in a semester. In the didactic phase of the program, any course failure after attempts at remediation will result in dismissal from the program. In the clinical phase, one rotation may be failed, but with remediation and a repeat of that rotation once only for the clinical phase. In that instance, the student’s education may continue 5 more weeks. In the summative phase, the student must pass both the physical assessment exam and the comprehensive written final to pass PA 610 and to be recommended for graduation. If after remediation, a student cannot successfully pass either or both exams, they will not be recommended for graduation and will be released from the program.

Graduation Requirements
To graduate from the PA Program, and earn the Master of Science in Physician Assistant Studies degree (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 a multi-station OSCE/history and physical skills assessment by score
Successful completion of the comprehensive written final exam by score
Be recommended for graduation by the Program Chair and Clarkson University Faculty. This includes an evaluation of student professionalism.

Submit IRB completion forms successfully

Student must file the appropriate graduation application

Student must have paid all debts to the school and be in good standing

**Clarkson Pre-PA Plan**

High school seniors who apply to Clarkson University for undergraduate studies are eligible to apply for the Pre-PA Plan as part of their application. Applicants must demonstrate scholarship in Math and Science and a representative SAT/ACT score. Participation in health related courses and activities is encouraged.

The Pre-PA Plan is not a major or minor. Students must declare a major in an area of interest, but will be required to take the 10 prerequisite courses for the PA program as part of their degree. At least three prerequisite courses must be completed by the end of the second year. Patient care hours must be acquired during the first 2 years as well. At least 100 hours of the 500 hour total is required by this time.

Student advising will be done by the department of the declared major with input from the health science advisor and the PA advisor when needed. Pre-PA students will be expected to participate in PA program activities when possible.

Students must achieve and maintain a GPA of at least 3.25 throughout their undergraduate years. No grade less than B is acceptable for prerequisite courses. The students must also be free of any disciplinary problems. At the end of the second undergraduate year, the student will meet with the PA faculty to determine their continuation in the Pre-PA Plan. They must continue to acquire patient care hours and finish prerequisite courses while maintaining the above mentioned GPA.

During the senior year, the student must still formally apply through the centralized process (CASPA). *50% of the available seats in each cohort will be held for Clarkson University pre-PA students.* Each student that successfully completes the prerequisites of the pre-PA plan will be granted an interview and then compete for the available seats with other pre-PA applicants. Applicants that are not Clarkson pre-PA students will compete for the remaining seats.

**Accreditation**

The program has been granted continuing accreditation by the ARC-PA as of March 2015. The program has also been registered by the New York State Education Department. Graduation from an accredited program is a requirement of states for licensing and healthcare systems for credentialing. Accreditation-Continued is an accreditation status. The granting of Accreditation-Continued is an accreditation status granted when a currently accredited program is in compliance with ARC-PA Standards. Accreditation remains in effect until the program closes or withdraws from the accreditation process or until accreditation is withdrawn for failure to comply with the Standards.
Physician Assistant Faculty

Clinical Assistant Professors: Joan Caruso (Dept. Chair) Christopher LaPoint, Katharine Matthis, Dawn White and Riane Dodge; Assistant Professor: Tushar Sirsat
Doctor of Physical Therapy Program
Vicki LaFay, PT, DPT, PhD, CSCS, CEEAA-Department Chair
vlafay@clarkson.edu

Mission
The domain of physical therapy is the application of human movement science to maintain or enhance activity level and social participation. Physical therapy is a health profession that includes evaluating, alleviating and preventing impairments, functional limitations, and disability from injuries, disease and other causes. Physical therapists serve a dynamic and comprehensive role in health care engaging in treatment, consultation, education and research.

The mission of the Department of Physical Therapy is:

To graduate physical therapists who emulate the core values of the profession in their physical therapy practice; and for faculty, graduates, and students to contribute to the profession, community, and society through education, scholarship, service, or practice.

Pre-Physical Therapy (Pre-PT) Undergraduate Advising Track
To prepare candidates for entry into the graduate physical therapy professional curriculum, the University offers an undergraduate Pre-Physical Therapy (Pre-PT) Advising Track.

The Pre-PT Advising Track consists of four unique aspects:
1. At least 50% of the available seats in each cohort will be held for Clarkson University pre-PT undergraduate students who successfully complete all of the necessary pre-requisite requirements
2. In addition to your major adviser, you will be assigned a second faculty adviser from the Department of Physical Therapy. This extra mentoring relationship adds another dimension of support to your experience. You and your PT adviser will work together to define your career goals, balance your PT course requirements with major requirements, and make a successful transition to the Doctor of Physical Therapy program
3. A solid foundation in Problem-Based Learning, which is a cornerstone of the graduate program. The pre physical therapy courses will introduce you to this student-centered, collaborative and self-directed education model. Problem-Based Learning (PBL), based on patient case studies, more closely resembles actual clinical practice. It better prepares you to be a self-motivated lifelong learner, which is essential to being a competent healthcare professional. The graduate professional curriculum (DPT) emphasizes problem-based learning, technology in education, a strong basic science partnership, and a strong commitment to cultural diversity.

Pre-PT Advising Track Admissions Requirements
Pre-PT Advising Track applicants must complete all the required material for general Clarkson undergraduate admission, and indicate on the undergraduate application that Special Advising - Physical Therapy is desired.

Pre-PT Advising Track Program Length
An undergraduate degree normally takes 4 academic years. There are plans of study in some undergraduate majors that can be completed in 3 years
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 3.20.

2. Take all the necessary pre-requisite courses with a grade point average greater than or equal to 3.20 in all pre-requisite courses and no grade lower than a C in these courses. Submit documentation of a minimum of 50 hours of observation/volunteer or work experience in a minimum of two different physical therapy and/or another healthcare settings, of which a minimum of 30 hours must be completed under the supervision of a physical therapist.

All applications to the graduate physical therapy program must be submitted through the Physical Therapy Centralized Application Service (PTCAS) at www.ptcas.org.

Prerequisite Courses

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<td>PY 151</td>
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<tr>
<td>PY 370</td>
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Medical Terminology Course work available at www.ed2go.com
**Academic Learning Experiences**
The DPT curriculum utilizes a problem-based learning (PBL) approach to education, providing students an active, exciting and effective way to learn. PBL is student-centered, collaborative, self-directed, and an active learning process based on patient case studies. Students are prepared for clinical practice and lifelong learning.

**Clinical Learning Experiences**
Clinical experiences are integrated into the curriculum throughout the educational process. To prepare students optimally for work in a variety of clinical settings, Clarkson continuously develops new clinical partnerships. Contractual relationships exist with many clinical sites in the North Country of New York State, throughout the United States, and some international sites as well.

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

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<th>Fall I</th>
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<tr>
<td>PT 505 Foundational Sciences for Physical Therapy</td>
<td>9</td>
<td>PT 515 Cardiopulmonary/ Exercise Science</td>
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<tr>
<td>PT 506 Professional Found for Physical Therapy</td>
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<td>PT 517 Professional Practice</td>
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<td>PT 508 Literature Critique and Review</td>
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<td>PT 518 Principles of Measurement and Testing</td>
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<td>PT 525 Musculoskeletal Physical Therapy</td>
<td>9</td>
<td>PT 537 Professional Practice II</td>
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<td>PT 527 Professional Practice Preparation</td>
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<td>PT 605 Neuromuscular Physical Therapy I</td>
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<td>PT 528 Analytical Methods for Evidence Based Practice</td>
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<td>PT 607A Professional Practice III</td>
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<td>PT 616</td>
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<td>PT 615</td>
<td>Physical Therapy for Multiple Systems I</td>
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<td>PT 627A</td>
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<td>PT 617A</td>
<td>Professional Practice IV</td>
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<td>Research Practicum</td>
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### Summer II

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<tr>
<td>PT 617B</td>
<td>Professional Practice IV</td>
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### Fall III

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<td>PT 627B</td>
<td>Professional Practice V</td>
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<td>PT 667</td>
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<td>PT 645</td>
<td>Practice Management in the Autonomous Environment</td>
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<td>PT 677</td>
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<td>PT 648</td>
<td>Writing &amp; Presenting Research</td>
<td>1</td>
<td></td>
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<tr>
<td>PT 657</td>
<td>Advanced Clinical Skills</td>
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### Facilities

The Doctor of Physical Therapy (DPT) program is housed in Clarkson Hall. The Department of Physical Therapy provides a focus on health sciences education, treatment and research in physical rehabilitation for the University and the community.

