Catalog & Student Handbook
2007-2008

Rensselaer’s Hartford Campus
and Southeastern Connecticut Site

Graduate Programs
Rensselaer’s Catalog & Student Handbook is an official publication of Rensselaer for its students, faculty, staff, and friends. It is published by the Office of Communications, 275 Windsor Street, Hartford, Connecticut 06120-2991.

**Notice Regarding Changes** All information in this Catalog pertains to the 2007-2008 academic year and is correct to the extent that the information was available on the Catalog preparation date. However, Rensselaer reserves the right to change the course offerings, tuition, fees, rules governing admission, requirements for graduation and the granting of degrees, and any other regulations affecting its students. Such changes are to take effect whenever the administration deems necessary whether or not there is actual notice to individual students.
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Welcome to Rensselaer

Rensselaer Overview
Rensselaer Polytechnic Institute, of Troy, New York, founded in 1824, is the nation’s oldest technological research university. Well known for its leadership in technology-based education and its rigorous approach to problem solving, Rensselaer is a nonsectarian, coeducational institution. The branch campus in Connecticut has been the home of Rensselaer-wide excellence in advanced Education for Working Professionals for more than fifty years. The Hartford Campus and the Southeastern Connecticut Site provide a challenging educational environment and a dynamic learning experience for students who need to balance their professional, academic, and personal lives.

Education for Working Professionals
Education for Working Professionals (EWP) is one of Rensselaer’s core enterprises and encompasses a range of programs designed specifically for current and future workforce leaders with a range of high-end, customized, degree, certificate, and professional development programs. Program content flows from the heart of Rensselaer’s research strengths and unique academic programs. The EWP organization supports the Rensselaer vision by forging strategic partnerships with businesses, governments, universities, and innovative professionals who impact society and technology around the nation and the world.

Rensselaer’s educational enterprise for working professionals is dedicated to providing a highly interactive learning environment for students who are seeking high-level knowledge while they hone their analytical capabilities and leadership skills and enhance their innovative thinking. The intent is to have Rensselaer graduates—executives, senior professionals, managers, and individuals with high potential—become architects of their futures. With dramatic increases in the rate of change, working professionals expect and demand an academic environment that fits the evolving needs of their fast-paced world.

Degree Programs
The Hartford Campus offers graduate programs in Business Administration, Management, Computer Science, Computer and Systems Engineering, Electrical Engineering, Engineering Science, Mechanical Engineering, and Information Technology. Specialized programs include the Dual Master’s Degrees, the Weekend M.B.A., the Elite Master’s Program, and the Rensselaer Fellows Program. Courses are delivered by faculty with significant industry experience, solid academic credentials and scholarship, and exceptional teaching skills whose expertise is grounded in sound research and best practices on a global basis. Each course is designed to meet the needs of working professionals seeking to advance their careers and enhance the success of their organizations. Rensselaer graduates are changing the world every day.

Graduate Certificate Programs
Several graduate certificates are available in Computer and Information Sciences and Engineering. For working professionals not seeking a complete master’s degree, Rensselaer’s Graduate Certificate programs are tailored to enhance or update skills in a shorter period of time. They have a selective focus and require that a student successfully complete three or four courses in a specific area of study. With an advisor’s approval, credits earned may be subsequently applied as electives toward a master’s degree.

Rensselaer now offers the International Scholars Program for recent college graduates. Students complete four graduate courses in Management or Information Technology at various international locations.
Rensselaer’s Centers for Professional Development
A full range of professional development programs and services are offered at the Hartford Campus. These noncredit programs are designed to provide working professionals and organizations with the critical skills needed to be effective in today’s dynamic workplace. Programs generally range from one to five days in length. Training programs and workshops are available in the areas of leadership and executive development, technical and professional development, and computer and information technology. Specialized programs reflective of Rensselaer’s research strengths are also available, as well as the quality-focused offerings of the Connecticut Quality Council. Rensselaer offers services designed to help companies and individuals understand and define their developmental needs. Services include: needs assessment, custom program development, executive coaching, and multiple delivery options and locations. See pages 89-90 for more information.

Accreditation
Rensselaer is accredited by the Middle States Association of Colleges and Schools, by the Board of Governors for Higher Education of the State of Connecticut, and by a number of professional and academic societies. Rensselaer’s Lally School of Management and Technology is an accredited member of AACSB International, The Association to Advance Collegiate Schools of Business International.

Affirmative Action Policy
Rensselaer admits qualified students without regard to age, race, color, gender, sexual orientation, religion, national or ethnic origin, veteran status, marital status, or disability. Rensselaer is committed to equal access and equal opportunity. Should you require special accommodations in order to participate in any of the programs offered, please contact the Manager of Operations and Facilities at (860) 548-5392 or the Acting Associate Dean for Student Services at (860) 548-2421. Alternative formats of course material may be provided upon request.
Frequently Asked Questions

Do I have to apply to take classes?
Anyone wanting to take classes at Rensselaer must apply and be admitted. Although Rensselaer requires the formal admission of all students prior to registering for a credit course (even if you are not seeking a degree), the process is designed to be both streamlined and flexible. We also offer an online application that can be accessed at: www.ewp.rpi.edu/hartford/admissions/apponline.html.

How is an application evaluated?
The review process is designed to comprehensively evaluate an applicant’s academic and professional background. Some factors include: the undergraduate or graduate school attended, the applicant’s major, the year graduated, subsequent course work, performance in key subjects, rank in class (if available), awards and/or honors received, letters of recommendations, a personal statement of goals, résumé, and standardized test scores (if requested).

When should I apply?
The rolling admission process allows you to apply and enter a program during any of the three terms beginning in September, January, or May. The application deadline is approximately one month prior to the start of a particular term or program. Applications are reviewed on a first-come, first-accommodated basis.

How long does the application process take?
As soon as all of your materials are received your application will be considered for a decision. You will then be contacted in writing with the admissions decision.

Do you require GMAT or GRE test scores?
Although applicants to the M.B.A. are required to submit GMAT scores, waiver of this requirement may be granted to part-time applicants. Please refer to the Admissions section for complete details on the GMAT waiver policy. Please note: the GMAT cannot be waived for full-time M.B.A. candidates.

The Graduate Record Examination (GRE) is not required for our master’s programs in Engineering, Computer Science, or Information Technology. However, if an applicant’s credentials do not indicate strong probability of success in a competitive graduate program, a GRE may be required as part of the admissions process.

How long does it take to complete a degree and how long does a student have to complete all the requirements?
The primary mission of Rensselaer is to provide education for working professionals. Classes are held once a week, in the evenings or on weekends, on a trimester basis. A student sets his or her own pace depending upon the number of classes he or she decides to take each term. All work for a 30-credit master’s degree must be completed within three calendar years, beginning with the date on the original acceptance letter. All work for the 60-credit M.B.A. must be completed within five calendar years, beginning with the date on the original acceptance letter. However, one-year extensions are granted for compelling reasons.

Are your programs accredited?
Yes. Rensselaer is accredited by the Middle States Association of Colleges and Schools (MSACS) and by the Board of Governors for Higher Education of the State of Connecticut. Rensselaer’s Lally School of Management and Technology is accredited by AACSB International (The Association to Advance Collegiate Schools of Business International).

When are classes scheduled?
Computer Science, Information Technology, and Engineering classes are held Monday-Thursday from 5:30-8:30 p.m. Management courses are offered Monday-Thursday, from 5:30-9 p.m., and on alternating Saturdays. The Weekend M.B.A. meets on Friday evenings and alternating Saturdays. Each course meets once a week.
Will I have an advisor?
Each student, whether matriculated or non-matriculated, is assigned a faculty advisor.

How does the M.B.A. differ from the Master of Science in Management?
The M.B.A. is a 60-credit program (20 classes). It consists of 15 core management courses and 5 electives, which can be organized into a concentration. The M.B.A. equips graduates with the skills necessary to assume leadership positions in their organizations.

The M.S. is a 30-credit program (10 classes). It consists of 4 core management courses and 6 electives that must be organized into a concentration. The M.S. is a more specialized program, because the majority of the coursework focuses on the area of specialization.

The Lally School of Management offers several different focal areas that can be applied to the M.S. in Management. Please refer to the Lally School of Management section for details.

Do you require a Thesis for your M.B.A./Management program?
All students enrolled in the M.B.A. and M.S. programs in the Lally School of Management and Technology are required to complete a 3-credit CAPSTONE course. The CAPSTONE is an opportunity for students to synthesize the body of knowledge gained during their course of study and is ordinarily completed in the final term of the degree program.

What is the dual degree program?
The dual degree program is a combination of an M.B.A. and an M.S. or M.Eng. program. Taken separately, the two degrees consist of 90 credit hours. However, if done in a “dual” format, both may be earned in 72 credit hours. If you are interested in a dual degree, it is beneficial to fill out a Plan of Study and meet with an advisor as soon as possible.

How many classes can be transferred or waived?
A student in the M.B.A. program may waive up to four classes (12 credit hours) and transfer two (6 credit hours) of appropriate graduate work. The transfer/waiver process must be approved by the faculty advisor and department chair. Transfer courses must be the same subject, depth, and breadth of a course offered by Rensselaer.

A student in the M.S. program may transfer two graduate courses (6 credit hours) and the same rules apply.

What is the tuition?
Tuition is charged at the rate of $1167 per credit hour of graduate instruction. There are no additional fees for registration, use of the library, computing facilities, Commencement, parking, or any other Rensselaer student service.

Do you offer Financial Aid?
Rensselaer participates in the Federal Family Education Loan Program (FFELP) and administers the Federal Stafford Loan to help you manage graduate education expenses. The Stafford Loan requires enrollment of at least six credits. For further requirements and Financial Aid options, please review the Financial Aid section of the Web site. You may contact the Financial Aid Office at (860) 548-2406 or (800) 433-4723, ext. 2406 to request financial application materials, or read the online Financial Aid Handbook at: www.ewp.rpi.edu/hartford/finaidhb.

If I still have questions, what should I do?
Contact the Office of Enrollment Management. Personnel are available to answer your questions over the phone, or you may wish to schedule an appointment, or attend an Open House. For more information, please call (860) 548-2420; (800) 433-4723, ext. 2420; or e-mail: info@ewp.rpi.edu.
Academic Calendar, Advanced Studies

NOTE: Students in cohort programs should refer to the specific calendar distributed for their program.

Fall Term 2007

July 2 - Monday
Fall 2007 registration begins

August 3 - Friday
Application deadline for Fall 2007 new students

August 20 - Monday
Registration deadline for Fall 2007 - tuition due

August 29 - Wednesday
New Student Welcome Reception

September 3 - Monday
Labor Day - no classes, facilities closed

September 4 - Tuesday
Classes begin

September 25 - Tuesday
Drop Deadline (Last day to drop a course without full financial penalty) - Registration cancelled if tuition not paid

October 5 - Friday
Degree Applications due in the Office of the Registrar for December 2007 graduates

October 26 - Friday
Last day to request Thesis or Project Defense and to submit copy to advisor

November 12 - Monday
Spring 2008 registration begins

November 16 - Friday
Last day to submit approved Thesis or Project

November 22-23 - Thursday and Friday
Thanksgiving recess - no classes, facilities closed

November 26 - Monday
Classes resume

December 7 - Friday
Application deadline for Spring 2008 new students

December 13 - Thursday
Classes and exams end

December 17 - Monday
Grades due

December 21 - Friday
Registration deadline for Spring 2008 - tuition due

December 25 - Tuesday
Christmas holiday - facilities closed

December 28 - Friday
Official date of December degree award (Degrees will be available in February 2008)

Dates in the Academic Calendar are subject to change.

The calendar for distributed education courses originating at the Troy campus will be coordinated with the Education for Working Professionals office in Troy.

2007

2008
### Spring Term 2008

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>January 1, 2008</td>
<td>New Year’s Holiday - facilities closed</td>
</tr>
<tr>
<td>January 3</td>
<td>New Student Welcome Reception</td>
</tr>
<tr>
<td>January 7</td>
<td>Classes begin</td>
</tr>
<tr>
<td>January 21</td>
<td>Martin Luther King, Jr. Day - no classes, facilities closed</td>
</tr>
<tr>
<td>January 29</td>
<td>Drop Deadline (Last day to drop a course without full financial penalty) - Registration cancelled if tuition is not paid</td>
</tr>
<tr>
<td>February 8</td>
<td>Degree Applications due in Office of the Registrar for May 2008 graduates</td>
</tr>
<tr>
<td>February 18</td>
<td>Presidents’ Day - no classes, facilities closed</td>
</tr>
<tr>
<td>February 19</td>
<td>Classes resume (Follow Monday class schedule. No Tuesday classes this week.)</td>
</tr>
<tr>
<td>March 7</td>
<td>Last day to request Thesis or Project Defense and to submit copy to advisor</td>
</tr>
<tr>
<td>March 17</td>
<td>Summer 2008 registration begins</td>
</tr>
<tr>
<td>April 4</td>
<td>Last day to submit approved Thesis or Project</td>
</tr>
<tr>
<td>April 11</td>
<td>Application deadline for Summer 2008 new students</td>
</tr>
<tr>
<td>April 17</td>
<td>Classes and exams end</td>
</tr>
<tr>
<td>April 21</td>
<td>Grades due</td>
</tr>
<tr>
<td>April 28</td>
<td>Registration deadline for Summer 2008 - tuition due</td>
</tr>
<tr>
<td>May 17</td>
<td>Commencement (Troy, New York)</td>
</tr>
<tr>
<td>June 7</td>
<td>Commencement (Hartford Campus)</td>
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### Summer Term 2008

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 12</td>
<td>Classes begin</td>
</tr>
<tr>
<td>May 26</td>
<td>Memorial Day - no classes, facilities closed</td>
</tr>
<tr>
<td>June 3</td>
<td>Drop Deadline (Last day to drop a course without full financial penalty) - Registration cancelled if tuition is not paid</td>
</tr>
<tr>
<td>June 13</td>
<td>Degree Applications due in Office of the Registrar for August 2008 graduates</td>
</tr>
<tr>
<td>July 1 - July 5</td>
<td>No classes</td>
</tr>
<tr>
<td>July 4 - July 5</td>
<td>Independence Day - facilities closed</td>
</tr>
<tr>
<td>July 7</td>
<td>Fall 2008 registration begins</td>
</tr>
<tr>
<td>July 11</td>
<td>Last day to request Thesis or Project Defense and to submit copy to advisor</td>
</tr>
<tr>
<td>July 25</td>
<td>Last day to submit approved Thesis or Project</td>
</tr>
<tr>
<td>August 1</td>
<td>Application deadline for Fall 2008 new students</td>
</tr>
<tr>
<td>August 16</td>
<td>Classes and exams end</td>
</tr>
<tr>
<td>August 18</td>
<td>Registration deadline for Fall 2008 - tuition due</td>
</tr>
<tr>
<td>August 20</td>
<td>Grades due</td>
</tr>
<tr>
<td>August 29</td>
<td>Official date of August degree award (Degrees will be available in October 2008)</td>
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</tbody>
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### Fall Term 2008

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 27</td>
<td>New Student Welcome Reception</td>
</tr>
<tr>
<td>September 1</td>
<td>Labor Day - facilities closed</td>
</tr>
<tr>
<td>September 2</td>
<td>Classes begin</td>
</tr>
</tbody>
</table>
Rensselaer has diverse computing resources that rival or exceed many systems currently installed in other educational institutions and industries. Technical and Information Services (TIS) provides technical support services to students, faculty, and staff for their academic, instructional, and research endeavors. TIS is responsible for the design, development, implementation, and maintenance of a state-of-the-art computing environment for the Hartford Campus community.

To meet this challenge, we have developed a computing environment based on a distributed network of personal computers (PCs), high-end workstations, and file servers using a client-server model, combined with high-speed networking. Using this model enables us to provide a multi-user computing environment that is capable of handling demanding database management and compute-intensive applications for students and staff.

A variety of computing facilities, general access labs, and technology classrooms are available for student use. Our facilities have consistent equipment installed (Sun Workstations, PCs, etc.) and numerous software packages. TIS offices are located on Level 2.

Network and Servers
The Hartford Campus computing infrastructure is based on an open TCP/IP client-server architecture and uses Cisco System’s 7206 and 3600 routers and Catalyst 6500, 2950, 3500 and 2960 switches to support a high-speed 10/100/1000 Mbps switched network. All servers connect to the network via a dedicated 1000 Mbps full duplex link. Workstations and PCs connect to the switched network via dedicated 10/100/1000 Mbps links.

Users may access Hartford Campus network services from home or office via their Internet service provider. Robust Internet access is provided via redundant, high-speed connections to the Troy campus and a gigabit connection to the Connecticut Education Network (CEN). An additional T1 links Hartford to the Southeastern Connecticut Site. A Virtual Private Network (VPN) service is available for secure remote access to internal campus resources.

Wireless Access (802.1b/g) is available at the Hartford Campus. All wireless connections are secured either using PEAP/GTC 802.1x security protocols or via a wireless VPN service. The following areas feature wireless access: Level 2 (Plaza Building, Cafeteria, and courtyard), Level 3, Level 4, Level 5 (Cole Library) and Level 7 with additional areas and full campus coverage planned within a year.

The Hartford student file server is a Sun Microsystems’ Enterprise 450, a high-performance, four-processor server with 362 GB of raid disk storage. Additional file service for faculty, staff, and the Southeastern Connecticut Site is provided by a Sun Enterprise 220R file server. In addition, Sun Enterprise 450, V120, V240, V440, V480, and V1280 servers supply specialized network services and Web access. To complete the computing environment, the Hartford Campus has high-speed, publication-quality printers. All printers are networked and accessible throughout the building.

Personal Computer Laboratories
Students have access to several PC-based laboratories and technology classrooms. These facilities are located on the first, second, fourth, and sixth levels of the main building, in the Cole Library, and at the Southeastern Connecticut Site. The PCs in these facilities are connected to our local area network, giving students access to the Internet as well as file and print services. The technology classrooms are avail-
able for individual student use when they are not reserved for classes. Contact TIS for availability of PC-based labs and the technology classrooms.

**UNIX Workstation Laboratory and Classroom**
The UNIX workstation laboratory on Level 1 and classroom on Level 2 contain SunBlade 1500 workstations from Sun Microsystems. These workstations are connected to our local area network, giving students access to the Internet as well as file and print services. They feature high-speed I/O throughput, large amounts of memory and disk capacity, plus graphics acceleration. Technology classrooms are available for individual student use when they are not reserved for classes.

**Software Library**
Each PC/Workstation has a variety of industry standard application software installed. The following describes some of the application areas covered: programming languages/tools, office suite (word processing, spreadsheets, presentation, and database applications), Web interface and virus protection.

**Distributed Education and Multimedia**

The Distributed Education and Multimedia Department provides the instructional technology infrastructure for the educational programs offered. The Department is responsible for distributed education, multimedia design and production, multimedia classrooms and auditoriums, and audiovisual services. The Department’s production, technical, and logistic staff provide comprehensive instructional design, production, and technology services.

Faculty and training staff from a number of disciplines and producers from the Distributed Education and Multimedia Department work together to integrate proven content with instructional strategies designed to make effective use of distributed education technology. These design activities are complemented by the technical and logistic support provided by department staff. These efforts provide the exceptional instruction integrated with advanced instructional techniques, delivery systems, and support. The result is rich and rigorous instruction at a location convenient to the student.

Students choose to participate in courses offered via distributed education because they:

- Appreciate having classes offered at a site close to work and home.
- Understand the value of interacting with human and technical resources available beyond the traditional classroom.
- Want to gain competence and confidence using interactive technologies that are becoming common in the workplace.
- Recognize and appreciate the value of the wide range of experiences provided using distributed education.
- Enjoy participating in using advanced instructional technologies including both synchronous and asynchronous instruction.

In addition to distributed education activities, the Distributed Education and Multimedia Department staff are responsible for a variety of other instructional technologies and facilities including auditoriums, multimedia classrooms, and audiovisual services. They design and produce single and multimedia instructional materials for use in classes and training programs where technology is integrated into the instructional process. These integrated technologies include internet broadcasts, Web-based materials, computer and video projection, video conferencing, audiovisual, and interactive multimedia technologies.
The Robert L. and Sara Marcy Cole Library

Director: Mary S. Dixey

The Cole Library provides users with information resources and services that focus in the areas of management, business, computer science, and engineering. Its specialized collection of print and electronic resources consists of 55,000 volumes; 400 print journals; and a variety of bibliographic and full-text online databases that offer access to over 36,000 e-journals.

The Cole Library shares an online catalog with its sister library, the Folsom Library at Rensselaer in Troy, New York. The Cole Library Web site provides access to both regional academic library catalogs and those across the nation. The Cole Library has full membership in OCLC, Inc., an international bibliographic system, and has borrowing privileges with over 5,000 member institutions.

Of particular interest to students and faculty are the publications of professional associations such as the Association for Computing Machinery (ACM), the Institute of Electrical and Electronics Engineers (IEEE), and the American Society of Mechanical Engineers (ASME). Special online collections include proceedings of the ACM and IEEE.

Reference

The professional staff is available to assist students and faculty with research and reference needs using both the Cole Library and other resources. Quick reference by e-mail form is also available. Referrals to other libraries in the area augment in-house resources. Students and faculty may request material not available in the Cole Library through Interlibrary Loan.

The Cole Library’s instruction program offers subject-specific sessions on a class and individual basis. The staff is especially attuned to the research needs of the adult student.

Electronic Access Resources

The Cole Library provides on-site and remote access to its resources. An open computing area provides online databases that support both the management and the sciences curricula. A full gateway to the Internet is available through PC workstations.

The Cole Library’s home page is regularly updated. It offers tutorials and serves as a guide to course-related resources. The information may be reached from remote locations through an Internet Service Provider.

Use of the Library

Students must register with the Cole Library to borrow materials. The Rensselaer ID card, issued at registration, also serves as a Library Card. Material in the open collection is loaned for the entire term. Reserve materials are available for shorter loan periods determined by the faculty. Students may contact the Cole Library at (860) 548-2490; (800) 433-4723, ext. 2490; e-mail: lib-info@eup.rpi.edu; or visit our home page: www.eup.rpi.edu/library.
Southeastern Connecticut Site

Courses leading to the Master of Business Administration; Master of Science in Management, Computer Science, and Engineering Science; Master of Science or Master of Engineering in Mechanical Engineering and Electrical Engineering; and Master of Engineering in Computer and Systems Engineering are offered at the Southeastern Connecticut Site. Rensselaer has been serving students and corporations in southeastern Connecticut since 1977.

The Southeastern Connecticut Site is located at the Trails Corner Professional Center at 618 Poquonnock Road in Groton. All student services are available at the Administrative Office.

Cole Library Services
Both faculty and students are asked to refer to www.eup.rpi.edu/library/groton.htm for an introduction to services provided by the Cole Library. Resources are available to Southeastern Connecticut students through the Cole Library Web site at: www.eup.rpi.edu/library. The Southeastern Connecticut Site has twelve PCs and four Sun Workstations which allows students complete access to all databases in Hartford. Books borrowed from the Hartford collection are delivered to the Southeastern Connecticut Site by shuttle and students may pick them up at the Administrative Office. Contact the Cole Library for assistance at (860) 548-2490; (800) 433-4723, ext. 2490; e-mail: lib-info@eup.rpi.edu; or visit our home page: www.eup.rpi.edu/library.

Technical and Information Services
The computing facilities at the Southeastern Connecticut Site have hardware and software resources consistent with those available in Hartford. Students have access to one computing classroom with eighteen PCs and a lab with one Sun workstation, two PCs, a printer, and network access. Each system has a myriad of software applications installed and is connected to the Hartford Campus local area network, providing access to the Internet as well as file and print services. The Southeastern Connecticut Site fileserver is a Sun Ultra Server with 100 GB of storage space. The computing facilities are located on the second floor of the Trails Corner Professional Center.

Distributed Education and Multimedia
The distributed education facilities at the Trails Corner Professional Center are designed to send and receive courses at the Southeastern Connecticut Site. Three interactive compressed video send and receive rooms with audio and video systems are available. One multimedia computer classroom is available for classes, which may also be configured for distributed education. Distributed Education and Multimedia staff assist with the technical and logistical aspects of these classes and provide audiovisual support.
Admissions

General Information for All Applicants
Early submission of applications is encouraged and applications are due thirty (30) days prior to the start of the term or program, as indicated in the Academic Calendar (please see page 8). Degree and nonmatriculated (nondegree status) applicants have different application requirements. Please read the section that pertains to you. If you are interested in nonmatriculated status at this time, but may wish to matriculate in the future, then please read both sections. Application forms and complete application instructions are available by calling the Office of Enrollment Management at (860) 548-2420; (800) 433-4723, ext. 2420; or e-mail: info@ewp.rpi.edu. You can also apply online at: www.rpi.edu/ewp.

Degree Applicants
An applicant may request degree admission if he or she has received a bachelor’s degree from an accredited undergraduate institution and has demonstrated a strong academic record. Credentials will be reviewed to determine whether the applicant has the necessary qualifications and meets the competitive admissions standards established by Rensselaer. Please refer to the Checklist of Application Credentials needed to complete your file which can be found on page III in the application package. Degree-seeking applicants may be admitted with conditions. Admission and continued enrollment depend upon the satisfactory fulfillment of the stated conditions.

Nonmatriculated Applicants (Nondegree Applicants)
The applicant who wishes to undertake graduate course work to improve his or her knowledge in a specific area but not follow a degree program is considered for nonmatriculated status. An applicant may request admission as a nonmatriculated student if he or she has received a bachelor’s degree from an accredited undergraduate institution and meets the admissions standards established by Rensselaer. It does not represent a conditional admission to any degree program, nor does it guarantee later degree admission. If the ultimate academic goal is a master’s degree, then applicants should apply for degree status at the outset.

Admission for nondegree students is granted if the supporting documents indicate strong academic achievement and demonstrate that the applicant has the necessary preparation for the desired course(s). To apply, an applicant must submit an application form indicating the requested course or courses; application processing fee; an unofficial copy of the bachelor’s (or post-baccalaureate) degree transcript showing all courses, grades, and award of the degree; a current résumé, and proof of immunization as required by Connecticut State law. If the transcript is not sufficient for a decision, the Office of Enrollment Management may request additional supporting documents such as references or results from standardized admissions tests.

Applicants with Postbaccalaureate Degrees
Applicants who have been awarded a postbaccalaureate degree (i.e., M.S., M.B.A., J.D., Ph.D., etc.) may be eligible to participate in the Rensselaer special admissions process. Please call the Office of Enrollment Management at (860) 548-2420 or (800) 433-4723, ext. 2420 to discuss your particular circumstances.

International Applicants
To receive complete information on the credentials needed to apply, please write or call: Office of Enrollment Management, 275 Windsor Street, Hartford, CT 06120-2991 U.S.A.; (860) 548-2420; (800) 433-4723, ext. 2420; or e-mail: info@ewp.rpi.edu. All international applicants must demonstrate English
language proficiency by submitting a Test of English as a Foreign Language (TOEFL) score of at least 600 on the paper based test, 250 on the computer based test, or 100 on the Internet based test.

**Lally School of Management and Technology GMAT Requirement and Waiver Policy for M.B.A. Candidates**

The Graduate Management Admission Test (GMAT) is one component given consideration in the admissions decision for applicants to the Management and Technology M.B.A. program. There are certain occasions when other graduate admissions examinations such as the Graduate Record Examination (GRE) are accepted in place of the GMAT. For example, applicants for a dual degree such as the M.B.A. and Engineering or the M.B.A. and Computer Science may submit GRE scores if desired.

A GMAT score must be presented as part of the admissions file. However, a waiver of this requirement may be granted to part-time applicants if the candidate presents:

- Significant analytical background as evidenced by strong undergraduate course work and grades
- 2-5 years of progressively responsible work experience as indicated on the requested résumé.

Those applicants wishing to pursue a full-time course of study (12 credit hours or more each term) will be required to submit GMAT scores with only rare exception.

The GMAT is not required for applicants to the M.S. degree in Management. However, students concerned about the competitiveness of their academic background may wish to take the GMAT exam to obtain an additional academic credential.

**Background Preparation for Master of Science in Computer Science and Nonmatriculated Computer Science Applicants**

Depending on academic background and professional experience, some students may be required to begin their studies with one or more of the following prerequisite “immigration” courses. These courses will be taken in addition to the standard 30 credits needed for degree completion:

- CISH-4960 Introduction to Computer Programming
- CISH-4010 Discrete Mathematics
- CISH-4020 Object Structures
- CISH-4030 Structured Computer Architecture

Students with immigration courses as prerequisites may be admitted conditionally. Since these are undergraduate courses, students are expected to achieve a grade of “B” or better in each course. Achievement below this level is cause for reexamination of admission. In addition, these immigration courses will not enter into the calculation of a student’s GPA for graduation.

**Background Preparation for Master of Science in Information Technology (IT) and Nonmatriculated IT Applicants**

Depending on academic background and professional experience, some students may be required to begin their studies with one or more of the following prerequisite “immigration” courses. These courses will be taken in addition to the standard 30 credits needed for degree completion:

- CISH-4960 Introduction to Computer Programming
- CISH-4010 Discrete Mathematics
- CISH-4020 Object Structures
Students with immigration courses as prerequisites may be admitted conditionally. Since these are undergraduate courses, students are expected to achieve a grade of “B” or better in each course. Achievement below this level is cause for reexamination of admission. In addition, these immigration courses will not enter into the calculation of a student’s GPA for graduation.

**Background Preparation for Engineering Applicants**

All Engineering applicants are expected to have earned a Bachelor of Science degree from an ABET accredited college or university. The Bachelor of Engineering Technology (BET) is not generally appropriate for master’s level courses or degree programs in Engineering. If you hold a BET degree and are interested in courses and/or a degree in Engineering, please refer to the General Engineering Requirements listed on pages 40, 41, 43, 46, and 48. If you do not yet have the background indicated for a particular Engineering discipline, please call the Office of Enrollment Management at (860) 548-2420 or (800) 433-4723, ext. 2420 to discuss your particular circumstances. In certain instances, you may be required to submit scores from the Graduate Record Examination (GRE) Engineering Test or to pursue further instruction in order to meet these background requirements.
Financial Aid

Financial Aid Officer: John F. Gonyea

Rensselaer offers a range of programs and resources to help you effectively manage graduate educational expenses. While many companies offer their employees tuition reimbursement, the amount and timing of this benefit vary tremendously from company to company. Full tuition may not be covered, payment may be made to a student only after grades are issued, and taxes (on tuition above $5,250 for the year) also may be withheld. Whether you anticipate a cash flow problem or your needs go deeper than that, we have a program designed specifically for you. Please call John Gonyea in the Financial Aid Office at (860) 548-2406 or (800) 433-4723, ext. 2406 to request financial information and application materials, or visit our Web site at: www.epi.rpi.edu for financial aid information.

Student Loans

The Federal Family Education Loan Program has certain basic eligibility criteria. For instance, you must be a U.S. citizen or permanent resident, degree-seeking, and must maintain half-time enrollment (six credit hours) each term of the loan period. Evidence of financial need is not necessary for a graduate student to borrow up to $20,500 each academic year (limited only by the actual cost of attendance). Demonstrated financial need, however, is necessary for up to $8,500 of this amount to be subsidized (i.e., accrue no interest while you are enrolled half-time).

For loans first disbursed on or after 7/1/06, the fixed interest rate will be 6.8%.

The U.S. Department of Education has set up an Office of the Ombudsman to work with student loan borrowers to informally resolve loan disputes and problems. To contact Ombudsman Debra Wiley’s office, please use the toll-free number (877) 557-2575 or visit their Web site at: www.ombudsman.ed.gov. For instructions on how to return Federal Loan funds (for students who withdraw completely from this institution), please contact the Financial Aid Office.

Student Loan Deferments

In-school deferment requests should be submitted to the Financial Aid Office. Enrollment is certified on a term-by-term basis immediately following the posted add/drop deadline. Loan deferment usually requires certification of both half-time enrollment plus degree-seeking status. Perkins loans generally require that deferment forms be completed each term. Students considering deferment should be aware of the following definitions:

• Part-time status (i.e. less than half-time): one to five credit hours per term
• Half-time status: six to eleven credit hours per term
• Full-time status: twelve or more credit hours per term
Tuition and Fees

Beginning with the Fall 2007 term, tuition for advanced studies programs is $1167 per credit hour. Registration is not complete until payment is received through any of the Payment Options outlined below. Tuition payment is due two weeks before classes begin (see specific Program Schedule). Tuition paid after this date will be subject to a late fee of $100 per course. Students will not be able to attend class until all financial obligations have been met.

No refunds will be issued for any courses dropped after the Drop Deadline for the specific Program.

Financial Responsibilities

Academic credit, degrees, grade reports, diplomas, and transcripts will not be granted to students who have outstanding financial obligations to Rensselaer. In addition, students who have not satisfied their financial obligations will be unable to register for future terms. Should a student fail to pay any amounts due Rensselaer in accordance with the terms of the Catalog, Rensselaer may, at its option, increase the amounts due by any attorneys’ fees, collection agency fees, or any other costs or charges incurred in the collection process.

Payment Options

Payments can be made through Student Accounts located on Level 6 in the Financial Services office on the Hartford Campus. Normal business hours are 8:30 a.m. to 5 p.m., Monday through Friday. For the convenience of our students, payments are also accepted at the Reception Desk located on Level 3. Extended hours at the Reception Desk are Monday - Thursday, 8 a.m. to 9:30 p.m.; Friday, 8 a.m. to 9 p.m.; Saturday, 8:30 a.m. to 5 p.m.; and Sunday, 11 a.m. to 4 p.m. Other arrangements can also be made by contacting Student Accounts directly at (860) 548-2413.

Checks, Money Orders, and Travelers Checks should be payable to Rensselaer. To expedite processing, please also include your RIN (Rensselaer Identification Number) and name on all forms of payment.

Credit Card Payments. Rensselaer accepts Mastercard, Discover, and American Express. If you wish to pay all or a portion of your charges by credit card please log on to the Rensselaer Web site and pay online.

Payment Plan. As an alternative to paying one lump sum at the beginning of the term, Rensselaer offers a monthly installment plan. This plan, called “Tuition Pay,” is coordinated with Academic Management Services (AMS). The plan permits tuition charges to be paid in four interest-free installments over the course of the current term. The only additional cost is an application fee of $35 per term. For more information on Tuition Pay through AMS, please contact Student Accounts, or AMS directly at (800) 635-0120 or visit their Web site at: www.tuitionpay.com.

Employer Payments

1. Direct Billing. Rensselaer currently has contracts with several local employers to direct bill the company for tuition charges incurred on behalf of certain qualified employees. If an employer authorizes direct billing by Rensselaer, the appropriate authorization form/letter, or purchase order must be submitted to Student Accounts at the time of registration. If you have questions as to whether or not your employer has such an arrangement with Rensselaer or the documentation required for such payments, please contact Student Accounts.
2. **Tuition Reimbursement.** If an employer is supporting tuition costs by reimbursing an employee directly at the end of the term, this does not qualify a student for deferred payment. Students in this situation are considered to be self-paying, subject to the standard financial responsibilities and payment schedules described on page 18.

**Tuition Refunds**
Students who withdraw from a course without registering for another course prior to the Drop Deadline will receive a full tuition refund. All other withdrawals after the Drop Deadline will result in 100% forfeiture of tuition.

*At Commencement exercises, the graduates are recognized for their achievements and welcomed into the Rensselaer alumni community.*
Academic Information and Regulations

Registrar: Doris M. Matsikas

Registration

Students must register prior to the beginning of each term as specified in the academic calendar. New students are expected to contact their academic advisor for assistance in course selection. Returning students are given the opportunity to register in advance. Registration procedures are available online at: www.eup.rpi.edu/hartford/portal/curstu/webreg.

Residence and Time Limit

A student earning a master’s degree is required to complete a minimum of 24 credit hours at Rensselaer for each Master of Science degree sought. Students engaged in professional programs (part-time students) must complete all work for the master’s degrees requiring 30 credits within three calendar years of the original admission date. Those Rensselaer students working on master’s degrees requiring 60 credits must complete the requirements within five calendar years of the original admission date. Extensions may only be granted if the student is in good academic standing and has an acceptable Plan of Study. Working professionals must petition the Assistant Registrar for an extension. Final approval is granted by the Assistant Dean for Academic Programs.