### Program Length

Students complete within 2 2/3 years or 8 semesters.

### Accreditation Status

The Doctor of Physical Therapy program at Clarkson University is accredited by the [Commission on Accreditation in Physical Therapy Education (CAPTE)](https://www.capteonline.org). 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 fall of 2026. Licensure through the state is required for practice as a physical therapist. Licensure is gained through successful completion of the National Physical Therapy Examination offered by the Federation of State Boards of Physical Therapy.
Physical Therapy Department Faculty

Clinical Associate Professors Vicki LaFay (Dept. Chair); Clinical Full Professor Stacey Zeigler; Associate Professor: Ali Boolani; Clinical Assistant Professors Moshe Marko, Jaime Bicknell, Heather Shattuck, and Christopher Towlerk;
INTERDISCIPLINARY PROGRAMS

In recent years, Clarkson University has built on its existing strengths in business, engineering, liberal arts, and the sciences to develop an increasing number of new interdisciplinary majors that combine learning from two or more traditionally distinct areas. Today, many of the most profound advances in knowledge are occurring at the intersections of previously separate academic disciplines and industrial fields. These innovative programs reflect not only the strength of the University’s academic faculty and resources, but also the flexibility and vitality of Clarkson’s highly collaborative academic environment.

Bioethics Program

Jane Oppenlander, Assistant Professor of Operations & Information Systems/Interim Chair of Bioethics
joppenla@clarkson.edu

Program Curriculum

The Bioethics Program at Clarkson University and the Icahn School of Medicine at Mount Sinai is a professional degree program intended to prepare students academically and professionally for responsibilities and services as a Bioethicist. This Master of Science degree program consists of 39 credit hours. The degree can be taken full time taking three or more courses per term or part-time taking one or two course(s) per term. There are three specializations within the Bioethics Degree: Clinical Ethics, Research Ethics and Bioethics Policy.

| Course Plan for a full time student in Clinical Ethics Specialization |
|---|---|---|---|
| **Summer** | **Credits** | **Fall** | **Credits** |
| BIE 500 Proseminar in Health & Human Values | 3 | BIE 510 Biomedical Ethics | 3 |
| | | BIE 590 Clinical Ethics | 3 |
| | | BIE 630 Master Project I (Pass/Fail) | 3 |
| Total | 3 | Total | 9 |
| **Winter** | **Credits** | **Spring** | **Credits** |
| BIE 520 Health Care Policy | 3 | BIE 530 Bioethics & The Law | 3 |
| BIE 610 Online Practicum in Clinical Ethics | 3 | BIE 620 Onsite Practicum in Clinical Ethics | 3 |
| BIE 635 Master Project II | 3 | BIE 640 Master Project III (Tuition Waived) | 3 |
| | | BIE 650 Capstone | 3 |
| Total | 9 | Total | 12 |

*Students must also take two electives of their choice with a total of 6 credit hours.*
### Course Plan for a full time student in Research Ethics Specialization

<table>
<thead>
<tr>
<th>Summer</th>
<th>Credits</th>
<th>Fall</th>
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<tbody>
<tr>
<td>BIE 500</td>
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<td>BIE 510</td>
<td>3</td>
</tr>
<tr>
<td>Proseminar in Health &amp; Human Values</td>
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<td>Biomedical Ethics</td>
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<td>BIE 555</td>
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<td></td>
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<td>Research Ethics I</td>
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<td></td>
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</tr>
<tr>
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### Winter

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>BIE 520</td>
<td>Health Care Policy</td>
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<tr>
<td>BIE 530</td>
<td>Bioethics &amp; The Law</td>
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<td>BIE 580</td>
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<tr>
<td>BIE 611</td>
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<td>BIE 602</td>
<td>Onsite Practicum in Research Ethics</td>
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<tr>
<td>BIE 640</td>
<td>Master Project III (Tuition Waived)</td>
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<tr>
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</table>

*Students must also take one elective of their choice with a total of 3 credit hours.*

### Course Plan for a full time student in Bioethics Policy Specialization

<table>
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<tr>
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<th>Credits</th>
<th>Fall</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIE 500</td>
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<tr>
<td>Proseminar in Health &amp; Human Values</td>
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<td>BIE 535</td>
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<tr>
<td></td>
<td></td>
<td>Medicine and Social Justice</td>
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<td>BIE 570</td>
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<tr>
<td></td>
<td></td>
<td>Foundations of Bioethics Policy</td>
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<td></td>
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### Winter

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<th>Credits</th>
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<tbody>
<tr>
<td>BIE 520</td>
<td>Health Care Policy</td>
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<td>BIE 530</td>
<td>Bioethics &amp; The Law</td>
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<td>BIE 525</td>
<td>Public Health Ethics</td>
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<td>BIE 612</td>
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<td>Total</td>
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</tbody>
</table>

*Students must also take one elective of their choice with a total of 3 credit hours.*
Graduation Requirements
To graduate from the Bioethics Program, and earn the Master of Science in Bioethics degree (MSB), candidates must:
1. Achieve a minimum overall GPA of 3.00 or better at program completion
2. Successfully complete the comprehensive Capstone Assessment by score or remediation
3. Be recommended for graduation by the Program Chair and Clarkson University Faculty
4. Have paid all debts to the school and be in good standing

Academic Performance Standards
Standards of acceptable performance (cognitive and psychomotor) for courses are communicated to students in writing via the syllabus and, for onsite courses, orally reviewed at the introduction of the course.

The policy of 3.00 or better in a graduate professional program has been adopted to better ensure student’s preparation for future sequential course work. Students will be given feedback at the completion of each exam.

Performance in didactic courses is commonly assessed by written exams, oral presentations and/or research papers, as well as final written (cognitive) exams. In designated courses, psychomotor performance may be assessed by target skill competency exams and small group exercises. During the didactic phase of the program, grades for cognitive performances will be recorded as a raw score and a percentage. At the end of each course the percentage scores will be converted to a grade, A through F for each of the core Bioethics courses.

To remain in good academic standing, please refer to the academic standing section. Additionally, Clinical Ethics and Research Ethics students may not progress to the Onsite Practicum with a cumulative GPA of less than 3.00.

Program Length
The majority of students finish in three years. Students must complete the program in 5 years unless granted a leave of absence for health or personal reasons. Any student that requests and is granted a leave of absence must submit a letter to the academic committee requesting a return to studies.

Bioethics Faculty
Adjunct Professor Kevin Ashby, Robert Baker, Ellen Tobin Ballato, Amy Bloom, Paul Cummins, Nada Gligorov, Jane Oppenlander, Ilene Penn, Rosamond Rhodes, Henry Sacks, Abraham P Schwab, Bonnie Steinbock, Marty Strosberg
The Department of 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 molecular biology, neurophysiology, pharmacology, bioinformatics, biomathematics, zoology and evolutionary parasitology, 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 an official undergraduate transcript, statement of purpose, three letters of recommendation, and score results of the Graduate Records Examination (GRE) aptitude test. The GRE requirement may be waived for students with a Clarkson B.S. degree, at the discretion of the IBB Program Director. All international students for whom English is not a first language must submit a TOEFL score unless their undergraduate or Master of Science degree was in the English language. The admissions committee will select candidates on the basis of aptitude, programmatic needs, and overall excellence of academic qualifications.