Academic Load

A part-time student normally carries a maximum of six credit hours per term. Full-time registration requires enrollment in a minimum of twelve credit hours per term unless the student’s academic program does not permit registering for twelve credit hours. In such cases, full-time status will require a minimum of nine credit hours.

Academic Standing

A student is considered in good academic standing if he or she is making satisfactory progress toward his or her educational goals. Students not making satisfactory progress are subject to dismissal.

Academic Dismissal

Continuation in the graduate program requires satisfactory performance. Satisfactory performance is not limited to the academic record, but also includes other appraisals of the student’s ability.

The minimum GPA of all grades used for credit must be 3.0. If a student’s grade average falls below 3.0, the department will conduct a formal review to determine whether continuation is warranted.

A student will be dismissed from Rensselaer if:

• He or she has accumulated six credit hours beyond the stated degree requirements and has not satisfied the 3.0/4.0 GPA.
• His or her record indicates two failing “F” grades or three “C” grades where the GPA is less than 3.0/4.0.
• He or she fails to make satisfactory progress toward the completion of course work or a degree program.

Readmission

This policy applies to students who have completed only a few courses and have exceeded the three-year (M.S. and M.Eng.) or five-year (M.B.A.) limit to complete degree requirements. Graduate students requesting readmission must receive the prior approval of the Assistant Dean for Academic Programs.

A student reappplies by completing the Rensselaer application. Resubmission of letters of recommendation
and official transcripts is generally not required. However, if the transcripts in the student’s file are not official, or if he or she has completed additional course work at another graduate institution since attending Rensselaer, the Office of Enrollment Management will require the appropriate official transcripts.

If readmission is approved, all course work for the master’s degree must be completed within three or five calendar years (depending upon degree) beginning with the date of the readmission letter. Course work taken prior to readmission will be subject to evaluation by the Assistant Dean for Academic Programs and faculty advisor. When a student is readmitted, he or she must satisfy current program requirements.

Leave of Absence
A leave of absence is a period of time voluntarily spent away from Rensselaer. A student in good standing who finds it necessary to withdraw for an allowable period of time must complete a Leave of Absence form, stating reasons for the request, and submit it to the Office of the Registrar. A leave of absence is normally given for up to one year, starting with the term during which the leave is requested. A leave of absence does not afford additional time to complete the degree. Exceptions to this rule can be requested when the leave is taken for maternity, medical, or military reasons.

Withdrawal from Rensselaer
In order to leave in good standing, a student who voluntarily withdraws during the academic year must request a Withdrawal form and submit it to the Office of the Registrar.

Advisors
Students are required to establish and maintain working relationships with faculty advisors during their programs of study.

Each student is assigned a faculty advisor to assist in academic program planning and the development of an approved Plan of Study. It is recommended that students contact the faculty advisor during their first term. All students are required to complete a plan with their advisor’s approval by the completion of their second course. If no plan is on file, a flag will be placed on the student's record preventing registration.

Students should also meet with the faculty advisor annually and prior to starting their last term before graduation to assure that all degree requirements are being completed in compliance with established criteria. **It is the student’s responsibility to ensure that the academic regulations are met and that any deviations from these regulations are approved in advance by the advisor and the Assistant Dean for Academic Programs.**

Requests for change of status, change in program plan, and transfer of credit should be submitted on the appropriate form to the faculty advisor for review, consideration, and processing. Supporting letters and documentation should accompany such requests as required.

In addition to assisting in academic program planning, faculty advisors are aware of Rensselaer policies that may affect student status. They are also familiar with future elective course options which may be of special interest to advisees.

Attendance Requirements
Requirements for class attendance are generally determined by the academic department. It is the responsibility of each instructor to make these requirements clear at the beginning of the course, and it is the responsibility of the student to abide by them. If the instructor does not inform the class of the attendance policy, he or she should be asked to state the policy for the class.

The instructor who defers a class or changes his or her class schedule for any reason is responsible for arranging for the work that is missed. The entire class must agree with any change to a class meeting schedule or final exam schedule.
Auditing

Auditing is attending a course without credit. Auditors may participate in recitations, discussions, or examinations at the discretion of the instructor. Admitted students will be allowed to audit courses on a non-credit basis with the written permission of the instructor.

A student is granted auditor status when the Auditor Registration Form has been signed by all appropriate parties and returned to the Office of the Registrar.

Auditors are charged full tuition for courses audited and may not register for credit in the audited course later in the same term. They may, however, register in a future term on a credit basis for the audited course. Tuition will be charged at the time of registration. Auditors who have fulfilled the attendance requirements of the instructor will be assigned the grade of “AU” for the audited course at the end of the term.

Changes in Course Registration

Add/Drop Regulations:

1) A student may add a course, make a section change, or drop a course either online during Web Registration or by completing the Add/Drop Form after Web Registration ends (first day of classes).

2) There is no refund of tuition after the first three weeks of the term. Tuition charges are based on the number of credits for which the student is enrolled at the end of the third week of the term (Drop Deadline), independent of any further late drops.

3) After the published Drop Deadline, a student may withdraw after submitting the Add/Drop Form and providing a detailed explanation of the reason for the late withdrawal. Such late drops are assigned the nonpunitive grade of “W” (Withdrawn), and the student is charged full tuition.

4) Failure to attend a class, verbal notification, or other unofficial communication with the instructor or Office of the Registrar does not constitute dropping a course.

5) Students who fail to submit a Drop Form will be assigned the punitive grade “FA” (Administrative Failure) by the Registrar at the end of the term.

6) A veteran who changes his or her original credit-hour load within a term, or who withdraws, must notify the Veterans Coordinator immediately.

7) Students are reminded that the possibility of receiving a low grade is not sufficient ground to petition for permission to withdraw during the final two weeks of the course. Late withdrawals involving extenuating circumstances beyond the student's control are given individual consideration.

Changes in Status

All changes in student status require completion of a Change of Status Form. This Form may be used to request one or more of the following:

1) Admission to Degree Status (Nonmatriculated to Matriculated)

A prerequisite for admission to degree status is the completion of a minimum of two graduate courses (6 credit hours) and before the completion of four graduate courses (12 credit hours) with grades of “A” or “B” (minimum 3.0/4.0 GPA). No more than twelve credit hours earned as a nonmatriculated student will be transferred to a degree program.

Nonmatriculated students may request admission to degree status by submitting the following documents to the Office of the Registrar: 1) a Graduate Request for Change of Status Form, 2) a proposed
Plan of Study Form, and 3) the remaining documents required to complete the formal application as shown in the “Checklist of Required Application Materials” (see page III in Application package). Note that the documents required for admission to degree status vary by department. Admission to degree status is subject to the approval of the Assistant Dean for Academic Programs.

2) Returning After an Absence
Students in good standing who have been inactive for one or more academic years may petition to return to graduate study by submitting the Change of Status Form. All requests to return to a program after an absence or to return to study after graduation are subject to the review and approval of the appropriate academic officials.

3) Entry to a Second Master’s Program or Alumni Returning for Additional Course Work
Graduates of Rensselaer are welcome to return for another master’s degree or additional course work. If returning as an Alumnus for additional course work, a Change of Status Form is required. If seeking another master’s degree, the Change of Status Form and Plan of Study Form are required. All requests to enter a new degree program are subject to the review and approval of the Assistant Dean for Academic Programs.

4) Change in Curriculum
Students wishing to change from one curriculum to another (such as from Mechanical Engineering to Management) must file a new Change of Status Form and submit a new Plan of Study. All requests to enter a new degree program are subject to the review and approval of the Assistant Dean for Academic Programs. A student who petitions to change his or her curriculum must satisfactorily fulfill current admissions and program requirements.

5) Dual Degree
Matriculated students may request admission to seek dual degrees (earning two separate degrees concurrently) by submitting a Change of Status Form and a Plan of Study Form for each degree program. This request is subject to approval of the academic officials from each department.

Any change affecting the student’s permanent record, such as change of name, address, Social Security number, or status must be reported to the Office of the Registrar as soon as possible. Questions concerning Change of Status procedures should be directed to the Office of the Registrar.

**Consortium Registration**

**Rensselaer Students**
Rensselaer is a member of the Hartford Consortium for Higher Education. Eligible students who wish to take a course through the Consortium program should contact the Registrar for information and forms.

Students who wish to register at a Consortium school must bring the Consortium Graduate Student Registration Form, validated by the Registrar at the Hartford Campus, to the other school. Rensselaer students are reminded that attendance at the other school is on a space-available basis.

Approved courses taken at one of the Consortium colleges are entered on the student’s record in the same manner as courses taken at Rensselaer, and thus carry term and cumulative hours and quality points.

**Consortium Students From Other Schools**
Rensselaer requires the formal admission, prior to registration, of all students or full-time employees of member institutions who wish to take a course through the Consortium program.

Students participating in the Consortium Employee Agreement are limited to one course per term without tuition obligation on a space-available basis.
Veterans’ Benefits

Veterans’ Coordinator: John F. Gonyea

Rensselaer degree programs are approved for the training of veterans. If you believe you are eligible for education benefits, please contact the Veterans Coordinator at (860) 548-2406 or gonyej@rpi.edu and request an Application for Education Benefits form. Or, you can complete this form online by going to the Veterans online application Web site at: www.vabenefits.vba.va.gov/vonapp/. If you already have a Certificate of Eligibility, a copy of this document should be submitted to the Veterans Coordinator. If you previously have received veterans’ education benefits while attending another institution, please ask for a Request for Change of Program or Training Location form. Once completed, this form will be submitted to the Veterans Administration (VA) Regional Processing Office with your Enrollment Certification.

Each term you should notify the Veterans Coordinator that you are applying for veterans’ benefits. Enrollment Certification forms are forwarded to the VA Regional Office immediately following the posted add/drop deadline.

For additional information on veterans’ education benefits, please visit the VA Web site at: www.gibill.va.gov or call their education information hotline at (888) 442-4551.

Credit Hour Definition

Academic credit is assigned in terms of the credit hour. For formal course work, one credit hour is equivalent to one class hour per week for one term as specified in the academic calendar. All courses carry three credit hours except where noted.

Credit by Transfer, Examination, and Waiver

Transfer of Credit

1) Credit for graduate work completed in residence at other accredited institutions (management courses must be from AACSB-accredited programs) may be offered in partial fulfillment of the requirements when the grade earned is a “B-” or better, the work is substantially equivalent to the Rensselaer course it replaces, and the course has not been credited toward an undergraduate degree. No more than six credit hours may be transferred toward the degree, and not more than six credit hours used for a master’s degree in one area can be applied to a second master’s degree.

2) A matriculated student who obtains the approval of his/her academic advisor to take graduate-level course work elsewhere while enrolled at Rensselaer must apply for transfer of credit as soon as the credit has been earned.

3) It is the student’s responsibility to complete the Transfer of Credit Form; submit an official transcript indicating grade received and credit awarded; and any other documentation required by his or her advisor, such as a catalog description of the course and a (new or revised) Plan of Study. Courses taken elsewhere and approved for transfer to Rensselaer as part of a degree program are not considered in computing the “B” average requirement. For additional information concerning the awarding of credit by transfer, contact the Office of the Registrar.

4) On the student’s official transcript, a Transfer of Credit will record only the course title and the credit hours, but not the grade of the transferred course. The credit hours of a transferred course compute into the cumulative earned hours, but do not affect the attempted hours column.
Validation Examination
In certain instances, a Validation Examination may be given to establish course credit for proficiency acquired in an area of specialization.

A matriculated student in good standing may petition his or her department for permission to satisfy a program requirement by means of a Validation Examination and to replace the required course with an approved elective. Under no circumstances may credit by Validation Examination be counted toward satisfying the residency requirement.

Validation Examinations must be approved in advance by the academic department Chair and are administered by the instructor of the course for which credit is desired. Validation Examinations are not permitted for courses previously failed or audited. The examination fee is $75. Forms and information concerning the exam fee are available from the Office of the Registrar.

Waiver
A student whose prior academic preparation is substantially equivalent to the level and content of a required core course may petition the department for a waiver from the course.

Courses required for M.S. degrees may be waived only with substitution. M.S. students requesting waiver(s) must fill out Plan of Study and Request for Waiver with Substitution Forms indicating the course or courses to be waived and include: 1) an unofficial transcript, 2) a catalog description of the course, and 3) a letter justifying the rationale for the waiver. These materials should be submitted to the advisor.

Waivers for credit apply only to the M.B.A. degree and are limited to a maximum of twelve credit hours. M.B.A. students requesting waiver(s) must fill out a Plan of Study Form and Request for Waiver Form indicating the course or courses to be waived and include: 1) an unofficial transcript, 2) a catalog description of the course, and 3) a letter justifying the rationale for the waiver. These materials should be submitted to the advisor.

Grade Requirements
A “B” average must be maintained in order to fulfill degree requirements. When the student’s academic performance is unacceptable, one of the following actions will be taken:

1) The Assistant Dean for Academic Programs will inform the student in writing that his or her quality point average has fallen below the stated “B” (3.0) average.

2) The Assistant Dean for Academic Programs may require that the student take a substitute course or repeat a course.

3) The Assistant Dean for Academic Programs may, under exceptional circumstances, request that the student be reexamined in a course.

For further information, please refer to the section on Academic Standing on page 20.
Grading System

Please note that +/- grading will be implemented as follows:

• +/- grading is now used for all 6000- and 7000-level courses
• Beginning Fall 2007, +/- grading will be used for all 4000- and 5000-level courses

Letter grades and their meanings are:

A   Excellent
A−  Excellent
B+  Good
B   Good
B−  Good
C+  Average
C   Average
C−  Average
F   Failed
I   Incomplete course work
W   Withdrawn
AU  Audit
U   Unsatisfactory in a satisfactory/unsatisfactory graded course
IP  In Progress (multiple-term course)
S   Satisfactory in a satisfactory/unsatisfactory graded course
Z   Grade unknown—see instructor
NE  Not Examined
FA  Failed (due to administrative reasons)
WI  Failed (course that was previously graded “I” in which the student did not meet the deadline for completing course work)

Grading System Explanation

FA Grade

The grade “FA” (Administrative Failure) is assigned by the Registrar to students who register for a course they do not attend and do not submit an Add/Drop Form.

I Grade

The grade “I” (Incomplete) is given when a student is unable to complete required course work due to illness or other extenuating circumstance such as a personal emergency beyond the student’s control.

The “I” grade is given only after the contract form (“Authorization for the Grade of Incomplete”) is completed and signed by the instructor and the student and received by the Registrar.

The “I” grade is given only in instances of truly incomplete class work, such as laboratory exercises, course projects, term papers, etc.

Under no circumstances may the “I” grade be given for the following situations:

• Absence from a final exam
• Student on class list who never attended class
• Student who wishes to do additional post-term work to improve a grade
• Student who wishes to repeat the course as an auditor, retaking examinations, etc., to improve a grade
The work for which the “I” grade was given must be completed within one term. If facilities or special resources are required to complete the outstanding work, but are not available during the next term, then one year is the maximum time limit, subject to the approval of the instructor.

If the agreements made in the “I” grade contract are not faithfully observed, or if the “I” grade is not cleared in the time specified by the contract, the grade automatically becomes a “WI.” The “I” is considered a penalty grade in the calculation of the term GPA. Until changed, it is calculated as if it were the grade of “F.”

**IP Grade**
The “IP” (In Progress) grade is given at the end of the preliminary term of multiple-term courses such as thesis, project, seminar, culminating experience (CAPSTONE), or practicum.

**NE Grade**
The “NE” (Not Examined) grade is given by the instructor to a student who has been excused from taking a final exam at the scheduled time. The “NE” grade is recorded on the student’s record when the instructor submits the “NE Grade Authorization” to the Office of the Registrar.

The grade of “NE” must be made up on the day specified by the instructor and prior to the end of the subsequent term.

If the examination is not taken by the date specified, the grade automatically becomes an “F.”

Once the “NE” grade is changed to an “F,” no other grade change will be accepted.

It should be noted that the grade of “NE” is not considered in the calculation of the term GPA.

**S Grade and U Grade**
“S” (Satisfactory) and “U” (Unsatisfactory) grades can only be assigned in courses specifically approved for such grading by the Curriculum Committee. Examples of such courses are seminar, thesis, project, or certain general electives.

**W Grade**
The grade “W” (Withdrawn) is assigned by the Registrar when a student is permitted to withdraw from a course after the drop deadline.

**WI Grade**
This letter grade is assigned by the Registrar to students who received an Incomplete (“I”) grade but failed to meet the criteria or the deadline specified in the “I” contract. The grade is calculated as an “F” in the student’s grade point average. Once the “I” grade is changed to “WI,” no other grade change will be accepted.

**Z Grade**
The “Z” grade (Grade Unknown) is assigned by the Registrar when the grade roster is not submitted by the instructor in time to print the term grade reports. The student should see his or her instructor for the grade.

**AU Grade**
The grade “AU” (Audit) is assigned to students who have officially registered as auditors and who have fulfilled the instructor’s attendance requirements.

**NOTE:** The grades A, B, C, F, FA, S, U, or WI cannot be appealed or changed six months after award by instructor.
Grade Point Average (GPA)

A student’s grade point average is determined on the basis of the following numbers assigned to the letter grades: A=4.0, A–=3.67, B+=3.33, B=3.0, B–=2.67, C+=2.33, C=2.0, C–=1.67, F=0, I=0, FA=0, WI=0. The grades U, S, IP, NE, W, AU, and Z are not considered when computing averages. The grade point average is computed by multiplying the number corresponding to the grade in each and every course by the number of credit hours for the course, totaling these products and then dividing the sum by the total number of credit hours for the courses considered. Credit granted for work taken at another institution other than a member of the Hartford Consortium for Higher Education and credit granted by waiver and examination are not included in the GPA.

The grade point average for the term is computed at the end of each term. The cumulative quality point average is computed at the end of each term for the full period of attendance at Rensselaer.

If a Graduate student repeats a course, both grades are entered on the record. However, course credit will count only once and, although both grades appear on the transcript, the grade received in the repeated course is always the one used in computing the GPA. The grade for a repeated course for which the student receives a grade of “W” or taken at another institution cannot be used in place of the original course grade in calculating the GPA.

Institutional Requirements

A candidate for a master’s degree must:

• Be in good academic and disciplinary standing.
• Satisfy the culminating experience requirement as specified by the academic department.
• Complete a Plan of Study with at least 30 credit hours (60 for the Master of Business Administration) beyond the bachelor’s degree with satisfactory grades.
• Satisfy grade requirements with a minimum of 3.0/4.0 GPA.
• Satisfy residence requirements (refer to page 20).
• Satisfy the department’s practicum or seminar requirement, if applicable.
• Present a thesis or project, if required.
• Pursue a Plan of Study that will lead to the completion of all requirements.
• Satisfy all financial obligations.
• File a Degree Application with the Office of the Registrar by the date specified in the academic calendar for the term in which he or she plans to fulfill degree requirements. If a degree application was filed for a previous term but the requirements were not fulfilled, a new degree application must be filed for the term in which the student actually is graduating.

A student pursuing more than one master’s degree must meet the above requirements for each degree sought.

Master’s Thesis and Master’s Project

Certain departments may specify presentation of a thesis or completion of a project as a requirement for a master’s degree. Usually six, but no more than nine credit hours are allowed for a master’s thesis or project. Theses and projects are graded either “S” (Satisfactory) or “U” (Unsatisfactory).

In a department that ordinarily requires a thesis or project, a student may be permitted to substitute additional courses on recommendation of the advisor and with the approval of the Assistant Dean for Academic Programs.

Submission of the thesis or project report and any final examination on the thesis or project must occur by the dates listed in the academic calendar for the year. Students who wish to undertake a thesis or proj-
# Grade Calculations*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Contributes To Quality Hours</th>
<th>Quality Points Earned Prior to Fall 2005</th>
<th>Quality Points Earned Effective Fall 2005</th>
<th>Contributes To Earned Hours</th>
<th>Temporary Grade</th>
<th>Grade Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Yes</td>
<td>4.00</td>
<td>4.00</td>
<td>Yes</td>
<td>No</td>
<td>Excellent</td>
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<tr>
<td>A-</td>
<td>Yes</td>
<td>NA</td>
<td>3.67</td>
<td>Yes</td>
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<td>B+</td>
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<tr>
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<td>3.00</td>
<td>Yes</td>
<td>No</td>
<td>Good</td>
</tr>
<tr>
<td>B-</td>
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<td>NA</td>
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<td>Yes</td>
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<td>C+</td>
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<tr>
<td>C</td>
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<td>No</td>
<td>Average</td>
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<tr>
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<tr>
<td>F</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>Yes</td>
<td>Incomplete</td>
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<tr>
<td>I</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>Failed</td>
</tr>
<tr>
<td>W</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>Withdrawn</td>
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<tr>
<td>AU</td>
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<td>0</td>
<td>No</td>
<td>No</td>
<td>Audit</td>
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<tr>
<td>U</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>Unsatisfactory</td>
</tr>
<tr>
<td>IP</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>In Progress</td>
</tr>
<tr>
<td>S</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>Yes</td>
<td>No</td>
<td>Satisfactory</td>
</tr>
<tr>
<td>Z</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>Yes</td>
<td>Grade Unknown (Grade due, but not submitted)</td>
</tr>
<tr>
<td>NE</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>Yes</td>
<td>Not Examined (Missed Final Exam)</td>
</tr>
<tr>
<td>FA</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>Failed due to administrative reasons</td>
</tr>
<tr>
<td>WI</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>No</td>
<td>No</td>
<td>Failed (Did not complete course that was previously graded incomplete)</td>
</tr>
</tbody>
</table>

*Prior to Fall 2005: +/- Grading not implemented

+/- Grading Implementation Schedule:
Fall 2005: 6000 and 7000 level courses
Fall 2007: 4000 and 5000 level courses

Elect in Management should contact the Assistant Dean for Academic Programs for information and guidelines. Students in the Engineering and Computer and Information Sciences curricula would complete the thesis or project under the guidance of a thesis/project advisor. Details concerning deadlines, proposal, and defense are available in the guide “Project/Thesis Requirements and Guidelines” that can be obtained from the department.
The candidate must submit the final original copy of the thesis or project, together with the advisor’s written approval of both content and format, to the Office of the Registrar at least one week before the end of classes in the term in which the degree is to be awarded.

**Degree Completion**

At the beginning of the term in which the degree is expected, eligible degree candidates who have fulfilled all departmental requirements and satisfied all financial obligations must file a Degree Application Form and current Plan of Study Form with the Office of the Registrar.

No student is considered a degree candidate until he or she files the Degree Application Form.

Students who apply for degree completion but do not fulfill degree requirements must reapply for degree completion by submitting a new Degree Application Form for the term in which completion is anticipated. Degrees are conferred in August, December, and May.

Degree candidates not registering for course work in their final term must register for EWP Degree Completion (course number ADMN-5030H01). This no-credit designation carries a $50 administrative fee.

Commencement exercises are held on the grounds of Rensselaer’s Hartford Campus in June to honor graduates for the entire academic year. Information concerning the degree clearance procedure and deadlines may be obtained by contacting the Office of the Registrar. Graduates may also attend Commencement on the Troy Campus in May. Please see the Academic Calendar for specific dates.

**Transcript Requests**

Students in Rensselaer’s Hartford Campus programs may request an official transcript by writing to: Student Records and Financial Services, Rensselaer Polytechnic Institute, 110 8th Street, Academy Hall 2000 Level, Troy, NY 12180-3590; request via Rensselaer’s Web site: www.rpi.edu/dept/srfs/transcripts.pdf or fax the request to the Registrar’s Office in Troy, New York, at (518) 276-6180.

Former students/graduates of The Hartford Graduate Center’s Biomedical Engineering, Health Care Management, or Corporate Fellows programs may request an official copy of their transcript by writing to the Office of the Registrar, Rensselaer at Hartford, 275 Windsor Street, Hartford, CT 06120-2991.

All requests for transcripts should include the student’s full name, Social Security number, signature, and the name and address of the recipient. The transcript will be mailed at no charge.

*Note: Official transcripts bearing the seal of Rensselaer Polytechnic Institute will be issued only after all financial obligations have been met.*

Please note that transcripts submitted as part of the application process cannot be photocopied, faxed, or given to the student. Students requiring these documents must, therefore, obtain the records directly from their college or university.
# Computer Science

## Computer Science - Full-time Faculty

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
<th>Teaching Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown, Roger H.</td>
<td>Clinical Assistant Professor</td>
<td>M.S.E.E., University of Illinois</td>
<td>Networks, Security</td>
</tr>
<tr>
<td>Eberbach, Eugene</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., Warsaw University of Technology</td>
<td>Theoretical Computer Science, AI and Intelligent Systems, Database</td>
</tr>
<tr>
<td>Pawlak, Renaud</td>
<td>Clinical Assistant Professor</td>
<td>Ph.D., French National Institute of Arts and Crafts (France)</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>Younessi, Houman</td>
<td>Clinical Professor</td>
<td>Ph.D., Swinburne University of Technology (Australia)</td>
<td>Software Engineering Research Methods</td>
</tr>
</tbody>
</table>

## Computer Science - Adjunct Faculty

<table>
<thead>
<tr>
<th>Adjunct Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
<th>Teaching Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blough, R. Thomas</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Industrial Automation</td>
</tr>
<tr>
<td>Clarke, David L.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Operating Systems, Compiler Design</td>
</tr>
<tr>
<td>Exley, Gerard</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Networks, Discrete Mathematics</td>
</tr>
<tr>
<td>Kousen, Kenneth A.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Princeton University</td>
<td>Java; Object-Oriented Concepts, Analysis and Design</td>
</tr>
<tr>
<td>LaBarre, Robert E.</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Mathematics and Complexity</td>
</tr>
<tr>
<td>Madison, James</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Software Engineering/IT</td>
</tr>
<tr>
<td>McCarthy, Charles F.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Myers, Mark R.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Cornell University</td>
<td>Computability and Complexity</td>
</tr>
<tr>
<td>Stevens, Michael</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Software Engineering/IT</td>
</tr>
<tr>
<td>Weatherby, Gerard</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Object-Oriented Programming and Design</td>
</tr>
</tbody>
</table>
Master of Science in Computer Science

Applicants are assumed to have knowledge of computer concepts and programming in a high-level language (e.g., C, Pascal). To receive the Master of Science Degree in Computer Science, students must earn a minimum of 30 credit hours in Computer Science or Engineering courses and satisfy the following requirements:

1) Plan of Study
Each student completes a Plan of Study in consultation with his or her advisor. This Plan will include required immigration courses (if any), five core courses, Research Methods course, the Culminating Experience (Computer Science Seminar), and three elective courses. At least two of the elective courses should pertain to a specific area that reflects the student’s professional or academic interest.

2) Immigration Courses
Depending on academic background and professional experience, some students may be required to begin their studies with one or more prerequisite “immigration” course(s) beyond the standard 30 credit hours. The immigration courses are:

- **CISH-4010** Discrete Mathematics and Computer Theory
- **CISH-4020** Object Structures
- **CISH-4030** Structured Computer Architecture

Students with two or more immigration courses as prerequisites may be admitted conditionally. Since these are the equivalent of undergraduate courses, students are expected to achieve a grade of “B” or better in each course. Achievement below this level is cause for reexamination of admission. In addition, these immigration courses will not enter into the calculation of a student’s GPA for graduation.

3) Core Courses (15 credits)
Each Plan of Study will contain the following five courses:

- **CISH-4210** Operating Systems
- **CISH-4380** Database Systems
- **CSCI-6050** Computability and Complexity
- **ECSE-4670** Computer Communication Networks
- **ECSE-6770** Software Engineering I

Research Methods Course (3 credits)
**CISH-6960H09** Research Methods in Computer Science

Culminating Experience (3 credits)
**CISH-6902** Computer Science Seminar *(for students admitted after Summer 2004)*

Computer Science and Other Electives (9 credits)
With the exception of the immigration courses, all courses with the designation CISH or CSCI and most designated ECSE may be used as electives for the degree.
4) Advanced Courses
At least 18 credit hours must be at the “advanced” level. All courses with suffix numbers 6000-6990 fall into this category. These courses may include special topics courses which are offered under CISH or CSCI-6960 Topics in Computer and Information Sciences, or ECSE-6960 Topics in Electrical Engineering.

After completing course work in a particular area, students may elect to complete a six-credit Master’s Project (CISH or CSCI-6980) or Thesis (CISH or CSCI-6990) in that area.

5) Program Completion
Students will complete their program of study via one of two paths:

<table>
<thead>
<tr>
<th>Applied Path</th>
<th>Theory Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISH-6960 Research Methods</td>
<td>A Theory Course</td>
</tr>
<tr>
<td>CISH-6902 Computer Science Seminar</td>
<td>Master’s Thesis/Project</td>
</tr>
</tbody>
</table>

For More Information
Information concerning the Computer Science programs may be obtained by contacting Dr. Houman Younessi at (860) 548-7880; (800) 290-7637, ext. 7880; e-mail: youneh@rpi.edu; or by visiting: www.ewp.rpi.edu/does/.

Computer Science Graduate Certificate Programs
(Minimum of 12 Credit Hours)
The Computer Science Graduate Certificate Programs are designed with a selective focus and require that a student successfully complete four graduate courses (twelve credit hours of which nine credit hours must be in residence), with an average grade of “B” or better, in a specific area of Computer Science. Credits earned in Graduate Certificates may be subsequently applied toward an M.S. degree as electives with advisor’s approval. Additional technical information about the Graduate Certificates can be obtained from the Certificate Program Coordinators listed on pages 33 and 34. Graduate Certificates are offered in the following four areas:

**Computer Network Communications**
- ECSE-4670 Computer Communication Networks
  Select any three of the following courses:
  - CISH-6210 Computer Network Analysis and Design
  - CISH-6220 LANs, MANs, and Internetworking
  - CISH-6230 Network Management
  - CISH-6960 Cryptography and Network Security
  - ECSE-6660 Broadband Networks and Optical Networking

Program Coordinator: Roger H. Brown, (860) 548-2462; (800) 290-7637, ext. 2462; or e-mail: brownr@rpi.edu
Database Systems

CISH-4380 Database Systems
Select any three of the following courses:
CSCI-6460 Advanced Database Management Topics
CISH-6110 Object-Oriented Database Systems
CISH-6120 Distributed Database Systems
CISH-6960 Data Warehouse Systems

Program Coordinator: Houman Younessi; (860) 548-7880, (800) 290-7637, ext. 7880; or e-mail: youneh@rpi.edu

Information Systems

Required
ECSE-4670 Computer Communication Networks
CISH-4380 Database Systems
COMM-6420 Foundations of Human-Computer Interaction Usability

Elective
ECSE-6770 Software Engineering I
or
CISH-6010 Object-Oriented Programming and Design

Program Coordinator: Roger H. Brown, (860) 548-2462; (800) 290-7637, ext. 2462; or e-mail: brownr@rpi.edu

Software Engineering

Required
ECSE-6770 Software Engineering I
CISH-6050 Software Engineering Management

Electives (Select any two of the following)
CISH-6010 Object-Oriented Programming and Design
CISH-6510 Web Application Design and Development
ECSE-6780 Software Engineering II

Program Coordinator: Houman Younessi; (860) 548-7880, (800) 290-7637, ext. 7880; or e-mail: youneh@rpi.edu
Information Technology
Master of Science in Information Technology

Program Objective
The primary intent of the Master of Science in Information Technology (MSIT) program is to prepare graduates for professional practice in information technology. Although the term “information technology” may be subject to many interpretations, we consider it to mean “applied computer science.” Therefore, the program provides students with exposure to a practical application of technology within an area of specialization. To this end, students will gain a broad exposure to technology by completing a set of core courses and an in-depth exposure to the application of technology in a particular discipline through courses in a student-selected application area.

Admission Requirements
Students enter the Master of Science in Information Technology program with diverse backgrounds. Ideally, a student entering the program will have completed undergraduate courses which provide a background in the following areas:

- Computer programming in a high-level procedural language (e.g., COBOL, C)
- Computer programming in an object-oriented language (e.g., C++, Eiffel)
- Data structures and algorithm design
- Discrete mathematics

A student lacking a background in any of the above areas may need to take one or more of the following immigration courses:

- CISH-4010 Discrete Mathematics and Computer Theory
- CISH-4020 Object Structures

Academic Requirements
To meet the requirements for the MSIT, students must be formally admitted to the program and must complete an approved Plan of Study that meets the following requirements:

- A minimum of 30 credits
- A minimum of 18 credits of advanced graduate-level course work (6000-level courses)
- Five core courses in Information Technology
- A minimum of 12 credits in an approved Application Area (See page 36 for a list of these areas.)
- A culminating/integrating experience

An additional requirement is that no more than half of the credits used toward the MSIT degree be taken from courses offered by the Lally School of Management and Technology. These courses have the prefix “MGMT.”
Core Courses
The core areas include database systems, telecommunications, software design, management of technology, and human-computer interaction.

<table>
<thead>
<tr>
<th>IT Core Area</th>
<th>Course Number and Name</th>
<th>Term(s) Offered</th>
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<tr>
<td>Database Systems</td>
<td>CISH-4380 Database Systems</td>
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<td>Telecommunications</td>
<td>ECSE-4670 Computer Communication Networks</td>
<td>Fall / Spring</td>
</tr>
<tr>
<td>Software Design</td>
<td>ECSE-6770 Software Engineering I</td>
<td>Fall</td>
</tr>
<tr>
<td>Management of Technology</td>
<td>MGMT-6810 Management of Technical Projects</td>
<td>Fall / Spring</td>
</tr>
<tr>
<td>Human-Computer Interaction</td>
<td>COMM-6420 Foundations of HCI Usability</td>
<td>Fall</td>
</tr>
</tbody>
</table>

If a student is granted a waiver from any Core area, an additional elective course (approved by the student’s advisor) must be taken.

Application Areas
An in-depth experience in the application of information technology to a particular discipline is achieved through courses in a student-selected application area. Because technology changes so rapidly, the application of technology also changes frequently. The available application areas in the MSIT program reflect these changes. Below is a list of application areas currently available to students attending Rensselaer. To obtain an updated list and the course requirements, consult the IT Program home page at: www.eup.rpi.edu/does/it_degree.html.