Degree Requirements for the PhD in Interdisciplinary Bioscience & Biotechnology
Clarkson University requirements include:

1. Completion of a minimum of 90 total credit hours including a minimum of 24 credits of course work
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 (IB&B) 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 612 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.

Degree Requirements for the M.S in Interdisciplinary Bioscience & Biotechnology

Clarkson University requirements include:

1. Completion of a minimum of 30 total credit hours including a minimum of 20 credits of course work,
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 or an appropriate professionally-oriented special project submitted as a written dissertation and defended orally and approved by a committee of three PhD faculty members.

Specific Course Requirements for the Interdisciplinary Bioscience & Biotechnology (IB&B) M.S. Program include:

1. Two core courses in cell and Molecular Biology (BY 580 and BY582)
2. One Biotechnology or Molecular Biology lab course (BY 612 or CM 570)
3. Two free elective courses
4. One course Quantitative Skills Elective, and
5. One course on Bioethics, Policy, or Law.

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.

Please see Detailed Degree Requirements for Clarkson University Graduate Program for more information.
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.

Interdiciplinary Bioscience and Biotechnology Faculty
Professors Alan Christian, Tom Langen, Thomas Lufkin, Michael Twiss, Ken Wallace; Associate Professors Ali Boolani, Damien Samways, Shantanu Sur; Assistant Professors Susan Bailey, Andrew David, Beatrice Hernaut, Ginger Hunter, Petra Kraus, Stefanie Kring, Michelle Yoo.

Affiliated faculty include faculty in the departments of: Chemistry & Biomolecular Science, Chemical & Biomedical Engineering, Civil & Environmental Engineering, Electrical & Computer Engineering, Institute for a Sustainable Environment, Mathematics, Computer Science, Mechanical and Aeronautical Engineering, Physics, Physical Therapy and Psychology.
MS in Computer Science Program

Natasha K. Banerjee, Chair of the Graduate Committee of the Department of Computer Science
nbanerje@clarkson.edu

Christopher A. Lynch, Chair of the Department of Computer Science
clynch@clarkson.edu

The Department of Computer Science offers graduate programs leading to degrees of Master of Science (offered interdisciplinary with the Department of Electrical and Computer Engineering) and Doctor of Philosophy in Computer Science (See School of Arts & Sciences). 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.

**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 Advisory 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. Course and seminar work will comprise a minimum of 20 credit hours. To ensure breadth in the program, four courses must satisfy the following:

1. 2 foundation courses must be taken, as described below
   a. CS 541 Introduction to Automata Theory and Formal Languages
   b. CS 547 Computer Algorithms
2. 2 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.

For those students who can demonstrate that they have successfully completed comparable graduate-level courses before coming to Clarkson, the Advisory Committee may waive the requirement that the student take these specific courses upon request from the student.
Additional Program Requirements and Procedures for MS in Computer Science:

1. At least 2 restricted elective courses will be taken from the courses offered in computer science or computer engineering departments as selected by the student and their advisor. Of these 2 restricted elective courses, 1 must be a course that focuses on research topics in computer science and 1 must be a computer engineering course with relevant emphasis on computer science topics. Students should consult with their advisors to identify courses in these categories.

2. 2 seminar credits: To earn a seminar credit, students must enroll in a seminar course in Computer Science.

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 Department of Computer Science, or affiliated with the department through a courtesy appointment. The department has strengths in theory, artificial intelligence, software, graphics & visualization, security, systems, and networks. An overview of research areas in which department members perform research can be found [here](#). The Examination Committee shall consist of a minimum of 3 faculty members. All students must complete a thesis and defend it orally to their Examination Committee. 2 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 this degree in 2 years.

Computer Science Faculty
Professors Daqing Hou, Christopher Lynch, Jeanna Matthews, Christino Tamon, Chuck Thorpe;
Associate Professors Natasha Banerjee, Sean Banerjee, Alexis Maciel; Assistant Professors Shafique Chaudhry, Soumyabrata Dey, Faraz Hussain
Data Analytics MS

Key Contacts
Boris Jukic, Co-Director of Data Analytics & Professor of Operations & Information Systems
bjukic@clarkson.edu
Joseph Skufca, Co-Director of Data Analytics & Professor and Chair of Mathematics
jskufca@clarkson.edu
Daqing Hou, Co-Director of Data Analytics, Associate Professor and Director of Software Engineering
dhou@clarkson.edu

The MS-Data Analytics 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 common set of key critical skills in areas of data management, decision analysis, statistics, data mining and knowledge discovery. In addition, the programs offers a variety of elective courses in various areas of data analytics form which students can build additional level 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 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 Analyst, Data Solution Analyst and Data Scientist, among many others.

Prerequisites
The MS program requires completion of foundation courses in three specific areas: Calculus, 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 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 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 630 - Modeling for Insight
IA 626 - Big Data Processing and Cloud Services
IA 628 - Introduction to Big Data Architecture and Applications
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 advisor 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 a 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 MSDA (residential) is three semesters, but it can be extended and expected program length for the MSDA (distance) is (5) five quarters, but it can be extended.
Master of Science in Data Analytics (MSDA) degree/Master of Business Administration (MBA)

Boris Jukic, Co-Director of Data Analytics & Professor of Operations & Information Systems
bjukic@clarkson.edu

Joseph Skufca, Co-Director of Data Analytics & Professor and Chair of Mathematics
jskufca@clarkson.edu

Daqing Hou, Co-Director of Data Analytics, Associate Professor and Director of Software Engineering
dhou@clarkson.edu

Program Description Clarkson’s new 2-year double degree program leading to a Master of Science in Data Analytics (MSDA) 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 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 MSDA 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 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 MSDA and MBA programs, allowing for the 38 credit hour MBA program and 33 credit hour MSDA 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 MSDA degree. Together the MSDA 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 EPG 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 are expected to have completed a bachelor’s degree, preferably in 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:
  o 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 MSDA will facilitate achieving this goal).
  o Describe a personal characteristic or something in your background that will help the Graduate Admission Committee to get to know you better.
  o 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 pre-requisites 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
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 MSDA schedule do not directly correspond. For example, the MBA program typically begins prior to the start of the MSDA semester and the MBA program has a two week Spring break (to allow for international travel), while the MSDA 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 520 - Optimization Methods for Analytics
IA/IS 605 - Data Warehousing
IA/IS 610 – Tabular Data Analytics
IA 630 - Modeling for Insight
EC 611 – Econometrics
OM 680 - Strategic Project Management
MK 696 – Marketing Research Methods

<table>
<thead>
<tr>
<th>Fall Year 1</th>
<th>Spring Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS 608 Organizational Behavior and Performance Management (2 Credits, MBA)</td>
<td>OM 680 Strategic Project Management (3 Credits MBA and DA)</td>
</tr>
<tr>
<td>IA/IS 510 Database Modeling, Design and Implementation (3 Credits, DA and MBA)</td>
<td>IA/IS 610 Tabular Data Analytics (3 Credits MBA and DA)</td>
</tr>
<tr>
<td>EC 604 Applied Economics (2 Credits, MBA)</td>
<td>MK 696 Marketing Research Methods (3 Credits MBA and DA)</td>
</tr>
<tr>
<td>MK 609 Marketing Management (2 Credits, MBA)</td>
<td>IA/IS 605 Data Warehousing (3 Credits MBA and DA)</td>
</tr>
<tr>
<td>IS 605 Information Systems (2 Credits, MBA)</td>
<td></td>
</tr>
<tr>
<td>Fall Year 2</td>
<td>Spring Year 2</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>IA 640 Information Visualization (3 Credits, DA)</td>
<td>IA 520 Optimization Methods for Analytics (3 Credits, DA and MBA)</td>
</tr>
<tr>
<td>OM 606 Supply Chain Management (2 Credits, MBA)</td>
<td>IA 650 Data Mining (3 Credits, DA)</td>
</tr>
<tr>
<td>FN 607 Financial Management (2 Credits, MBA)</td>
<td>OS 610 Strategic Planning (2 Credits, MBA)</td>
</tr>
<tr>
<td>IA 530 Probability and Statistics (3 Credits, DA)</td>
<td>EC 611 Econometrics (3 Credits, MBA and DA)</td>
</tr>
<tr>
<td>AC 603 Management Accounting (2 Credits, MBA)</td>
<td></td>
</tr>
<tr>
<td>SB 609 Corporate Ethical Decision Making (2 Credits, MBA)</td>
<td></td>
</tr>
</tbody>
</table>

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

**Program Length**
2 years
Engineering Science Programs
William Jemison, Dean of the Wallace H. Coulter School of Engineering
wjemison@clarkson.edu

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 & Aeronautical Engineering

Requirements for MS in Engineering Science
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 CSoE.

Requirements for PhD in Engineering Science
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 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 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.

Engineering Science Faculty

Please see the Faculty Directory for all Engineering Faculty.
Master of Science in Engineering Management
Michael Walsh, Executive Director of Engineering Management Programs
mwalsh@clarkson.edu

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.

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

Requirements for MS in Engineering Management
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:

<table>
<thead>
<tr>
<th>Required core classes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Management and Financial Analysis</td>
</tr>
<tr>
<td>Decision Analysis and Risk Management</td>
</tr>
<tr>
<td>Strategic Project Management</td>
</tr>
<tr>
<td>Operations Strategy and International Competitiveness</td>
</tr>
<tr>
<td>Negotiations and Relationship Management</td>
</tr>
<tr>
<td>Leading and Managing Organizations</td>
</tr>
<tr>
<td>Capstone Project</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Construction Engineering</td>
</tr>
<tr>
<td>Sustainable Infrastructure and Building</td>
</tr>
<tr>
<td>Special Topics in Construction Engineering Management</td>
</tr>
<tr>
<td>Operations Management and Factory Physics</td>
</tr>
<tr>
<td>Law for Engineers</td>
</tr>
<tr>
<td>Advanced Topics in Supply Chain Management</td>
</tr>
<tr>
<td>Enterprise Sustainability</td>
</tr>
<tr>
<td>Introduction to Artificial Intelligence: Principles and Techniques</td>
</tr>
<tr>
<td>Leading Organizational Change</td>
</tr>
<tr>
<td>Optimization Methods</td>
</tr>
<tr>
<td>Marketing Management for Innovation</td>
</tr>
<tr>
<td>Database Modeling, Design, and Implementation</td>
</tr>
<tr>
<td>Information Visualization</td>
</tr>
<tr>
<td>Data Warehousing</td>
</tr>
<tr>
<td>Modeling for Insight</td>
</tr>
<tr>
<td>Geospatial Systems</td>
</tr>
<tr>
<td>Quality Management and Process Improvement</td>
</tr>
</tbody>
</table>
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.
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 (materials@clarkson.edu), who works closely with the Dean of Engineering and the Dean of Arts & Sciences. The MSE graduate program is closely associated with Clarkson’s Center for Advanced Materials Processing, whose mission is "to perform innovative research and conduct educational efforts on the synthesis and processing of advanced materials of interest to industry." 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 MAE or CBE Seminar

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 for PhD in Materials Science & Engineering†

PhD students are required to take 10 courses (30 hours) from the 3 areas below.

### Materials Science Required core classes

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSE 551</td>
<td>Advanced Characterization of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MSE 560</td>
<td>Advanced Materials Science and Engineering (Spring semesters)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Materials Properties and Applications (Select 4)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM 530</td>
<td>Colloids and Interfaces (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>CM 553</td>
<td>Introduction to Biomaterials (Fall semesters)</td>
<td>3</td>
</tr>
<tr>
<td>CM 566</td>
<td>Bioelectronics and Bionanotechnology</td>
<td>3</td>
</tr>
<tr>
<td>CM 583</td>
<td>Introduction to Polymer Science (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>CM 584</td>
<td>Functional Polymer Systems (Every odd Spring semester)</td>
<td>3</td>
</tr>
<tr>
<td>CM 585</td>
<td>Nanostructured Materials (Every odd Spring semester)</td>
<td>3</td>
</tr>
<tr>
<td>CH 515</td>
<td>Polymer Materials (Every even Fall semester)</td>
<td>3</td>
</tr>
<tr>
<td>EE 539</td>
<td>Dielectrics (Every odd Fall semester)</td>
<td>3</td>
</tr>
<tr>
<td>EE 541</td>
<td>Electronic Devices for IC Simulation (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>ES 552</td>
<td>Biomaterials and Biomedical Engineering Applications (Every even Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>ME 503</td>
<td>Additive Manufacturing (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>ME 557</td>
<td>Advanced Mechanics of Composite Materials (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>ME 590</td>
<td>Advanced Welding Metallurgy</td>
<td>3</td>
</tr>
<tr>
<td>ME 591</td>
<td>Selected Topics in Materials Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ME 595</td>
<td>Principles of Physical Metallurgy</td>
<td></td>
</tr>
<tr>
<td>PH 528</td>
<td>Intermolecular Forces in Modern Nanotechnology</td>
<td></td>
</tr>
<tr>
<td>PH 589/EE 543</td>
<td>Physics of Semiconductor Devices</td>
<td>3</td>
</tr>
</tbody>
</table>

### Materials Processing and Characterization (Select 2)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM 551</td>
<td>Manufacturing Implications of Advanced Materials Processing</td>
<td>3</td>
</tr>
<tr>
<td>ES 557</td>
<td>Microelectronic Circuit Fabrication</td>
<td></td>
</tr>
<tr>
<td>ES 564</td>
<td>Corrosion Engineering (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>ME 637</td>
<td>Particle Transport, Deposition and Removal (Spring semesters)</td>
<td>3</td>
</tr>
<tr>
<td>PH 636</td>
<td>Scanning Probe Techniques in Soft Condensed Matter Physics</td>
<td></td>
</tr>
</tbody>
</table>

† Other courses not listed here may be credited toward the degree requirements by approval of the thesis advisor and the Director of MSE

### 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 from across the divisions of the School of Engineering and the School of Arts and Sciences to offer a diverse perspective on research and study relating to the Materials Science & Engineering curriculum. Please see faculty listings for Mechanical Engineering, Chemistry, Physics, Electrical and Computer Engineering, and Engineering Science.
Master of Science in Environmental Policy (MS)/Master of Business Administration Dual Degree
Susan Powers, Director and the Spence Professor in Sustainable Environmental Systems
spowers@clarkson.edu

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 16 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 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.

Admissions Process
Applicants must meet the admission requirements for both the EP 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 Graduate Record Examination (GRE) test scores
- Applicants are expected to have completed a bachelor’s degree, preferably in a field relevant to environmental management
- 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
- Three letters of recommendation.
- Two Essays that are one page each in length, double spaced:
o Describe your career progress to date and your future short-term and long-term career goals.

o Describe a personal characteristic or something in your background that will help the Graduate Admission Committee to get to know you better.

Applicants must complete both the MBA and EPG admissions processes and be accepted by both programs.