- Networking
- Database Systems Design
- Software Design
- Management Information Systems

Networking
Requirements: IT Core course in Telecommunications, at least three of the following courses, plus a culminating experience:

- ECSE-6660 Broadband and Optical Networking
- CISH-6230 Network Management
- CISH-6220 LANS, MANS, and Internetworking
- CISH-6960 Cryptography and Network Security

Database Systems Design
Requirements: IT Core course in Database Systems plus at least three of the following plus a culminating experience (maximum of 3 credits if Master's Project is chosen):

- CSCI-6460 Advanced Database Management Topics
- CISH-6110 Object-Oriented Database Systems
- CISH-6120 Distributed Database Systems
- CISH-6960 Data Warehouse Systems
Software Design
Requirements: IT Core course in Software Design, at least three of the following courses, plus a culminating experience:

• ECSE-6780 Software Engineering II
• CISH-6010 Object-Oriented Programming and Design
• CISH-6050 Software Engineering Management
• CISH-6510 Web Application Design and Development

Management Information System
Requirements: IT Core course in Management, at least three of the following courses, plus a culminating experience:

• MGMT-6170 Advanced Systems Analysis and Design
• MGMT-6180 Strategic IS Management
• MGMT-6710 Designing, Developing, and Staffing High-Performance Organizations I
• MGMT-6750 Legal Aspects of E-Business and Information Technology

Culminating Experience
The culminating experience may be satisfied by either of the following, depending on the application area and the approval of advisor:

• Master’s Project (ITEC-6980, 3-6 credits)
• Computer Science Seminar (CISH-6902, 3 credits)
## Engineering

### Engineering - Full-time Faculty

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
<th>Teaching Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown, Roger H.</td>
<td>Clinical Assistant Professor</td>
<td>M.S.E.E., University of Illinois</td>
<td>Networks, Security</td>
</tr>
<tr>
<td>Cassenti, Brice N.</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., Polytechnic Institute of Brooklyn</td>
<td>Mathematics, Dynamics, Applied Mechanics</td>
</tr>
<tr>
<td>Gutiérrez-Miravete, Ernesto</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., Massachusetts Institute of Technology</td>
<td>Modeling and Simulation, Metal Processing</td>
</tr>
<tr>
<td>Mesiya, Mohammed F.</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., Queen's University (Canada)</td>
<td>Communications, Networks</td>
</tr>
<tr>
<td>Younessi, Houman</td>
<td>Clinical Professor</td>
<td>Ph.D., Swinburne University of Technology (Australia)</td>
<td>Systems Engineering</td>
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</table>

### Engineering - Faculty Emeritus

<table>
<thead>
<tr>
<th>Faculty Emeritus</th>
<th>Position</th>
<th>Degree and Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krahula, Joseph L.</td>
<td>Professor Emeritus</td>
<td>Ph.D., University of Illinois</td>
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</tbody>
</table>

### Engineering - Adjunct Faculty

<table>
<thead>
<tr>
<th>Adjunct Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
<th>Teaching Area</th>
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<tbody>
<tr>
<td>Annigeri, Balkrishna S.</td>
<td>Adjunct Professor</td>
<td>Sc.D., Massachusetts Institute of Technology</td>
<td>Applied Mechanics Technology</td>
</tr>
<tr>
<td>Bak, Michael</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Applied Mechanics</td>
</tr>
<tr>
<td>Bortoff, Scott A.</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Illinois</td>
<td>Control System Design, Signals and Systems, Embedded Systems</td>
</tr>
<tr>
<td>Bose, Sudha</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of California at Berkeley</td>
<td>Metallurgy, Coatings, Hi-Temp, Ceramics</td>
</tr>
<tr>
<td>Brown, Kenneth W.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Rensselaer Polytechnic Institute</td>
<td>Finite Element Methods</td>
</tr>
<tr>
<td>Dennis, Anthony J.</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Applied Mechanics</td>
</tr>
<tr>
<td>Donachie, Matthew J., Jr.</td>
<td>Adjunct Professor</td>
<td>Sc.D., Massachusetts Institute of Technology</td>
<td>Metallurgy</td>
</tr>
<tr>
<td>Fazil, Hussain M.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Penn State</td>
<td>Controls, Networks</td>
</tr>
<tr>
<td>LaBarre, Robert E.</td>
<td>Adjunct Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Marcin, John J.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
<td>Metallurgy</td>
</tr>
<tr>
<td>Moon, Paul R.</td>
<td>Adjunct Professor</td>
<td>Ph.D.E.E., University of Manitoba</td>
<td>DSP, Control Systems, Circuit Design, Communication Systems</td>
</tr>
<tr>
<td>Quinn, Joseph W.</td>
<td>Adjunct Professor</td>
<td>M.S., Trinity College</td>
<td>DSP, Instrumentation Measurement, Probability</td>
</tr>
<tr>
<td>Tew, David E.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Massachusetts Institute of Technology</td>
<td>Theory of Potential Flow, Turbulence</td>
</tr>
<tr>
<td>Wagner, Timothy C.</td>
<td>Adjunct Professor</td>
<td>Ph.D., Virginia Polytechnic Institute and State University</td>
<td>Radiation Heat Transfer, Propulsion</td>
</tr>
</tbody>
</table>
Engineering
Rensselaer offers an engineering curriculum designed to accommodate the evolving needs of the practicing engineer. Each curriculum helps students establish and build on a solid theoretical base while allowing them to practice their skills. This blend of academic excellence and industrial experience creates a unique learning environment for engineering students at Rensselaer at Hartford. Degree programs are offered in Mechanical Engineering, Electrical Engineering, Computer and Systems Engineering, and Engineering Science together with Graduate Certificate Programs in Control Systems and High-Temperature Materials.

Engineering Degrees
Master of Engineering and Master of Science degrees are offered in selected engineering disciplines. The Master of Engineering degrees require completion of a three-credit project as a culminating experience while Master of Science degree candidates must carry out research leading to a six credit thesis. Apart from that, the curricula for both degrees are identical. The Master of Engineering degree is designed to fulfill the needs of practicing engineers in industry while the Master of Science degree is for those focused on a research career.

The following engineering degrees are awarded:

- M.Eng. in Computer and Systems Engineering
- M.Eng. in Electrical Engineering
- M.Eng. in Mechanical Engineering
- M.S. in Engineering Science
- M.S. in Electrical Engineering
- M.S. in Mechanical Engineering

Candidates for the master’s degree must complete an advisor-approved plan of study consisting of:

- At least 30 credit hours beyond the bachelor’s degree with cumulative GPA of 3.0/4.0 or higher.
- At least 18 of the total credit hours presented toward the degree must have the suffix numbers 6000-6990 or 7000-7990.
- At least 21 of the total credit hours presented towards the degree must be from courses taken within the discipline.

A student may transfer credits for 2 graduate-level (equivalent to 6000 or 7000 level in the Rensselaer at Hartford Catalog) courses (total of 6 credit hours) taken at an accredited graduate school with the grade(s) of “B” or better. The transfer/waiver process must be approved by the faculty advisor and the Assistant Dean for Academic Programs. Transfer courses must be relevant to the program of study being pursued by the student at Rensselaer.

Students must prepare their Plan of Study together with their advisor and have it reviewed and approved by the advisor and the Assistant Dean for Academic Programs before completion of their fourth course. All the above requirements must be completed within three years of admission.

Culminating Experience (Engineering Project/Engineering Thesis)
The culminating experience is a requirement for the master’s degree as stipulated by the Board of Governors for Higher Education of the State of Connecticut. It may be fulfilled by either of the following:

- Completing a three-credit-hour master’s project along with 27 credit hours of appropriate course work thus leading to the Master of Engineering degree.
- Completing a six-credit-hour master’s thesis along with 24 credit hours of appropriate course work thus leading to the Master of Science degree.
Electrical Engineering

The Master’s Program in Electrical Engineering allows students to increase their competence in a number of Electrical Engineering subjects, particularly in Digital Communications and Signal Processing, Control Systems, and Communication Networks.

Admission Requirements

1. Students who have received a B.S. degree in Electrical Engineering or Computer Engineering from an accredited institution, a GPA in the upper quartile, and some work experience in a high-technology environment.
2. Students with a B.S. degree in another engineering discipline, mathematics, or physics may be admitted subject to fulfillment of the following Electrical Engineering Background Requirements.

Electrical Engineering Background Requirements

- Advanced Mathematics (i.e., Complex Variables, Laplace Transforms, Fourier Analysis, Probability) (one term)
- Electric Circuits (one term)
- Electronic Circuits (two terms)
- Signals and Systems (one term)
- Digital Logic (one term)
- Technical Design Elective (e.g., Communications Systems, Control Systems Engineering, Computer Networks) (one term)

Students lacking any of the above courses must consult with their advisor to devise a plan for corrective action.

Areas of Specialization

Students must include in their plan of study a sequence of three 6000 (or 7000) level courses in at least one of the following areas of specialization:

- Digital Communications and Signal Processing
- Control Systems
- Communication Networks

M.Eng. in Electrical Engineering Program Requirements

The Master of Engineering degree is awarded on successful completion of the following:

Required Core (15 credits)

ECSE-6400 Systems Analysis Techniques
ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6560 Digital Communications Engineering
ECSE-6620 Digital Signal Processing
ECSE-6980 Engineering Project

Electives (15 credits)

ECSE-4440 Control Systems Engineering
ECSE-4990 Fundamentals of Robotics
ECSE-4670 Computer Communication Networks
ECSE-4770 Computer Hardware Design
ECSE-6050 Advanced Electronic Circuits
ECSE-6410 Robotics and Automation Systems
ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
ECSE-6460 Multivariable Control Systems

ECSE-6590 Wireless Communications and Networks
ECSE-6630 Digital Image and Video Processing
ECSE-6660 Broadband and Optical Networking
ECSE-6960 Topics in Electrical Engineering, LANs, MANs, and Internetworking
ECSE-6960 Topics in Electrical Engineering, Embedded Digital Control Systems
ECSE-6960 Topics in Electrical Engineering, Applied Digital Signal Processing
Electrical Engineering Electives, continued

ECSE-6960 Topics in Electrical Engineering, Mechatronics
ECSE-7010 Optical Fiber Communications
ECSE-7100 Real-Time Programming and Applications

ECSE-4960 Fundamentals of Signals and Systems (prerequisite course – not credited towards M.S. or M.Eng. degree)

Example Curricula for Three Areas of Specialization

Digital Communications and Signal Processing

ECSE-4670 Computer Communications Networks
ECSE-6400 Systems Analysis Techniques
ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6560 Digital Communications Engineering
ECSE-6620 Digital Signal Processing

ECSE-6630 Digital Image and Video Processing
ECSE-6590 Wireless Communications and Networks
ECSE-7010 Optical Fiber Communications
ECSE-6960 Topics in Electrical Engineering, Applied Digital Signal Processing
ECSE-6980 Engineering Project

Control Systems

ECSE-4440 Control Systems Engineering
ECSE-4490 Fundamentals of Robotics
ECSE-6400 Systems Analysis Techniques
ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
ECSE-6460 Multivariable Control Systems or ECSE-6960 Embedded Digital Control Systems

ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6560 Digital Communications Engineering
ECSE-6620 Digital Signal Processing
ECSE-6980 Engineering Project

Communication Networks

ECSE-4670 Computer Communications Networks
ECSE-6400 Systems Analysis Techniques
ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6560 Digital Communications Engineering
ECSE-6620 Digital Signal Processing
ECSE-6960 Topics in Electrical Engineering, LANs, MANs, and Internetworking

ECSE-6660 Broadband and Optical Networking
CISH-6230 Network Management or ECSE-6960 Topics in Electrical Engineering, Cryptography and Network Security
ECSE-7010 Optical Fiber Communications
ECSE-6590 Wireless Communications and Networks
ECSE-6980 Engineering Project

M.S. in Electrical Engineering Program Requirements

The M.S. requirements are the same as those for the M.Eng. in Electrical Engineering (pages 39-41), except for the substitution of a 6-credit-hour thesis in place of one elective and the three-credit-hour project.

Please contact Professor Farooque Mesiya at mesiyf@rpi.edu if you have any questions about the Electrical Engineering program.
Computer and Systems Engineering

The Master of Engineering in Computer and Systems Engineering provides the student with the appropriate hardware and software tools needed in such critical areas as digital communications and signal processing, robotics and automation systems, computer communication networks, and software engineering.

Admission Requirements
1. Students who have received a B.S. degree in Electrical Engineering, Computer Engineering, or Computer Science
2. Students with a B.S. degree in another engineering discipline, mathematics or physics, subject to the condition that the following essential prerequisites for their chosen area of specialization have been completed:

Digital Communications and Signal Processing
ECSE-2010 Electrical Circuits
ECSE-2410 Signals and Systems (or ECSE-4960 Fundamentals of Signals and Systems)
ECSE-2610 Computer Components and Operations (or CISH-4030 Structured Computer Architecture)

Computer Communications Networks
ECSE-2010 Electrical Circuits
ECSE-2410 Signals and Systems (or ECSE-4960 Fundamentals of Signals and Systems)
ECSE-2610 Computer Components and Operations (or CISH-4030 Structured Computer Architecture)

Robotics and Automation Systems
ECSE-2010 Electrical Circuits
ECSE-2410 Signals and Systems (or ECSE-4960 Fundamentals of Signals and Systems)
ECSE-2610 Computer Components and Operations (or CISH-4030 Structured Computer Architecture)

Software Engineering
CSCI-1100 Computer Science I
ECSE-4960 Fundamentals of Signals and Systems
CSCI-2300 Data Structures and Algorithms (or CISH-4020 Object Structures)
ECSE-2610 Computer Components and Operations (or CISH-4030 Structured Computer Architecture)

Preparatory courses do not apply toward the minimum 30 credit hours required for the Master of Engineering degree.

Areas of Specialization
Students must include in their plan of study a sequence of three 6000 or 7000 level courses in at least one of the following areas of specialization:

- Digital Communications and Signal Processing
- Robotics and Automation Systems
- Computer Communication Networks
- Software Engineering

M.Eng. in Computer and Systems Engineering Program Requirements
Required Core (15 credits)
CSCI-4210 Operating Systems
or ECSE-4440 Control Systems Engineering
ECSE-4670 Computer Communication Networks
ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6620 Digital Signal Processing
ECSE-6980 Engineering Project
Electives (15 credits)
ECSE-4490 Fundamentals of Robotics
ECSE-4770 Computer Hardware Design
ECSE-6050 Advanced Electronic Circuits
ECSE-6410 Robotics and Automation Systems
ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
ECSE-6460 Multivariable Control Systems
ECSE-6560 Digital Communications Engineering
ECSE-6590 Wireless Communications and Networks
ECSE-6630 Digital Image and Video Processing
ECSE-6660 Broadband and Optical Networking
ECSE-6770 Software Engineering I
ECSE-6780 Software Engineering II
ECSE-6960 Topics in Electrical Engineering, LANs, MANs, and Internetworking
ECSE-6960 Topics in Electrical Engineering, Embedded Digital Control Systems
ECSE-6960 Topics in Electrical Engineering, Applied Digital Signal Processing
ECSE-7010 Optical Fiber Communications
ECSE-7100 Real-Time Programming and Applications
CISH-6010 Object-Oriented Programming and Design
CISH-6050 Software Engineering Management
CISH-6230 Network Management
CISH-6320 GUI Building
CISH-6510 Web Application Design and Development

Sample Curricula for Four Areas of Specialization
Digital Communications and Signal Processing
ECSE-4670 Computer Communications Networks
ECSE 4440 Control Systems Engineering
ECSE-6400 Systems Analysis Techniques
ECSE-6510 Introduction to Stochastic Signals and Systems
ECSE-6560 Digital Communications Engineering
ECSE-6620 Digital Signal Processing
ECSE-6630 Digital Image and Video Processing or ECSE-6660 Broadband and Optical Networking

Robotics and Automation Systems
ECSE-4440 Control Systems Engineering
ECSE-4490 Fundamentals of Robotics
ECSE-4670 Computer Communications Networks
ECSE-6400 Systems Analysis Techniques
ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
ECSE-6460 Multivariable Control Systems or ECSE-6960 Embedded Digital Control Systems
Computer Communication Networks

- ECSE-4670 Computer Communications Networks
- ECSE-6960 Topics in Electrical Engineering, LANs, MANs, and Internetworking
- ECSE-4440 Control Systems Engineering
- ECSE-6510 Introduction to Stochastic Signals and Systems
- ECSE-6560 Digital Communications Engineering
- ECSE-6620 Digital Signal Processing

- ECSE-6660 Broadband and Optical Networking
- CISH-6230 Network Management or ECSE-6960 Topics in Electrical Engineering, Cryptography and Network Security
- ECSE-7010 Optical Fiber Communications or ECSE-6590 Wireless Communications and Networks
- ECSE-6980 Engineering Project

Software Engineering

- CSCI-4210 Operating Systems
- ECSE-4670 Computer Communications Networks
- ECSE-6510 Introduction to Stochastic Signals and Systems
- ECSE-6620 Digital Signal Processing
- ECSE-6770 Software Engineering I

- ECSE-6780 Software Engineering II
- CISH-6050 Software Engineering Management
- CISH-6010 Object-Oriented Programming and Design
- CISH-6320 GUI Building or CISH-6510 Web Application Design and Development
- ECSE-6980 Engineering Project

Please contact Professor Farooque Mesiya at mesiyf@rpi.edu if you have any questions about the Computer and Systems Engineering program.

Engineering Science

The Master of Science in Engineering Science degree serves students whose educational needs do not correspond to the standard professional engineering curricula. It allows students to tailor a plan of study to their particular requirements. Each student’s course of study is developed in close consultation with the advisor to allow meaningful and strongly directed interdisciplinary approach. The degree awarded in this area is not, nor is it intended to be, accredited for practice. Students entering the Engineering Science program are expected to hold a Bachelor of Science degree in one of the traditional engineering disciplines. Applicants not holding such degree must have evidence of coursework in at least:

- Mathematics, through Ordinary Differential Equations (three terms or 12 credits)
- Physics (two terms)
- Chemistry and/or Engineering Materials (one term)
- Mechanics (one term)
- Electronics/Circuits (one term)
- Probability and Statistics (one term)

Students lacking one or more of these courses are expected to take corrective action before entering the Engineering Science program.

Please contact Professor Ernesto Gutierrez-Miravete at gutiie@rpi.edu if you have any questions about the Engineering Science program.
Mechanical Engineering

The Master of Engineering in Mechanical Engineering and Master of Science in Mechanical Engineering degrees allow the student to increase his or her competence in a number of mechanical engineering subjects, or to specialize in depth in the areas of fluid mechanics, heat transfer, mechanical design, solid mechanics, or thermodynamics.

Admission Requirements
1. Students who have received a B.S. degree in Mechanical Engineering from an accredited institution, a GPA in the upper quartile, and some work experience in a high-technology environment.
2. Students with a B.S. degree in another engineering discipline, mathematics, or physics may be admitted subject to fulfillment of the following background requirements.

Mechanical Engineering Background Requirements
- Chemistry (one additional term)
- Dynamics (one term)
- Fluid Mechanics (one term)
- Machine Design (one term)
- Mechanisms (one term)
- Statics (one term)
- Strength of Materials (one term)
- Heat Transfer (one term)
- Thermodynamics (two terms)

Students lacking any of the above courses must work closely with their advisor to devise a plan for corrective action.

Master’s Degrees in Mechanical Engineering Program Requirements
The Master of Engineering in Mechanical Engineering degree is awarded upon successful completion of the following:

Required Core (15 credits)
MANE-5000 Advanced Engineering Mathematics I
MANE-7000 Advanced Engineering Mathematics II
MANE-5100 Mechanical Engineering Foundations I
MANE-7100 Mechanical Engineering Foundations II
MANE-6980 Mechanical Engineering Project (Culminating Experience)

Electives (15 credits)
In consultation with advisor, select five courses from a single or several speciality area(s).

Specialty Area: Solids
MANE-4240 Introduction to Finite Elements
MANE-4610 Vibrations
MANE-4650 Fracture Mechanics
MANE-6180 Mechanics of Composite Materials

MANE-6200 Plates and Shells
MANE-6960 Advanced Topics in Finite Element Analysis

Specialty Area: Fluids
MANE-4800 Boundary Layers and Heat Transfer
MANE-5060 Introduction to Compressible Flow
MANE-5080 Turbomachinery

MANE-6300 Turbulence
MANE-6550 Theory of Compressible Flow
MANE-6720 Computational Fluid Dynamics

Specialty Area: Thermal Systems
MANE-6540 Advanced Thermodynamics
MANE-6630 Conduction Heat Transfer
MANE-6640 Radiation Heat Transfer
MANE-6650 Convection Heat Transfer

MANE-6840 An Intro to Multiphase Flow and Heat Transfer
MANE-6830 Combustion
Specialty Area: Manufacturing and Materials
DSES-6110 Introduction to Applied Statistics
MTLE-4260 High Temperature Alloys
MTLE-6960 High Temperature Coatings Engineering
MTLE-7061 Casting and Joining Processes

Sample Curricula for Master of Engineering in Mechanical Engineering
Solid Mechanics Focus
MANE-5000 Advanced Math for Engineers I (4000-level)
MANE-5100 Foundations of Mechanical Engineering I (4000-level)
MANE-6180 Mechanics of Composite Materials
MANE-6200 Plates and Shells
MANE-6310 Non-linear Vibrations
MANE-6960 Advanced Topics in Finite Element Analysis
MANE-6980 Engineering Project
MANE-7000 Advanced Math for Engineers II (6000-level)
MANE-7100 Foundations of Mechanical Engineering II (6000-level)

Thermofluids Focus
MANE-4800 Boundary Layers and Heat Transfer
MANE-5000 Advanced Math for Engineers I (4000-level)
MANE-5100 Foundations of Mechanical Engineering I (4000-level)
MANE-6630 Conduction Heat Transfer
MANE-6650 Convection Heat Transfer
MANE-6720 Computational Fluid Dynamics
MANE-6980 Engineering Project
MANE-7000 Advanced Math for Engineers II (6000-level)
MANE-7100 Foundations of Mechanical Engineering II (6000-level)

Computational Focus
DSES-6110 Introduction to Applied Statistics
MANE-4240 Introduction to Finite Elements
MANE-5000 Advanced Math for Engineers I (4000-level)
MANE-5100 Foundations of Mechanical Engineering I (4000-level)
MANE-6530 Turbulence
MANE-6720 Computational Fluid Dynamics
MANE-6980 Engineering Project
MANE-6960 Advanced Topics in Finite Element Analysis
MANE-7000 Advanced Math for Engineers II (6000-level)
MANE-7100 Foundations of Mechanical Engineering II (6000-level)

Manufacturing/Materials Focus
MANE-4240 Introduction to Finite Elements
MANE-4650 Fracture Mechanics
MTLE-4260 High Temperature Alloys
MANE-5000 Advanced Math for Engineers I (4000-level)
MANE-5100 Foundations of Mechanical Engineering I (4000-level)
MANE-6980 Engineering Project
MANE-7000 Advanced Math for Engineers II (6000-level)
MANE-7100 Foundations of Mechanical Engineering II (6000-level)
MTLE-6960 High Temperature Coatings Engineering
MTLE-7061 Casting and Joining Processes
Multidisciplinary Focus
DSES-6110 Introduction to Applied Statistics
MANE-4240 Introduction to Finite Elements
MANE-4800 Boundary Layers and Heat Transfer
MANE-5000 Advanced Math for Engineers I (4000-level)
MANE-5100 Foundations of Mechanical Engineering I (4000-level)
MANE-6540 Advanced Thermodynamics
MANE-6830 Combustion
MANE-6980 Engineering Project
MANE-7000 Advanced Math for Engineers II (6000-level)
MANE-7100 Foundations of Mechanical Engineering II (6000-level)
MTLE-4260 High Temperature Alloys

M.S. in Mechanical Engineering Program Requirements
The M.S. requirements are the same as those for the M.Eng. in Mechanical Engineering, except for the substitution of a 6-credit-hour thesis in place of one elective and the three-credit-hour project.

Please contact Professor Ernesto Gutierrez-Miravete at gutiee@rpi.edu if you have any questions about the Mechanical Engineering program.
Engineering Graduate Certificate Programs

For working professionals not seeking to complete a Master’s degree, Rensselaer’s Graduate Certificate Programs are tailored to enhance or update skills in a shorter period of time. They have a selective focus and require that a student successfully complete three or four graduate courses in a specific area of Engineering. With an advisor’s approval, credits earned may be subsequently applied as electives toward a Master’s degree.

Graduate Certificate Program in Control Systems

Control systems are widely used in engineering to monitor the values of process variables by measurement so as to make rational decisions about required corrective actions. Analysis and design of control systems requires consideration of sensors, controllers, transmitters as well as auxiliary control and hardware elements.

Rensselaer at Hartford offers a Graduate Certificate in Control Systems designed to provide an understanding of control systems engineering, including the fundamental principles of control systems and their application to real-life engineering problems.

Admission Requirements

1. Students who have received a B.S. degree in Electrical Engineering, Computer Engineering, or Computer Science
2. Students with a B.S. degree in another engineering discipline, mathematics, or physics, subject to the condition that the following essential prerequisites have been completed:
   • ECSE-2010 Electrical Circuits
   • ECSE-2410 Signals and Systems (or ECSE-4960 Fundamentals of Signals and Systems)

The Certificate of Advanced Graduate Studies in Control Systems is awarded upon successful completion of the following courses:

Core Courses (6 credits):
ECSE-4440 Control Systems Engineering
ECSE-6400 Systems Analysis Techniques

Elective Courses (Any two, 6 credits)
ECSE-4490 Fundamentals of Robotics
ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
ECSE-6460 Multivariable Control Systems
ECSE-6960 Topics in Electrical Engineering: Mechatronics
ECSE-6960 Topics in Electrical Engineering: Embedded Digital Control Systems
ECSE-6410 Robotics and Automations Systems

Academic credit earned from these courses can then be applied towards a Master’s degree.

Please contact Professor Farooque Mesiya at mesiyf@rpi.edu if you have any questions about the Control Systems Certificate Program.
**Graduate Certificate Program in High Temperature Materials**

Materials used in the “hot zones” of propulsion and power generation systems must satisfy stringent demands for integrity and performance. Materials exposed to these extreme environments exhibit continuously evolving microstructures, and this must be accounted for during the component design stage of production.

Rensselaer offers a Certificate of Advanced Graduate Studies in High Temperature Materials designed to provide an understanding of the properties of high temperature alloys as well as skills in improving those properties by manipulating the material microstructure through processing.

The Certificate of Advanced Graduate Studies in High Temperature Materials is awarded upon successful completion of the following courses:

- MTLE-4260 High Temperature Alloys (Superalloys)
- MTLE-7061 Casting and Joining Processes for Superalloys
- MTLE-6960 High Temperature Coatings Engineering

Academic credit earned from these courses can then be applied towards a Master’s degree.

Please contact Professor Ernesto Gutierrez-Miravete at gutiee@rpi.edu if you have any questions about the Certificate of Advanced Graduate Studies in High Temperature Materials.
Assistant Dean for Academic Programs: Houman Younessi, Ph.D.
Area Coordinator: John Maleyeff, Ph.D.
Department Home Page: www.ewp.rpi.edu/hartford/academic/lsmt

The primary purpose of the Lally School of Management and Technology is to educate business leaders and professionals in the strategic use of technology to create corporate value and sustainable competitive advantage in the global business environment. The mission of the Lally School is to develop technically sophisticated business leaders who are prepared to guide their organizations in the integration of technology for new products, new businesses, and new systems. The Lally School has a vision to be pre-eminent among educational institutions in integrating management and technology for innovation and value creation. The values that the Lally School holds are:

- Passion for lifelong learning.
- Dedication to the idea that management and technology and innovation and entrepreneurship are critical to improving the quality of life.
- Vibrant relations with our business partners.
- Rigor and relevance in intellectual contributions and business practice.
- Highest standards of ethics, responsibility, and respect for individuals.
- Creative solutions through interdisciplinary teamwork.
- Commitment to serving our stakeholders.

The Lally School comprises two departments: one based in Hartford, Connecticut, and the other in Troy, New York. The programs, degree requirements, and course offerings included in this section specifically pertain to the Hartford department.
Faculty

Full-Time Faculty
The Lally School full-time faculty possess a broad range of academic and business experience. The diverse backgrounds of the faculty help ensure that students receive high-quality academic experiences that are also grounded in the practical realities of business. The faculty is focused on delivering an educational experience that is relevant to the needs of full-time working professionals.

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
<th>Teaching Area(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albright, Robert R., II</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., University of Pittsburgh</td>
<td>Human Resources, Strategy</td>
</tr>
<tr>
<td>Arnheiter, Edward D.</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., University of Massachusetts</td>
<td>Operations Management</td>
</tr>
<tr>
<td>Gingerella, Louis W., Jr.</td>
<td>Clinical Associate Professor</td>
<td>M.B.A., Rensselaer Polytechnic Institute</td>
<td>Finance</td>
</tr>
<tr>
<td>Kelly, Leonard J.</td>
<td>Clinical Professor</td>
<td>Ph.D., University of Connecticut</td>
<td>Quantitative Management</td>
</tr>
<tr>
<td>Luddy, William J., Jr.</td>
<td>Clinical Professor</td>
<td>J.D., University of Connecticut</td>
<td>Law, Corporate Governance, and Business Policy</td>
</tr>
<tr>
<td>Maleyeff, John</td>
<td>Clinical Professor</td>
<td>Ph.D., University of Massachusetts</td>
<td>Operations Management</td>
</tr>
<tr>
<td>Peteros, Randall G.</td>
<td>Clinical Associate Professor</td>
<td>J.D., Western New England College School of Law</td>
<td>Finance</td>
</tr>
<tr>
<td>Rainey, David L.</td>
<td>Clinical Professor</td>
<td>Ph.D., Rensselaer Polytechnic Institute</td>
<td>Technology, Innovation, and Environment</td>
</tr>
<tr>
<td>Stodder, James P.</td>
<td>Clinical Associate Professor</td>
<td>Ph.D., Yale University</td>
<td>Economics</td>
</tr>
<tr>
<td>Younessi, Houman</td>
<td>Clinical Professor</td>
<td>Ph.D., Swinburne University of Technology (Australia)</td>
<td>Information Systems, Information Technology and Innovation, Systems and Operations Management</td>
</tr>
</tbody>
</table>

Adjunct Faculty
The Lally School adjunct faculty includes leading business practitioners whose in-depth knowledge of current business practices enhances student’s learning experience. The current Rensselaer adjunct faculty includes the following:

<table>
<thead>
<tr>
<th>Adjunct Faculty</th>
<th>Position</th>
<th>Degree and Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araujo, Robert J.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute and M.B.A., University of New Haven</td>
</tr>
<tr>
<td>Bialecki, Dennis M.</td>
<td>Adjunct Professor</td>
<td>M.B.A., Rensselaer Polytechnic Institute</td>
</tr>
<tr>
<td>Getz, Richard D.</td>
<td>Adjunct Professor</td>
<td>J.D., Western New England College School of Law</td>
</tr>
<tr>
<td>Kerr, James M.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
</tr>
<tr>
<td>Luddy, Grace B.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
</tr>
<tr>
<td>O’Donovan, Edward G.</td>
<td>Adjunct Professor</td>
<td>M.B.A., University of Connecticut</td>
</tr>
<tr>
<td>Russell, Susan</td>
<td>Adjunct Professor</td>
<td>Ph.D., Fielding Institute</td>
</tr>
<tr>
<td>Sparzo, Gregory M.</td>
<td>Adjunct Professor</td>
<td>M.S., Rensselaer Polytechnic Institute</td>
</tr>
</tbody>
</table>
Programs

The programs offered by the Lally School for the Education of Working Professionals at Rensselaer are the Master of Business Administration (M.B.A.) and the Master of Science (M.S.) in Management. Dual degrees with the Department of Engineering and Science are also available. The M.S. in Management program contains two different focal areas: Enterprise Management and Innovation and Entrepreneurship.

In its programs, the Lally School strives for a balance between theory and practice, and between rigor and relevance. The programs place heavy emphasis on the application of knowledge through team-based projects.

The Lally School and all its programs are based on three core principles:

• Technology and innovation are the primary lifeblood of the business enterprise and its competitiveness in business and commerce.
• Entrepreneurship and innovation involve the constant search for new and better ways of achieving sustainable outcomes.
• Management and leadership mean being on the leading edge of the changes in the business environment and inspiring people within and outside the corporation to realize the vision and passion of the organization.

Graduate Programs

Evening M.B.A.

The Lally School offers an evening version of its full-time daytime (Troy, New York) M.B.A. program which focuses on innovation, globalization, and entrepreneurship. The evening M.B.A. provides students the same 60-credit integrated learning experience of the daytime cohort in a flexible, evening setting. It is recommended that evening M.B.A. students complete the degree in a four-year timeframe by taking required streams during the academic year, and elective courses in the summer. Since several course streams continue across the Fall and Spring terms, students who sign up for Fall stream courses will be expected to complete the Spring courses in the following term.

The Plan of Study includes:

Year 1
MGMT-7740  Accounting for Reporting and Control
MGMT-6040  Creating and Managing an Enterprise I
MGMT-6020  Financial Management I
MGMT-6050  Creating and Managing an Enterprise II
MGMT-6100  Statistics and Operations Management I

Year 2
MGMT-6110  Statistics and Operations Management II
MGMT-6060  Business Implications of Emerging Technologies I
MGMT-6030  Financial Management II
MGMT-7730  Economics and Institutions

Summer 2 Elective

Year 3
MGMT-6080  Networks, Innovation & Value Creation I
MGMT-7050  Developing Innovative New Products/Services I
MGMT-7060  Developing Innovative New Products/Services II
MGMT-xxxx  Elective
Summer 3 Elective

Year 4
MGMT-7030 Strategy, Technology, and Competition I
MGMT-7750 Global Business and Social Responsibility
MGMT-7070 Managing on the Edge
MGMT-xxxx Elective

Summer 4 Elective

Accelerated Weekend M.B.A. (WEMBA)
In the Weekend M.B.A. Program, students earn an M.B.A. degree in a 30-month period of accelerated instruction (10 terms of study). Classes are conducted primarily on Friday evenings and essentially every other Saturday, consisting of two courses a term for four terms a year, designed to enhance cumulative skill building and learning.

The Weekend schedule is designed to appeal to students with significant work experience who are unable to attend classes during the week; who are interested in joining a group of mature students attending classes and working and studying together; and who desire an opportunity to earn the M.B.A. degree in a two-and-a-half-year period. The objective is to form a diverse weekend class of broadly experienced middle managers and professionals.

For more information concerning the Weekend M.B.A. Program, contact Kristin E. Galligan at (860) 548-7881; (800) 433-4723, ext. 7881; or e-mail: lalitk@rpi.edu.

Elite Master’s Program (EMP)
The Elite Master’s Program is a focused, integrated, ten-month program leading to a Master of Science in Management. In addition, students will be enrolled in the Leadership Development Program Center through Rensselaer’s affiliation with the Center for Creative Leadership (CCL). Courses are designed and taught to prepare experienced managers for more senior leadership positions in their organizations. The Elite Master’s Program emphasizes the blending of management and technology as a critical skill set for senior managers in an increasingly technology-based world. The curriculum focuses on strategic thinking and leadership, innovation, and managerial decision making. The program concentrates on crafting strategies through effective analysis for gaining competitive advantage in a global environment.

The following courses make up the program curriculum:

- Creating and Managing an Enterprise I
- Data Analysis for Managerial Decision Making
- Finance for Decision Analysis
- Marketing and Product Management
- Economics and Institutions
• Lean Strategies for Manufacturing and Service
• Corporate Investment Strategies and Risk Management
• Global Strategic Management of Technological Innovation
• Strategy, Technology and Global Competitive Advantage
• Failure Analysis of Management Decisions

Classes typically meet on alternating Fridays and Saturdays beginning each fall through August. Information concerning the Elite Master’s Program may be obtained by contacting Kristin E. Galligan at (860) 548-7881; (800) 433-4723, ext. 7881; or e-mail: laritk@rpi.edu.

Master of Science in Management

The M.S. in Management is designed to provide students with the knowledge, skills, and capabilities to be professional contributors and technical managers in a functional area of organizations. It is intended for students who want to acquire more expertise in a specialized area before they seek general management skills and capabilities later in their careers. The educational objective is to provide a learning environment that is centered on analysis, decision making, and implementation.

The Master of Science in Management is a specialized program requiring a minimum of 30 credit hours of graduate work and must:

• Focus on enterprise management or innovation and entrepreneurship. It must not be of a general business nature. See pages 55-56 for a list of areas of concentration.

• Include the four core courses as defined below, four courses in an approved area of concentration, one elective, and a culminating experience (CAPSTONE course). The program must meet the requirements of the Graduate School. A Plan of Study must be approved by the Assistant Dean for Academic Programs.

• Include a three-credit CAPSTONE course ordinarily completed in the final term, which is satisfied by either: a) MGMT-6680 Strategy, Technology, and Global Competitive Advantage; b) MGMT-7540 Leadership and Organizational Improvement; or c) MGMT-7980, CAPSTONE Project Course with the approval of a full-time faculty member. See page 58 for additional details.

The following is a typical ten-course M.S. program sequence. The four core courses are normally offered every term.
**Course Sequence**

<table>
<thead>
<tr>
<th>Management Core: Background in Key Areas of Management</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT-7740 Accounting for Reporting and Control (Formerly MGMT-6190 Financial and Managerial Accounting)</td>
<td>3</td>
</tr>
<tr>
<td>MGMT-6040 Creating and Managing an Enterprise I (Formerly MGMT-6710 Designing, Developing, and Staffing High-Performance Organizations)</td>
<td>3</td>
</tr>
<tr>
<td>MGMT-6020 Financial Management I (Formerly MGMT-6310 Financial Management and Valuation of Firms)</td>
<td>3</td>
</tr>
<tr>
<td>MGMT-6050 Creating and Managing an Enterprise II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Concentration: Four Courses in a Focused Area of Study (see pages 55-56)**

| MGMT-xxxx Concentration Course #1 | 3 |
| MGMT-xxxx Concentration Course #2 | 3 |
| MGMT-xxxx Concentration Course #3 | 3 |
| MGMT-xxxx Concentration Course #4 | 3 |
| MGMT-xxxx Elective Course | 3 |
| MGMT-xxxx CAPSTONE Course (MGMT-6680 or MGMT-7540 or MGMT-7980)* | 3 |

**TOTAL CREDITS** 30

* See page 58 for more information on CAPSTONE.