**MS EP 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

**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.
### Required Course List (34 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Program(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC660 Environmental Economics</td>
<td>3</td>
<td>EP</td>
</tr>
<tr>
<td>POL570 Environmental Policy OR POL571 Energy Policy</td>
<td>3</td>
<td>EP</td>
</tr>
<tr>
<td>Research Methods Course</td>
<td>3</td>
<td>EP</td>
</tr>
<tr>
<td>EV610 ISE Graduate Seminar</td>
<td>2</td>
<td>EP, MBA</td>
</tr>
<tr>
<td>OS608 Organizational Behavior and Performance Management</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>OM606 Supply Chain Management</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>SB693 Seminar in International Business or SB696 Global Business Strategies</td>
<td>3</td>
<td>MBA</td>
</tr>
<tr>
<td>EC604 Applied Economics</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>FN607 Financial Management</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>OS610 Strategic Planning</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>MK609 Marketing Management</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>OM602 Decision Analysis and Supply Chain Design</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>IS605 Information Systems</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>AC603 Management Accounting</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>SB609 Ethics</td>
<td>2</td>
<td>MBA</td>
</tr>
<tr>
<td>EP Thesis or Project</td>
<td>4-6</td>
<td></td>
</tr>
<tr>
<td>EV612 MS Project (minimum 4 credits) or MS Thesis (minimum 6 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives (12 credits)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total of 4 electives (12 credits); 3 of which must have environmental content.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 MS/MBA joint graduate committee
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.

Some typical areas of sponsored research in engineering and science include: crystal growth, aerosol kinetics and scavenging, light scattering, stability of colloidal dispersion, strength of materials, metallic systems, ceramic surfaces, phase transitions, bio-engineering, heat transfer and mass transfer, thin film adsorption, film flow stability, transition and turbulence and active flow control, nonlinear wave motion, dynamical systems, chaos and control, computational applied math, optimization and numerical p.d.e.s., wave forces, surface shear viscosity, nutrient regeneration in lakes, flow slides, copper and zinc protein, nanotechnology, artificial intelligence, oxygenation of metal complexes, asynchronous networks, communication networks, detection of random signals, renewable energy production, power transmission, energy conversion, plasma deposition, osmotic work, and corrosion.

In the business area, studies have been conducted relative to dispute settlement techniques, scientific and technical information systems, effects of organizational changes, economic impact of environmental damage from acid rain, marketing approaches, pricing environmental alternatives, banking systems, and monetary policies.

The Shipley Center for Innovation

Jamey Hoose, Director, jhoose@clarkson.edu

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.
ACADEMIC CENTERS

Center for Advanced Materials Processing (CAMP)
A New York State Center for Advanced Technology
Devon A. Shipp, Director
dshipp@clarkson.edu

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.
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 including Clarkson's 25 foot coastal research vessel, the R.V. Lavinia; 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
The Center for Rehabilitation Engineering, Science and Technology was established at Clarkson University in 2005. Its mission is to educate, mentor and train students to be able to integrate and apply a combined scientific, analytic, technological and business approach to emerging biomedical engineering and biomedical science areas. It is of note that biomedical engineering is the most rapidly growing field of engineering, with outstanding biomedical job prospects, and with half of the undergraduates being female, a ratio that exists in no other engineering discipline.

The Center for Rehabilitation Engineering, Science and Technology takes a unique approach to the study of rehabilitation problems. First, through its focus on biomedical engineering, the Center studies how the nervous and skeletal muscle systems of the human body normally work. Secondly, through its rehabilitation science and technology components, it models the mechanisms by which these systems become impaired through disease or injury. Within its rehabilitation technology aspects, the Center investigates how technology can help to restore or replace functions such as hearing, speaking, seeing or moving through the use of artificial assistive or substitutive devices. Through a clinical link with Clarkson’s Physical Therapy 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.”
Center for Identification Technology Research (CITE\textsc{r})

\textit{Stephanie Schuckers, Director}

\texttt{sschucke@clarkson.edu}

Clarkson University is the lead university for an NSF Industry/University Cooperative Research Center, called the Center for Identification Technology Research (CITE\textsc{r}). Other sites include West Virginia University, University at Buffalo, and Michigan State University. CITE\textsc{r} focuses on biometrics, identity, and human analytics (www.clarkson.edu/citer). Over 20 affiliates, including the FBI, DOD, DHS, Qualcomm, Northrop Grumman, and other industrial and government partners, cooperatively define, fund, and execute work to meet common needs. Applications include defense, homeland security, forensics, consumer electronics, financial services, and humanitarian applications. Research focus areas in identification technology include:

1. Human sensing and acquisition
2. Feature extraction and processing
3. Machine learning and analytics
4. Performance and modeling
5. Multispectral and cross spectral imaging
6. Novel modalities
7. Mobile & Computing
8. Social Signal processing
9. Authentication & cybersecurity
10. Behavioral and soft biometrics
11. Science of biometrics

Students are key team members for research projects which are cooperatively defined by industrial and government affiliates. At the completion of their degree, students often go to work for organizations that funded their research project. Educational programs which CITE\textsc{r} researchers pursue include electrical, computer, and software engineering, computer science, mathematics, among others. Additional information is available at \texttt{https://citer.clarkson.edu}.
The Center for Metamaterials (CfM) is an NSF-sponsored Industry/University Cooperative Research Center. The CfM’s mission is to provide a collaborative, multi-university one-stop shop to research, design, fabricate and test a wide range of metamaterials, photonic crystals, and plasmonic structures. These structures and materials are nano and micro composite structures that are engineered to control light in unusual ways that are not possible with naturally occurring materials; behavior such as cloaking, channeling and stopping light, and complex light filtering are possible with such structures. Industry interest in metamaterials is growing as these materials are being used to develop new or higher performing optical, electronic and acoustic devices.

Researchers at the Center focus on precompetitive topics jointly identified by the university and industry participants as being of high value, and include fundamental research, metamaterials processing, and device and system development. The CfM projects advance the knowledge base through fundamental and applied metamaterials research and development. The projects involve research teams composed of academic researchers (professors, postdocs, research staff, graduate students and undergraduate students), industry researchers at large and small companies, and researchers from government agencies (e.g., Air Force Research Laboratory (AFRL) and U.S. Army). The intent is to nurture long-term relationships and collaborations among the university, industry, and government laboratories. The intent is also to develop and perform technology transfer of metamaterials-based technologies to the applications of renewable energy, sensing and imaging, antennas, and communication systems. Industry members participating in the Center share in the products of the research and development, the generated intellectual property, have access to laboratories, equipment and expertise, and the resulting economic benefits.
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 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
Center for Electric Power Systems
Thomas Ortmeyer, Director
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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.
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BA, Indiana University  
MFA, Creative Writing  
PhD, University of Missouri  
Assistant Professor of Film Studies

PROBST, Lisa  
BS, McGill University  
M.Phil, D.Phil, Oxford University  
Assistant Professor of Literature

PETLEY, Lauren  
BSC, Laurentian University  
PhD University of Ottawa  
Assistant Professor of Psychology

PIENKOS, Elizabeth  
Psy.D Rutgers University  
BA, Rice University  
Assistant Professor of Psychology

RANDALL, Beth  
BS, Elizabethtown College  
OTD, Chatham University  
Clinical Assistant Professor, Occupational Therapy

RIVERA, Seema  
Assistant Professor Education CRC- Education Program

SACKS, Michael  
BS, Towson University  
MA, PhD, University of California, Irvine  
Assistant Professor of Economics and Financial Studies

SCHELLY, David  
BS, Colorado State University  
MS, University of Wisconsin  
PhD, University of Wisconsin  
Assistant Professor Occupational Therapy

SCRIMEGEOUR, Jan  
M. Phys., Heriot-Watt University  
D.Phil., University of Oxford  
Assistant Professor of Physics
SEMNNANI-AZAD, Zhaleh  
BA., MA, PhD, University of Waterloo in Ontario  
Assistant Professor of Consumer and Organizational Studies

SEYMOUR, Tonya  
BA, SUNY Potsdam  
MSP.A.S, Clarkson University  
Clinical Assistant Professor of Physician Assistant Studies

STEIN, Blair  
MA, Queens University  
MA, PhD, University of Oklahoma  
Assistant Professor of History

STEIN, Elizabeth  
BA, University of North Caroline at Chapel Hill  
MS, Northwestern University  
PhD, University of California  
Assistant Professor of Political Science

STEPHENSON, Amber  
BS, Ursinus College  
MPH, Westchester University  
PhD, Indiana University of Pennsylvania  
Assistant Professor of Healthcare Management

SWINK, Joshua  
BS, Ashford University  
Assistant Professor Military Aerospace

TAN, Chee-Keong  
BE, University of Sheffield  
PhD, Lehigh University  
Assistant Professor Electrical and Computer Engineering

THOMAS, Joshua  
BS, MS, PhD, University of Toledo  
Assistant Professor of Physics

THOMAS, Robert  
Assistant Professor of Civil and Environmental Engineering

TOOTH, Scott  
BS, Shippensburg University  
Assistant Professor of Military Science

Towler, Christopher  
BS, DPT, Clarkson University  
Clinical Assistant Professor of Physical Therapy

TRIVEDI, Dhara  
BSc, MSc, Gujarat University  
MA, PhD, University of Rochester  
Assistant Professor of Physics

VU, Tuyen  
BS, Hanoi University of Science and Technology  
PhD, Florida State University  
Assistant Professor of Electrical and Computer Engineering

WARSON, John  
BS, Liberty University  
MS, Missouri University of Science and Technology

WHITE, Dawn  
BA, Nazareth College  
MPAS, University of Nebraska  
DHS, A.T. Still University  
Clinical Assistant Professor of Physician Assistant Studies

WHITE, Diana  
BS, Memorial University of Newfoundland  
MS, PhD, University of Alberta, Canada  
Assistant Professor of Mathematics

WICRAMASHINGHE, Shandeepa  
Adjunct Assistant Professor of Mathematics

WILLIAMS, Robert  
BS, MBA, The Pennsylvania State University  
PhD, Edinburgh Napier University  
Visiting Assistant Professor of Consumer and Organizational Studies
WU, Wentao
CPA, licensed in state of Virginia (inactive status)
MS, George Washington University
Doctoral, Louisiana State University
Assistant Professor of Economics and Financial Studies

XUANG, Chen “Chester”
BS, Tsinghua University
MS, PhD, Carnegie Mellon University
Assistant Professor of Operations and Information Systems

YE, Jingyun
BS, Tianjin University
PhD, Tianjin University
Assistant Professor of Chemistry & Biomolecular Science

YAN, Wei
BS, Nanjing University of Science and Technology
MS, University of Chinese Academy of Sciences
PhD, University of Connecticut
Assistant Professor of Electrical and Computer Engineering

YOO, Michelle Mijeong
BS, Seoul National University
MS, Seoul National University
PhD University of Florida
Assistant Professor of Biology

BELL, Eric
BA, MA, University of Maine
PhD, Iowa State University
Assistant Professor of Communication, Media & Design

ZHANG, Jianhua
BS, Jimei University
MS, Xiamen University
MS, New Mexico Institute of Mining and Technology
PhD, North Carolina State University
Assistant Professor of Electrical and Computer Engineering

WULANDARI, Elisabeth Arti
BA, Gadjah Mada University
MA, Cornell University
MA, PhD, University of Wisconsin-Madison
Assistant Professor of Humanities and Social Sciences

Instructors

BACKUS, Erik C.
BS, Clarkson University
MS, University of Missouri-Rolla
PE, Missouri (active)
Professor of Practice and Executive Officer of Civil and Environmental Engineering/ Director of CEM

BELASEN, Alan
BA, MA, Hebrew University
PhD, State University of New York
Participating Professor of Consumer and Organizational Studies

BILLINGS, James J.
BS, Clarkson University
Adjunct Instructor of Civil and Environmental Engineering

BUCKINGHAM, Ronald
Instructor in Mechanical and Aeronautical Engineering

CHAPMAN, Edward
Senior Military Instructor of Military Science

CHAPMAN, Elisabeth
Instructor of School of Engineering

CHAUDHRY, Shafique
BS, MS, University of Punjab, Pakistan
PhD, Ajou University, Korea
Instructor of Operations and Information Systems

COMPEAU, Marc
BS, SUNY Potsdam
MS, Clarkson University

CONLON, Tyler
Instructor and Director of Projects and IT Infrastructure, Data Analytics
DULLEA, Daniel  
BS, MS, SUNY Syracuse  
Adjunct Instructor of Media Creation and Production, Communication, Media & Design

KAUFFMAN, Brett  
BS, State University of New York at Buffalo  
MBA, Union College  
Participating Professor of Operations and Information Systems

FARR, Kathryn  
BA, SUNY Potsdam  
MBA, Clarkson University  
Ph.D. Walden University, College of Management and Technology  
Instructor, Communication, Media & Design/Engineering and Management

KELLY, Gary  
Adjunct Instructor  
Honors Program

HEINL, Jared  
Adjunct Instructor of Civil and Environmental Engineering

KISSAM, Erika  
BFA, Emerson College  
MFA, Kent State University  
Adjunct Instructor of Communication, Media & Design

HOPKINS, John  
Adjunct Instructor  
Humanities and Social Sciences

MARTIN, Christopher  
BS, Clarkson University  
MS, SUNY Potsdam  
Instructor of Mathematics

HUDAK, Bryan  
Adjunct Instructor  
Humanities and Social Sciences

MILLER, Zachary  
BA Pitzer College  
Adjunct Instructor of Communication, Media & Design

ISSEN, Marshall  
BS, University of Illinois, Urbana  
MS, Roosevelt University  
P.E., Illinois  
Professor of Practice, Engineering and Management

MORRISON, Sara  
BS, St. Lawrence University  
MS, University of Vermont  
Instructor of Mathematics

JOHNS, Danielle  
BFA, SUNY Potsdam  
MFA, Rochester Institute of Technology  
Instructor of Digital Arts and Sciences, Communication, Media & Design

OLSEN, William  
Instructor of Civil and Environmental Engineering

JOHNSON-WOODS, Courtney  
BA, SUNY Buffalo  
MS, ABD, SUNY ESF  
Instructor of Communication, Media & Design

OTHMAN, Ali  
Adjunct Instructor  
Chemistry & Biomolecular Science

PIERCE, Duane  
Instructor for the School of Engineering
RILEY, Charles  
Adjunct Instructor  
Beacon Institute

SEKELI, Gasper  
BS, MBA, Clarkson University  
Instructor of Economics and Financial Studies

SHATTUCK, Heather  
PT, DPT Utica College  
Clinical Instructor of Physical Therapy

SMITH, Brad  
BA, MA, SUNY Potsdam  
Instructor of Mathematics

SMITH, Robert  
BS, Brooklyn College  
MS, C.W. Post College MHA New School for Social Research New York  
Participating Faculty of Healthcare Management

STRANG, Carl  
BA, Union College  
MS, SUNY Albany  
Participating Faculty of Operations and Information Systems

SZARKA, Andrew  
Adjunct Instructor Humanities and Social Sciences

TIRION, Monique  
Adjunct Research Associate Professor

TIGHE, Michael  
Assistant Instructor of Biology

TITUS, Leo  
Adjunct Instructor of Civil and Environmental Engineering

WELLS, David John  
BS, MS, PhD, Clarkson University  
PE, Wyoming (active)  
Dean Emeritus- SUNY Canton  
Adjunct Professor, MAE Department

WIGGINS, Arderrick  
Instructor of Military Science

WULTSCH, Elisabeth  
Instructor of School of Engineering

ZHANG, Yuan  
BS, Beijing International Studies University  
MS, University of California San Diego  
PhD, University of Texas at Arlington  
Instructor of Operations and Information Systems
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.