**Management and Technology Concentrations**

A Concentration is a 12-credit-hour (four-course) sequence of related course work that is required for the M.S. in Management program (see page 54) but not required for the M.B.A. Neither the diploma nor the transcript will specify a concentration. There are two main concentrations; Innovation and Entrepreneurship, and Enterprise Management. Specific requirements for each concentration are described below.

**Innovation and Entrepreneurship**

This concentration has been designed for students who have an interest in technological innovation, new product development, technological entrepreneurship, and new venture creation in established firms and start-up companies. It prepares professionals in the strategic management of innovation and the integration of the technical functions with other corporate functions and goals.

Students must select four concentration courses pertaining to Innovation and Entrepreneurship:

- MGMT-6060 Business Implications of Emerging Technologies I
- MGMT-6600 Research and Development Management
- MGMT-6610 Global Strategic Management of Technological Innovation
- MGMT-6620 Principles of Technological Entrepreneurship
- MGMT-6630 Starting Up A New Venture
- MGMT-6730 Technological Change and International Competitiveness
- MGMT-6810 Management of Technical Projects
- MGMT-6960 Product Innovation
- MGMT-7003 Sustainable Business Development
- MGMT-7050 Developing Innovative New Products and Services I
  (Formerly MGMT-6560 Managing New Product Development)
Enterprise Management
This concentration has been designed for students who are interested in the integration of supply networks, operations, marketing, finance, and management of information systems. It prepares students for management careers at several different levels of the product and service organization by developing the knowledge necessary to support and add value to the underlying strategic focus of a management system.

Students must select four concentration courses from one of the following areas of specialization:

Operations Management
Executives in every kind of organization, large and small, private and public, for-profit and not-for-profit, can utilize the tools delivered in this specialization to form high level strategy and improve day-to-day operations; to unlock the value of their data; to model complex systems; and to make better decisions with less risk. The courses will help improve processes, productivity, and performance across the entire business enterprise, whether its focus is service or production.

Select four courses from the following:
- MGMT-6100 Statistics and Operations Management I
- MGMT-6110 Statistics and Operations Management II
- MGMT-6450 Manufacturing Systems Management
- MGMT-6470 Management of Quality, Processes, and Reliability
- MGMT-6480 Service Operations Management
- MGMT-6490 Competitive Advantage and Operations Strategy
- MGMT-6960 Lean Strategies for Manufacturing and Service
- MGMT-7500 Managing Supply Networks

Global Enterprise Management
This specialization explores the rapidly evolving managerial and technological environments which students will encounter as professionals in a competitive global marketplace. Special emphasis is placed on the following areas: multinational business environments, varying levels of technology, finance, trade issues, politics, and cross-cultural dynamics.

Select four courses from the following:
- MGMT-6290 Macroeconomics and International Environments of Business
- MGMT-6390 International Operations
  (Formerly MGMT-6350 International Business)
- MGMT-6550 Marketing Research
- MGMT-6730 Technological Change and International Competitiveness
- MGMT-7700 International Negotiations
- MGMT-7710 Cultural Environment of International Business

Finance
This specialization prepares students for a career path in corporate finance functions and for careers in the financial services industries. The special finance problems in high-tech industries are explored as well as the impact of technology on financial markets and the financial manager in modern corporations. To provide students with a broad finance background, students take four courses beyond the core financial management courses (MGMT-6190 Financial and Managerial Accounting and MGMT-6310 Financial Management and Valuation of Firms) which are prerequisites for the courses listed below.
Select four courses from the following:

MGMT-6320 Investment Analysis I
MGMT-6330 Investment Analysis II
MGMT-6340 Financial Markets and Institutions
MGMT-6380 Advanced Corporate Finance
MGMT-6340 Financial Markets and Institutions
MGMT-6400 Financial Econometrics Modeling
MGMT-7210 Acquisition and Venture Analysis

Management Information Systems
This specialization is designed for professionals responsible for achieving competitive advantage through the integration of information technology into organizations. The specialization courses use an interdisciplinary approach to the practices and methodologies of systems analysis, design, development, and integration and evaluation of information technology into business functions and processes.

Complete the following courses:

MGMT-6140 Information Systems Management
MGMT-6170 Advanced Systems Analysis and Design
MGMT-6750 Legal Aspects of E-Business and Information Technology
MGMT-6810 Management of Technical Projects

Dual Master’s Programs
The dual degree option offers students the opportunity to complete two master’s degrees in a shorter period of time than if the degrees were pursued independently. The objective is to combine technical expertise in information technology, engineering, or computer science by obtaining an M.S. degree in one of these disciplines with an M.S. in Management or an M.B.A. degree.

The dual M.B.A./M.S. option allows the student to complete both degrees by taking a total of 72 credit hours (the M.B.A. alone is 60 credits). The dual M.S./M.S. option allows the student to complete both degrees by taking a total of 54 credit hours (the M.S. in Management alone is 30 credits).

Upon acceptance to both programs, students confer with academic advisors in both disciplines to determine their Plans of Study. The Plans of Study are submitted for both degree programs and separate diplomas reflect a degree in each discipline.

Please contact your advisor for the name of the dual degree faculty coordinator.
The CAPSTONE Course Requirement

All students enrolled in the M.B.A. and M.S. programs in the Lally School of Management and Technology are required to complete a 3-credit CAPSTONE course. The CAPSTONE serves as an opportunity for students to synthesize the body of knowledge gained during their course of study and is ordinarily completed in the final term of the degree program.

CAPSTONE Course Requirement for the M.B.A. Program

The CAPSTONE course requirement for the M.B.A. program is satisfied by students taking the required course MGMT-7030 Strategy, Technology, and Competition I.

CAPSTONE Course Requirement for the M.S. Program

The CAPSTONE course requirement for the M.S. program can be satisfied by:

- Taking MGMT-6680 Strategy, Technology, and Global Competitive Advantage or MGMT-7540 Leadership and Organizational Improvement.

- Conducting an independent research project (MGMT-7980) with the approval of a full-time faculty advisor. The independent research should result in a high-quality research paper that is suitable for publication in a journal. Such efforts are separate and independent of course work used to satisfy other M.S. program requirements.
The Rensselaer Fellow
A Fellow of Rensselaer is that rare individual who possesses vision, imagination, creativity and passion. A proven corporate leader, the Fellow is responsible for shaping the direction and purpose of leading-edge thought. The Rensselaer Fellows Program brings these leaders together with exceptional faculty to create incubators of knowledge and innovation. Built on a solid foundation of fundamentals, educated by the best scholars and industry leaders, and integrated through peer training and interactive study, the Fellows Program merges Rensselaer’s world-class education and training with Fellows’ experience and passion to foster a truly unique learning community.

The Fellows Program
Successful graduates of the Rensselaer Fellows Program earn a Master of Science degree, and are awarded the distinction of being appointed Rensselaer Fellows, a prestigious designation they retain for life. Rensselaer has created a program to engage the best and brightest from leading corporations, without taking participants away from their companies for extended periods of time. These premium program offerings consist of ten separate one-week residential sessions, with four- to six-week intervals separating these sessions. This allows students to return to work and home between sessions and to continue study and project work independently. Eight of the ten sessions take place at Rensselaer’s Hartford and Troy, New York campuses, and the remaining two take place at designated international locations in Europe and the Pacific Rim. The faculty selected to teach in the Rensselaer Fellows Program are internationally renowned and have had extensive industry experience in addition to their significant academic careers.

To qualify for admission to this elite cohort program, individuals must be nominated and supported by their companies and must have 10-15 years of increasingly responsible work experience and at least five years in a managerial role.

Candidates will progress through the Rensselaer Fellows Program with an elite cohort of outstanding executives from major, world-class corporations located around the globe. This affords a unique opportunity to network and establish new, long lasting business and personal relationships with a group of like-minded global business and technical leaders.

Initial Fellows Program Offering
Innovation and Corporate Entrepreneurship (ICE)
This program is designed to develop leaders for corporations involved in global competition and operations. Innovation is the key to opportunity in the twenty-first century and is a necessary survival skill for both corporations and business and technology leaders. The ability to develop skills to create, recognize, manage, and foster innovation in large, complex business organizations is critical to success. Corporate Entrepreneurship focuses on the ability to seize opportunities in developing new business ventures inside the existing framework of large corporate enterprises. This initial offering is scheduled to begin in May 2008.

Contact Information
For more information, please contact the Director of Marketing and Business Development at (860) 548-7864; (800) 433-4723, ext. 7864; or e-mail: fellows@ewp.rpi.edu.
International Scholars Program

A Program for Recent College Graduates
The Rensselaer International Scholars Program (ISP), launching in Summer 2008, will provide graduating college seniors with a valuable edge in educational background, worldly perspective, and the ability to speak from personal experience, as they make the transition from college to the working world. In addition to earning a Graduate Certificate in International Business from Rensselaer, ISP participants will also earn 40 percent of the requirements toward earning an M.S. in Management, along with the qualifications for a concentration.

Global Business
The ISP combines Rensselaer’s academic rigor with the global industry exposure of an international internship to provide an international experience introducing the college graduate to the global stage. The classroom experience will be complimented by guest lecturers, dialogues and visits with multinational corporations, in addition to Rensselaer’s distinguished faculty. Through four graduate courses, students complete individual and team-based projects, introduce themselves to management of multinational corporations, and are immersed into influential cultures. Upon completion of the program, students will earn a graduate certificate in either Enterprise Management or Information Technology.

Two Distinct Tracks to Choose From
The following are course sequences for the two different ISP tracks, Enterprise Management and Information Technology. Each includes a total of 12 credit-hours of coursework. See the Course Descriptions section in this Catalog.

ISP Enterprise Management
• Start Date: June 8, 2008
• End Date: August 15, 2008
• International Locations: Barcelona, Spain and Shanghai, China

<table>
<thead>
<tr>
<th>ISP Enterprise Management</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course No.</td>
<td>Course Name</td>
</tr>
<tr>
<td>MGMT 6020</td>
<td>Financial Management I</td>
</tr>
<tr>
<td>MGMT 6040</td>
<td>Creating and Managing an Enterprise I</td>
</tr>
<tr>
<td>MGMT 6050</td>
<td>Creating and Managing an Enterprise II</td>
</tr>
<tr>
<td>MGMT 7740</td>
<td>Accounting for Reporting and Control</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Enterprise Management Culminating Project
Enterprise Management students work in project teams to develop solutions for real-world international business issues. This project will demonstrate understanding of the business environments in the United States, the European Union, and China, building upon their knowledge of management fundamentals and dynamic global and cultural influences. They will blend their classroom learning with first-hand involvement of the local business community to develop recommendations for improved success of international endeavors. Specific project topics will be determined through interaction among faculty, students, and business partners. All projects will result in a formal report and presentation.
**ISP Information Technology (IT)**

- Start Date: June 8, 2008
- End Date: August 15, 2008
- International Locations: Rome, Italy and Warsaw, Poland

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSE 6770</td>
<td>Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CISH 6960</td>
<td>Distributed Algorithms and Systems</td>
<td>3</td>
</tr>
<tr>
<td>CISH 6960</td>
<td>Global IT</td>
<td>3</td>
</tr>
<tr>
<td>CISH 6960</td>
<td>Intelligent Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**IT Culminating Project**

IT students work in teams to specify, design, program, test, document, and demonstrate a system with software engineering complexity. The exercise incorporates elements from the coursework along with the global spirit that is the core of the program. Project topics integrate components of large-scale software engineering and geographically diverse project management with heavy emphasis on managing outsourcing, information and communication security, global communication, internet and e-commerce/service/government, and intelligent systems. Each project entails the development of a software application with a direct global perspective.

**Contact Information**

To learn more about ISP, please contact a Program Manager at (860) 548-5600; toll-free at (800) 433-4723, ext. 5600; or visit the Web site at: [www.ewp.rpi.edu/isp](http://www.ewp.rpi.edu/isp).
Course Descriptions

Computer and Information Sciences

The course numbering system is alphanumeric beginning with a four-letter department name followed by a dash, a three-digit course number, and a zero. All courses are 3 credit hours unless otherwise indicated. Below are the four-letter subject codes for Computer and Information Sciences.

**Acronyms**

- CISH  Computer and Information Sciences Hartford
- CSCI  Computer Science
- COMM  Communications

**Suffix Numbers**

- 4000-4990  Courses open for credit to both advanced undergraduate and graduate students
- 6000-6990  Courses designed for graduate credit

*NOTE: Asterisk (*) denotes an “immigration” course which will not count toward the M.S. in Computer Science, M.S. in Information Technology, or M.Eng. in Computer and Systems Engineering degrees. Such courses may count toward other degrees, but consult with your advisor before registering.*

**CISH Computer and Information Sciences Hartford**

**CISH-4010 Discrete Mathematics and Computer Theory**

Course covers foundations of discrete mathematics and fundamentals of computer theory. Topics include propositional logic, truth tables, quantifiers, sets, set operations, sequences, complexity of algorithms, divisibility, matrix manipulations, proofs, induction, recursion, counting and the pigeonhole principle, permutations, combinations, repeated trials, expectation, relations (properties, representation, equivalence, Warshall's algorithm), Boolean algebra, functions, logic gates, minimizing, Finite State Machines, Turing machines, Regular expressions, context free grammars, language recognizers, derivation trees, pushdown automata.

**CISH-4020 Object Structures**

A study of object oriented software component design. This course introduces the object oriented paradigm and its use in organizing software structures including arrays, stack, queues, lists, trees, graphs, and recursion. Programming assignments require the use of an object oriented language. Prerequisite: CISH-4010 or equivalent and knowledge of an imperative programming language (C, PASCAL, etc.).

**CISH-4030 Structured Computer Architecture**

Introduction to computer architecture; the structure and function of a computer system consisting of processors, memory, I/O modules, and its internal interconnections. Primary focus on the attributes of a system visible to an assembly level programmer. Topics include: digital logic, VLSI components, instruction sets, addressing schemes, memory hierarchy, cache and virtual memories, integer and floating point arithmetic, control structures, buses, RISC vs CISC, multiprocessor and vector processing (pipelining) organizations. Examples are drawn from contemporary (e.g. Intel Pentium, PowerPC) microcomputers. Prerequisite: Undergraduate course in “Introduction to Computer Science.”

**CISH-4210 Operating Systems**

Discussion of various aspects of computer operating systems design and implementation. Topics include I/O programming, concurrent processes and synchronization problems, process management and scheduling of processes, virtual memory management, device management, file systems, deadlock problems, system calls, and interprocess communication. Programming projects are required. Prerequisites: CISH-4020 and CISH-4030.

**CISH-4380 Database Systems**

Discussion of the state of practice in modern database systems with an emphasis on relational systems.
Topics include database design, database system architecture, SQL, normalization techniques, storage structures, query processing, concurrency control, recovery, security, and new direction such as object oriented and distributed database systems. Students gain hands-on experience with commercial database systems and interface building tools. Programming projects are required. Prerequisite: CISH-4020 or equivalent.

CISH-4940 Readings in Computer and Information Sciences
1 to 4 credit hours.

CISH-4960 Topics in Computer and Information Sciences
1 to 4 credit hours.

CISH-6010 Object-Oriented Programming and Design
An introduction to the theory and practice of object oriented programming and design. Encapsulation, inheritance, generality, dynamic binding, and polymorphism. Students use these concepts to design and implement a modest-sized system. One object oriented language (chosen by the instructor) is studied in detail and required for the project. Other languages are covered briefly. Prerequisite: CISH-4210.

CISH-6050 Software Engineering Management
Introduction to the current issues in software engineering management. Topics include the origin of the software crisis, current state-of-the-practice, modeling the software engineering process, the relationship of methods and tools to process, software validation, risk mitigation, and software engineering economics. Prerequisite: CISH-4020.

CISH-6110 Object-Oriented Database Systems
Presents concepts and architectures for support of objects in a database system. Emphasis is placed on DBMS issues rather than application issues with discussions of issues related to the object oriented view of data models, query languages, versioning evolution, authorization, transaction control, storage management, indexing techniques, distributed data. Current object oriented and object-relational database systems are reviewed and compared. A programming project or research paper may be required. Prerequisites: CSCI-4380 and the object oriented portion of either CISH-4020 or CISH-6010.

CISH-6120 Distributed Database Systems
Examines client/server DBMS and considers how a client-server architecture can be used to implement the requirements of a DDBMS. Topics include DDBMS taxonomies, case studies, design considerations, transaction management, and global query optimization. Concludes with an examination of multidatabase systems. Prerequisite: CSCI-4380.

CISH-6150 Artificial Intelligence and Heuristics
Survey of machine implementation of processes as foundation to thinking and perceiving. Modeling and representation of knowledge. AI systems and languages, reasoning and problem solving. Current literature is discussed. Applications are chosen from computer game playing programs, English dialogue, theorem proving, computer vision, robot implementation, and automatic programming. Limitations and performance of techniques. Certain topics are programmed. Prerequisite: CISH-4030.

CISH-6220 LANs, MANs, and Internetworking
Explores the current capabilities and trends in LANs and MANs with additional focus on issues of internetworking network systems or subsets. Topics include: Topologies and transmission media, Local and Metropolitan Area Network (LAN and MAN) architectures and performance. LAN standards IEEE 802.x, and ANSI Standard FDDI. Circuit switched local area networks, e.g., ATM, Fibre Channel. Internetworking alternatives, bridges, network switches, routers and gateways. General LAN management tools. Prerequisite: ECSE-4670 or equivalent.

CISH-6230 Network Management
Introduction to methods, techniques and tools for the management of telecommunication systems and networks. Major topics covered in the course are: Simple Network Management Protocol (SNMPv2, SNMPv3), Remote Monitoring (RMON1, RMON2), Standard Management Information (MIBs), and Telecommunications Management (TMN, CMIS/SMIP); configuration and name management, fault and performance management,
security, accounting management; and web-based network management. Prerequisite: ECSE-4670 or equivalent basic concept computer and communication networks course.

CISH-6510 Web Application Design and Development
Students will learn approaches to the design, development, and maintenance of Web Sites. Students will study software and information architectures for the Web, design techniques for distributed Web-based applications, and methods and tools for the creation and maintenance of Web sites. Study will encompass the major components of a Web site including browsers and client applications, Internet protocols that link client to server, and server applications. Issues of performance, security, and usability will be examined. Prerequisite: CISH-4020 or CSCI-2300. Prior experience with HTML and Java. ECSE-4670 and CSCI-4380 recommended.