Semester Programs
The academic calendar for semester-based programs includes all graduate residential programs in Potsdam (except for the health sciences), as well as the graduate Engineering Management program, and graduate Education programs based at the Capital Region Campus.

<table>
<thead>
<tr>
<th>Semester Programs</th>
<th>2020-2021</th>
<th>2021-2022</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Semester Events - Potsdam</strong></td>
<td><strong>2020</strong></td>
<td><strong>2021</strong></td>
</tr>
<tr>
<td>Classes Begin</td>
<td>19 Aug W</td>
<td>29 Aug M</td>
</tr>
<tr>
<td>Fall Recess Begins*</td>
<td>N/A</td>
<td>8 Oct F</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>N/A</td>
<td>13 Oct W</td>
</tr>
<tr>
<td>Family Weekend Begins</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
<td>9 Oct F</td>
<td>27 Oct W</td>
</tr>
<tr>
<td>Enrollment For Spring Classes Begin</td>
<td>26 Oct M</td>
<td>3 Nov W</td>
</tr>
<tr>
<td>Thanksgiving Recess Begins*</td>
<td>N/A</td>
<td>23 Nov Tu</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>N/A</td>
<td>29 Nov M</td>
</tr>
<tr>
<td>Last Day of Class</td>
<td>13 Nov F</td>
<td>10 Dec F</td>
</tr>
<tr>
<td>Reading Days</td>
<td>16-17 Nov M, Tu</td>
<td>N/A</td>
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<tr>
<td>Exams Begin</td>
<td>18 Nov W</td>
<td>13 Dec M</td>
</tr>
<tr>
<td>Exams End</td>
<td>24 Nov Tu</td>
<td>17 Dec F</td>
</tr>
<tr>
<td>Fall Commencement Ceremony</td>
<td>24 Nov Tu</td>
<td>18 Dec Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>1 Dec Tu</td>
<td>20 Dec M</td>
</tr>
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</table>

*Recesses begin at the end of the last scheduled class on this day*
<table>
<thead>
<tr>
<th>Semester Programs</th>
<th>2020-2021</th>
<th>2021-2022</th>
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</thead>
<tbody>
<tr>
<td><strong>Fall Semester Events- CRC &amp; Beacon</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classes Begin</td>
<td>31 Aug M</td>
<td>29 Aug M</td>
</tr>
<tr>
<td>Fall Recess Begins*</td>
<td>9 Oct F</td>
<td>8 Oct F</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>14 Oct W</td>
<td>13 Oct W</td>
</tr>
<tr>
<td>Family Weekend Begins</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
<td>28 Oct W</td>
<td>27 Oct W</td>
</tr>
<tr>
<td>Enrollment For Spring Classes Begin</td>
<td>26 Oct M</td>
<td>3 Nov W</td>
</tr>
<tr>
<td>Thanksgiving Recess Begins*</td>
<td>24 Nov Tu</td>
<td>23 Nov Tu</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>30 Nov M</td>
<td>29 Nov M</td>
</tr>
<tr>
<td>Last Day of Class</td>
<td>11 Dec F</td>
<td>10 Dec F</td>
</tr>
<tr>
<td>Exams Begin</td>
<td>14 Dec M</td>
<td>13 Dec M</td>
</tr>
<tr>
<td>Exams End</td>
<td>18 Dec F</td>
<td>17 Dec F</td>
</tr>
<tr>
<td>Fall Commencement Ceremony</td>
<td>24 Nov Tu</td>
<td>18 Dec Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>21 Dec M</td>
<td>20 Dec M</td>
</tr>
<tr>
<td><strong>Spring Semester Events- All Campuses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classes Begin</td>
<td>13 Jan W</td>
<td>13 Jan Th</td>
</tr>
<tr>
<td>Check-in Deadline</td>
<td>19 Jan Tu</td>
<td>19 Jan W</td>
</tr>
<tr>
<td>February Break Begins*</td>
<td>17 Feb W</td>
<td>23 Feb W</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>22 Feb M</td>
<td>28 Feb M</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
<td>10 Mar W</td>
<td>11 Mar F</td>
</tr>
<tr>
<td>Residential MBA Spring Recess Begins*</td>
<td>5 Mar F</td>
<td>TBD</td>
</tr>
<tr>
<td>Spring Recess Begins*</td>
<td>12 Mar F</td>
<td>11 Mar F</td>
</tr>
<tr>
<td>All Classes Resume</td>
<td>22 Mar M</td>
<td>21 Mar M</td>
</tr>
<tr>
<td>Enrollment For Fall Classes Begin</td>
<td>7 Apr W</td>
<td>6 Apr W</td>
</tr>
<tr>
<td>Spring Semester Events- All Campuses</td>
<td>Spring 2021</td>
<td>Spring 2022</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Last Day of Class</td>
<td>30 Apr F</td>
<td>29 Apr F</td>
</tr>
<tr>
<td>Reading Days</td>
<td>3-4 May M, Tu</td>
<td>2-3 May M, Tu</td>
</tr>
<tr>
<td>Exams Begin</td>
<td>5 May W</td>
<td>4 May W</td>
</tr>
<tr>
<td>Exams End</td>
<td>11 May Tu</td>
<td>10 May Tu</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>14 May F</td>
<td>13 May F</td>
</tr>
<tr>
<td>Graduate Commencement Ceremony</td>
<td>13 May Th</td>
<td>TBD</td>
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<table>
<thead>
<tr>
<th>Summer Semester Sessions</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td><strong>10 Week Session Events</strong></td>
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</tr>
<tr>
<td>Classes Begin</td>
<td>24 May M</td>
<td>23 May M</td>
</tr>
<tr>
<td>Classes End</td>
<td>7 Aug Sa</td>
<td>6 Aug Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>10 Aug Tu</td>
<td>9 Aug Tu</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>First 5 Week Session Events</th>
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</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>24 May M</td>
<td>23 May M</td>
</tr>
<tr>
<td>Classes End</td>
<td>26 June Sa</td>
<td>25 June Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>29 June Tu</td>
<td>28 June Tu</td>
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</table>

<table>
<thead>
<tr>
<th>Second 5 Week Session Events</th>
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<tbody>
<tr>
<td>Classes Begin</td>
<td>5 July M</td>
<td>4 July M</td>
</tr>
<tr>
<td>Classes End</td>
<td>7 Aug Sa</td>
<td>6 Aug Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>10 Aug Tu</td>
<td>9 Aug Tu</td>
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</table>

<table>
<thead>
<tr>
<th>MAT Week Session Events</th>
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</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Classes End</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>10 Aug Tu</td>
<td>9 Aug Tu</td>
</tr>
</tbody>
</table>

*Recesses begin at the end of the last scheduled class on this day*
The Earl R. and Barbara D. Lewis School of Health Sciences
The academic calendar for The Earl R. and Barbara D. Lewis School of Health Sciences programs includes the Doctor of Physical Therapy (PT) program, the Master of Science in Occupational Therapy (OT) program, and the Master of Science in Physician Assistant Studies (PA) program. Each program may offer a slightly different orientation and break schedule; when differences occur, the impacted program is noted in the Events column; otherwise, Events apply to all programs. Further, some cohorts within each program may follow slightly different start/end dates, or break days, to accommodate clinical rotation or fieldwork schedules. Students should refer to their program handbook for specific information.

<table>
<thead>
<tr>
<th>Fall Trimester Events</th>
<th>Fall 2020</th>
<th>Fall 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Student Orientation Begins (PT)</td>
<td>24 Aug M</td>
<td>23 Aug M</td>
</tr>
<tr>
<td>New Student Orientation Begins (OT)</td>
<td>26 Aug W</td>
<td>25 Aug W</td>
</tr>
<tr>
<td>Classes Begin</td>
<td>31 Aug M</td>
<td>30 Aug M</td>
</tr>
<tr>
<td>Check-in Deadline</td>
<td>4 Sept F</td>
<td>3 Sept F</td>
</tr>
<tr>
<td>Labor Day, No Classes (PA)</td>
<td>7 Sept M</td>
<td>6 Sept M</td>
</tr>
<tr>
<td>Fall Recess Begins* (PT, OT)</td>
<td>9 Oct F</td>
<td>8 Oct F</td>
</tr>
<tr>
<td>Classes Resume (PT, OT)</td>
<td>14 Oct W</td>
<td>13 Oct W</td>
</tr>
<tr>
<td>Fall Recess (PA)</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
<td>28 Oct W</td>
<td>27 Oct W</td>
</tr>
<tr>
<td>Enrollment For Spring Classes Begin</td>
<td>26 Oct M</td>
<td>10 Nov W</td>
</tr>
<tr>
<td>Thanksgiving Recess Begins*</td>
<td>24 Nov Tu</td>
<td>23 Nov Tu</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>30 Dec M</td>
<td>29 Nov M</td>
</tr>
<tr>
<td>Last Day of Class</td>
<td>11 Dec F</td>
<td>10 Dec F</td>
</tr>
<tr>
<td>Exams Begin</td>
<td>14 Dec M</td>
<td>13 Dec M</td>
</tr>
<tr>
<td>Exams End</td>
<td>18 Dec F</td>
<td>17 Dec F</td>
</tr>
<tr>
<td>Fall Commencement Ceremony</td>
<td>24 Nov Tu</td>
<td>18 Dec Sa</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>21 Dec M</td>
<td>20 Dec M</td>
</tr>
</tbody>
</table>

*Recesses begin at the end of the last scheduled class on this day
<table>
<thead>
<tr>
<th>Spring Trimester Events</th>
<th>Spring 2021</th>
<th>Spring 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Student Orientation (PA)</td>
<td>4 Jan M</td>
<td>3 Jan M</td>
</tr>
<tr>
<td>Classes Begin (PA)</td>
<td>4 Jan M</td>
<td>3 Jan M</td>
</tr>
<tr>
<td>Classes Begin (PT, OT)</td>
<td>11 Jan M</td>
<td>10 Jan M</td>
</tr>
<tr>
<td>Check-in Deadline</td>
<td>15 Jan F</td>
<td>14 Jan F</td>
</tr>
<tr>
<td>Winter Recess Begins* (OT)</td>
<td>17 Feb W</td>
<td>23 Feb W</td>
</tr>
<tr>
<td>Classes Resume (OT)</td>
<td>22 Feb M</td>
<td>28 Feb M</td>
</tr>
<tr>
<td>Winter Recess Begins* (PT)</td>
<td>24 Feb W</td>
<td>2 Feb W</td>
</tr>
<tr>
<td>Classes Resume (PT)</td>
<td>1 Mar M</td>
<td>7 Feb M</td>
</tr>
<tr>
<td>Spring Recess Begins*</td>
<td>12 Mar F</td>
<td>11 Mar F</td>
</tr>
<tr>
<td>Classes Resume</td>
<td>22 Mar M</td>
<td>21 Mar M</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
<td>10 Mar W</td>
<td>11 Mar F</td>
</tr>
<tr>
<td>Summer &amp; Fall Enrollment Begins</td>
<td>7 Apr W</td>
<td>6 Apr W</td>
</tr>
<tr>
<td>Last Day of Classes (PA)</td>
<td>23 Apr F</td>
<td></td>
</tr>
<tr>
<td>Last Day of Classes (OT)</td>
<td>30 Apr F</td>
<td>29 Apr F</td>
</tr>
<tr>
<td>Last Day of Classes (PT)</td>
<td>11 May Tu</td>
<td>13 May F</td>
</tr>
<tr>
<td>Final Exams (OT)</td>
<td>3 May M – 7 May F</td>
<td>2 May M – 6 May F</td>
</tr>
<tr>
<td>Final Exams (PA)</td>
<td>19 Apr M – 23 Apr F</td>
<td>18 Apr M – 22 Apr F</td>
</tr>
<tr>
<td>Commencement</td>
<td>13 May Th</td>
<td>TBD</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>14 May F</td>
<td>13 May F</td>
</tr>
</tbody>
</table>

*Recesses begin at the end of the last scheduled class on this day

<table>
<thead>
<tr>
<th>Summer Trimester Events</th>
<th>Summer 2021</th>
<th>Summer 2022</th>
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</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>17 May M</td>
<td>TBD</td>
</tr>
<tr>
<td>Check-in Deadline</td>
<td>21 May F</td>
<td>TBD</td>
</tr>
<tr>
<td>Classes End</td>
<td>27 Aug F</td>
<td>TBD</td>
</tr>
<tr>
<td>Final Grades Due at 9:00am</td>
<td>31 Aug Tu</td>
<td>TBD</td>
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</tbody>
</table>
Quarter Programs
The academic calendar for the quarter-based programs includes all remaining graduate programs not referenced above.

<table>
<thead>
<tr>
<th>Summer Quarter Events</th>
<th>Summer 2020</th>
<th>Summer 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes Begin</td>
<td>15 June M</td>
<td>14 Jun M</td>
</tr>
<tr>
<td>Check-in Deadline</td>
<td>18 June Th</td>
<td>17 Jun Th</td>
</tr>
<tr>
<td>Midterm Grades Due at Noon</td>
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<td>Exams Begin</td>
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<tr>
<td>Spring Commencement Ceremony</td>
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POLICIES

Clarkson University Non-Discrimination Policy
Clarkson University does not discriminate on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, gender expression, national or ethnic origin, age, disability, military or veteran status, predisposing genetic characteristics, domestic violence victim status, familial status, marital status, parental status, ancestry, source of income, or other classes protected by law in provision of educational opportunity or employment opportunities.

Clarkson University does not discriminate on the basis of sex or disability in its educational programs and activities, pursuant to the requirements of Title IX of the Educational Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973, and the American Disabilities Act of 1990 respectively. This policy extends to both employment by and admission to the University.

Inquiries concerning Section 504, and the Americans with Disabilities Act of 1990 should be directed to ADA504@clarkson.edu.

Inquiries concerning the Age Discrimination Act, or other discrimination concerns should be directed to the Chief Human Resources Officer/Affirmative Action Officer at (315) 268-3788, Room 102 Graham Hall, Clarkson University, Box 5542, Potsdam NY 13699-5542 and/or Title IX to the Title IX Coordinator, Room 1003a ERC, Clarkson University, Box 5750, Potsdam, NY 13699-5750; or telephone (315) 268-4208, titleix@clarkson.edu.

Information on the processing of grievances and charges relating to the above policies can be obtained from the Human Resources/ Affirmative Action Office.

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

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 EBA Room 969 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

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

Nonimmigrant 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 conduct, campus policies, and other information regarding University operations. For a link to the Clarkson student regulations, please visit: https://www.clarkson.edu/student-administrative-services-sas/clarkson-regulations.
LIST OF GRADUATE PROGRAMS/CERTIFICATES & 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.

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<td>0506</td>
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