CISH-6900 Computer Science Seminar
For students following the Applied path, who are near the end of their program, a two-term course that meets once per month from September through March and one Saturday in April when students give their presentations. Registration is accepted during Fall registration only. Students are required to attend all eight meetings in order to fulfill the Seminar requirement. 1 credit hour.

CISH-6902 Computer Science Seminar
For students following the Applied path, who were admitted after summer 2004. Registrations is allowed only after acceptance of an approved project plan by a faculty advisor. Students are required to attend guest speaker sessions and give a formal presentation of their own research results. 3 credit hours.

CISH-6940 Readings in Computer and Information Sciences
1 to 3 credit hours.

CISH-6960 Topics in Computer and Information Sciences
Contact the Department of Engineering and Science for descriptions of recently offered special topic classes. 1 to 3 credit hours.

CISH-6960 Topics in Computer Science: Artificial Intelligence and Heuristics
Survey of machine implementation of processes as foundation to thinking and perceiving. Modeling and representation of knowledge. A.I. systems and languages, reasoning and problem solving. Current literature is discussed. Applications are chosen from computer game playing programs, English dialogue, theorem proving, computer vision, robot implementation, and automatic programming. Limitations and performance of techniques. Certain topics are programmed. Prerequisite: CISH-4030.

CISH-6960 Topics in Computer Science: Bioinformatics
Bioinformatics (computational molecular biology) is a relatively new discipline, bringing together computational, statistical, experimental, and technological methods, which is energizing and dramatically accelerating the discovery of new technologies and tools for molecular biology. The solutions of bioinformatics problems very often require searching through very large search spaces. Bioinformatics applies computer science techniques to solve crucial problems in biology and medicine, on the other hand, the related area of DNA-based computing uses biological techniques to solve hard computational problems in computer science. Typical tasks done in bioinformatics include inferring a protein’s shape and function from a given sequence of amino acids, finding all the genes and proteins in a given genome, determining sites in the protein structure where drug molecules can be attached.

CISH-6960 Topics in Computer Science: Cryptography and Network Security
Principles of number theory and the practice of network security and cryptographic algorithms. Topics include: Primes, random numbers, modular arithmetic and discrete logarithms. Conventional or symmetric encryption (DES, IDEA, Blowfish, Twofish, Rijndael) and public key or asymmetric encryption (RSA, Diffie-Hellman), hash functions (MD5, SHA-1, RIPEMD-160, HMAC), digital signatures, certificates and authentication protocols (X.509, DSS, Kerberos), electronic mail security (PGP, S/MIME), web security and protocols for secure electronic commerce (IPSec, SSL, TLS, SET). Prerequisite: ECSE-4670 or permission of the instructor.
CISH-6960 Topics in Computer Science: Evolutionary Computation

The purpose of this course is to learn the foundations, techniques and rich applications of evolutionary computation - a powerful new sub-area of computer science, inspired and based on natural evolution, and targeting real-world intractable problems. The course will deal with a form of evolution, called Evolutionary Algorithms that takes place in a computer. In evolutionary algorithms, selection operates on population of individuals, called chromosomes, and stored in a computer’s memory. They are evolved using mutation and crossover in much the same way that natural populations evolve. This form of computation is called Evolutionary Computation.

CISH-6960 Topics in Computer Science: New Horizons in Computer Architecture and Networks

A course that examines the current state of the art and future technological growth in computers (mainframes to microprocessors), memory, information display, and the growth of data/voice/video communication networks (wired and wireless). What are the current limits of technologies and what breakthroughs are needed to reach the next plateau. What technologies are on the horizon and what will it mean to current and future IT systems and applications. Successful completion of this course may lead to additional 3-credit projects.

CISH-6960 Topics in Computer Science: Data Warehouse Systems

Course presents a comprehensive overview of the concepts and facilities of data warehouse systems. Special attention will be given to current research issues as described in the scholarly journals. The course begins with an introduction the basic concepts and objectives of data warehouse systems. This is followed by an examination of the logical data structures and related design methodologies applicable within a data warehouse environment. Special attention is given to multidimensional data models based on the star and snowflake schemas. Thereafter, the course considers data warehouse performance. Special attention is given to recent enhancements in DBMS technology and techniques applicable to physical database design. Topics include: SQL extensions for OLAP, special indexes, table partitioning, view materialization, query optimization, and query re-write, and data warehouse benchmarks. Prerequisite: CSCI-4380.

CISH-6960 Developing Enterprise Applications

Discussion of the architecture, design, and implementation of modern multi-tiered applications. Students will develop components that can be installed in containers provided by application servers, and learn how to access container-managed services like persistence, security, and distributed transactions. Asynchronous messaging through the use of message queues and topics will also be discussed. Web services and service oriented architectures will be examined as an integration mechanism for leveraging existing systems. Common design patterns will also be evaluated for large-scale system development. The course will use the Java 2 Enterprise Edition as an example of available API’s and reference implementations. Prerequisite: CISH-6510 or equivalent Java experience.

CISH-6960H09 Research Methods

Course will review the major considerations and tasks involved in conducting scientific research, particularly in the area of computer science. It introduces the essential aspects of designing, supporting and conducting a research project. Those who successfully complete the course will be able to: produce a well-developed research proposal; select an appropriate methodology with which to conduct the research and defend the methodology of their selection; understand the various tasks required to carry out the research; find the resources needed to guide them through the research process and the documentation of its findings.

CISH-6961 Ethics and Computer Science in the Information Age

Computers and high-speed communication networks are transforming our world. Although these technologies have brought us many benefits, they have also raised many social and ethical concerns. A thoughtful response to information technology requires a basic understanding of its history, an awareness of current information-technology-related issues, and a familiarity with ethics. Besides an introduction to ethics, this course will discuss such
topics as: intellectual property (software patents vs. open source software), Digital Rights Management (file sharing of copyrighted material vs. fair use), privacy and civil liberties, risks and liabilities of computer-based systems.

**CISH-6970 Professional Project**
Active participation in a term-long project, under the supervision of a faculty advisor. A Professional Project often serves as a culminating experience for a Professional Master’s program but, with departmental or school approval, can be used to fulfill other program requirements. With approval, students may register for more than one Professional Project. Professional Projects must result in documentation established by each department or school but are not submitted to the Graduate School and are not archived in the library. Grades of A, B, C, or F are assigned by the faculty advisor at the end of the term. If not completed on time, a formal Incomplete grade may be assigned by the faculty advisor, listing the work remaining to be completed and the time limit for completing this work.

**CISH-6980 Master’s Project**
Details may be obtained from the Department of Engineering and Science. 3 to 6 credit hours.

**CISH-6990 Master’s Thesis**
Details may be obtained from the Department of Engineering and Science. 3 to 6 credit hours.

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**CSCI Computer Science**

**CSCI-6050 Computability and Complexity**
This course discusses modern concepts of computability and computational complexity theories. The Church-Turing thesis. Variations of Turing Machines; Algorithms; Decidability; the Halting Problem; Reducibility; The Recursion theorem; The Concept of Information; the Time and Space Complexity; Intractability; NP completeness and Cook’s theorem; Elements of Cryptography. Prerequisite: CISH-4010.

**CSCI-6210 Design and Analysis of Algorithms**
Theoretical and empirical analysis of algorithms; tools for on-line monitoring of the algorithm’s performance. Advanced algorithms for polynomial problems; randomized heuristic and approximate algorithms. Problems include computation in discrete mathematics, number theory, linear algebra, graph theory, numerical and symbolic computing. It is suggested that students take CSCI-6050 before taking this course.

**CSCI-6390 Database Mining**
This course will provide an introductory survey of the main topics in data mining and knowledge discovery in databases (KDD), including: classification, clustering, association rules, sequence mining, similarity search, deviation detection, and so on. Emphasis will be on the algorithmic and system issues in KDD, as well as on applications such as Web mining, multimedia mining, bioinformatics, geographical information systems, etc.

**CSCI-6460 Advanced Database Management Topics**
Continuation of CSCI-4380/CSCI-4380, presents a more theoretical approach to logical and physical database design. Algorithms for logical database design, primary and secondary indexing techniques, query processing and query optimization, and database security. Problems of interfacing a database system with an operating system, and some of the issues in implementing distributed database systems. Much of the material comes from recent research papers. A term paper may be required. Prerequisite: CSCI-4380 or CISH-4380.
CSCI-6480 Theory of Compiler Design
Use of language theory and automata theory in the design of compilers. Syntax-directed compilers, Lexical analysis, computer implementation and finite state machines. Syntax analysis, parsing versus restructuring. Top-down and bottom-up parsing algorithms. TD(k) and LR(k) grammars. The Younges algorithm. Syntax-directed transducers. Prerequisites: CISH-4010 and CISH-4210. Knowledge of PASCAL, C or LISP.

CSCI-6940 Readings in Computer Science
1 to 3 credit hours.

CSCI-6960 Topics in Computer and Information Sciences
Contact the Department of Engineering and Science for descriptions of recently offered special topic classes. 1 to 3 credit hours.

CSCI-6970 Professional Project
Active participation in a term-long project, under the supervision of a faculty advisor. A Professional Project often serves as a culminating experience for a Professional Master’s program but, with departmental or school approval, can be used to fulfill other program requirements. With approval, students may register for more than one Professional Project. Professional Projects must result in documentation established by each department or school but are not submitted to the Graduate School and are not archived in the library. Grades of A, B, C, or F are assigned by the faculty advisor at the end of the semester. If not completed on time, a formal Incomplete grade may be assigned by the faculty advisor, listing the work remaining to be completed and the time limit for completing this work. 3-4 credit hours

CSCI-6980 Master’s Project in Computer and Information Sciences
Details may be obtained from the Department of Engineering and Science. 3 to 6 credit hours.

CSCI-6990 Master’s Thesis in Computer and Information Sciences
Details may be obtained from the Department of Engineering and Science. 3 to 6 credit hours.

COMM Communications
COMM-6420 Foundations of Human-Computer Interaction Usability
In this course, we will consider methods for gathering users’ requirements for product functions and information, ways to test products and information for usability and suitability, and procedures for incorporating the results learned through testing. We will design and conduct usability tests on products, documents, and interfaces of interest.
Engineering

The course numbering system is alphanumeric beginning with a four-letter department name followed by a dash, a three-digit course number, and a zero. All courses are 3 credit hours unless otherwise indicated. Below are the four-letter subject codes for Engineering.

Acronyms
- DSES Decision Sciences and Engineering Systems
- ECSE Electrical, Computer, and Systems Engineering
- MANE Mechanical, Aeronautical, Nuclear, and Engineering Physics
- MTLLE Materials Science and Engineering

Suffix Numbers
- 4000-4990 Courses open for credit to both advanced undergraduate and graduate students
- 5000-5990 Courses offered only at Rensselaer Hartford Campus for graduate credit
- 6000-6990 Courses designed for graduate credit
- 7000-7990 Courses offered only at Rensselaer Hartford Campus for graduate credit

Courses at the Southeastern Connecticut Site are scheduled term by term in consultation with students.

DSES Decision Sciences and Engineering Systems

DSES-6070 Statistical Methods for Reliability Engineering
Statistical methods for the analysis of life-test, failure, or other durational data. Engineering applications are emphasized, but the methods are applicable to biometric, actuarial, and social science durational data. Included are basic reliability concepts and definitions; statistical life and failure distributions such as the exponential, gamma, Weibull, normal, lognormal, and extreme value; probability and hazard plotting techniques; maximum likelihood and other estimation methods. Prerequisite: DSES-6110.

DSES-6110 Introduction to Applied Statistics
A graduate course in basic statistics. It stresses common tasks such as summarizing large databases, making quick estimates, establishing relationships among variables, forecasting, and evaluating alternatives. Topics include probability; common, discrete, and continuous distributions; sampling; confidence intervals; hypothesis tests; contingency tables; statistical process control; and multiple regression analysis. It involves extensive use of computers for the analysis of data sets.

DSES-6230 Quality Control and Reliability
Topics include basic concepts of system and component reliability; statistical distributions such as the exponential, gamma, Weibull, and lognormal, important in the description of life and failure phenomena; and the graphical and quantitative analysis of complete and censored life-testing and failure data. Prerequisite: DSES-6110.

ECSE Electrical, Computer, and Systems Engineering

ECSE-4440 Control Systems Engineering
Application of linear feedback theory to the analysis of large-scale, integrated control systems. Derivation of complex mathematical models of physical systems. Synthesis thesis of appropriate control laws to provide stability of these plants. Simulation of complex control systems on digital computers. Prerequisite: ECSE-4960.

ECSE-4490 Fundamentals of Robotics
A survey of the fundamental issues necessary for the design, analysis, control and implementation of robotic systems. The mathematical description of robot manipulators in terms of kinematics and dynamics. Hardware components of a typical robot arm. Path following, control, and sensing. Examples of several currently available manipulators. Electrical and Mechanical Engineering majors at Rensselaer in Troy have taken this course. Prerequisite: ECSE-2410.

ECSE-4500 Probability for Engineering Applications
Axioms of probability, joint and conditional proba-
bility, random variables, probability density and distribution functions, functions of random variables, statistical average, and Markov chains. Applications to such areas as sampling, reliability, statistical physics, and information theory. Prerequisite: ECSE-2410.

ECSE-4670 Computer Communication Networks
Problems, solutions, and limitations associated with interconnecting computers by communication networks. The seven layer ISO reference model of open systems interconnection (OSI) serves as a framework. Topics include: physical layer standards, data link protocols, queuing models, routing, satellite communications, local area networks, multiplexing, coding, and network configurations. Prerequisite: CISH-4010 or equivalent.

ECSE-4770 Computer Hardware Design
Digital design methodologies including timing chain and counter based “hardwired” microprogram design, modules, and modular design. The course bridges LSI and MSI design treating microprocessors, and I/O interfacing. Bus protocol standards, interrupts, direct memory access, priority arbitration, asynchronous timing, and overlap or double buffering. Specific examples of design include controllers for disks, Cassettes, video systems, and stepping motors. Course includes a laboratory with access to LSI-11 and M6800 microprocessors. Prerequisite: ECSE-2610 or CISH-4030.

ESCE-4960 Fundamentals of Signals and Systems (Formerly ECSE-4960 Linear Systems Analysis)
This course delivers a comprehensive introduction to continuous- and discrete-time signals and systems. The extensive use of MATLAB in the course is intended to develop the fluency required for graduate level engineering courses. Material covered includes time- and frequency-domain representation of continuous- and discrete-time signals. Time-domain analysis of continuous and discrete-time systems. Laplace transform and its use in the analysis of continuous-time systems. Transfer function, poles and zeros. Continuous Fourier series and transform. Discrete Fourier transforms. Sampling and aliasing. Frequency domain analysis of continuous and discrete-time systems. Frequency response of the systems and filter concepts. Discrete-time system analysis using the z transform. Introduction to Digital filters.

ECSE-5010 Instrumentation and Measurement
Complete survey of current instrumentation technology. Mathematical development of ideal first and second order instruments. Expands to cover temperature, pressure, flow, and motion measurements. Basic measurement statistical and error analysis techniques. Prerequisite: ECSE-4960.

ECSE-6050 Advanced Electronic Circuits
Design and analysis of wideband amplifiers, differential amplifiers, and operational amplifiers; the characteristics of op-amps and their use as linear and non-linear elements, including compensation techniques; regulated power supplies. Prerequisite: ECSE-2050 or an undergraduate course in analog electronics.

ECSE-6400 Systems Analysis Techniques

ECSE-6410 Robotics and Automation Systems

ECSE-6420 Nonlinear Control Systems
ECSE-6440 Optimal Control Theory
Optimal control from the Calculus of Variations point of view. Continuous and discrete variational calculus, discrete and continuous minimum principle. Other topics include: singular control, minimum fuel problems, numerical methods for non-linear optimal control, solutions to Riccati equations, sensitivity in optimal control, and observers. Prerequisite: ECSE-6400.

ECSE-6460 Multivariable Control Systems
Advanced course in the synthesis and analysis of linear multivariable control systems. Topics include: output feedback, reduced-order modeling and control, disturbance accommodation and counteraction pole-zero relocation via feedback, decoupling, vector frequency domain methods, decentralized control, numerical methods for controller syntheses. Emphasizes contemporary approaches to feedback controller design and connections between time and frequency domain methods. Material from technical journals and textbooks. Computer design problems. Prerequisite: ECSE-6400 and ECSE-6440.

ECSE-6510 Introduction to Stochastic Signals and Systems
Deterministic signal representations and analysis, introduction to random processes and spectral analysis, correlation function and power spectral density of stationary processes, noise mechanisms, the Gaussian and Poisson processes. Markov processes, the analysis of linear and nonlinear systems with random inputs, stochastic signal representations, orthogonal expansions, the Karhunen-Loeve series, channel characterization, introduction to signal detection, linear mean-square filtering, the orthogonality principle, optimum Wiener and Kalman filtering, modulation theory, and systems analysis. Prerequisite: ECSE-4960, undergraduate course in Probability.

ECSE-6560 Digital Communications Engineering
Functional characterization of digital signals and transmission facilities, band-limited and duration-limited signals, modulation and demodulation techniques for digital signals, error probability, intersymbol interference and its effects, equalization and optimization of baseband binary and M-ary signalling systems, error control coding techniques, digital filtering current practices in modern design. Introduction to communication networks and switched systems, store-and-forward communication systems, broadband communication techniques, channel protocol, current developments in digital communication systems design and operation. Prerequisite: ECSE-6510.

ECSE-6590 Principles of Wireless Communications
Course presents a unified treatment of all wireless networks — from cellular, WLANs to 3G. Principles of air interface design are covered which include characterization of the wireless channel, transmission techniques for the PHY layer, and multiple access alternatives applied to wireless networks. Wireless network design fundamentals including channel allocation techniques, cellular concepts, architectural methods used for expansion of the network, mobility management, radio resources and power management. Implementation of cellular telephone and mobile data networks based on TDMA/GSM and CDMA technologies. Wideband local access technologies: EEE 802.11 WLAN standards. Discussion of developments towards IMT-2000 3G standards, including W-CDMA and CDMA2000. Prerequisites: ECSE-6510 or ECSE-6560 and ECSE-4670.

ECSE-6620 Digital Signal Processing
Comprehensive treatment of the theory, design, and implementation of digital signal processing structures. Sampling, quantization and reconstruction process. Design of digital filters in both time and frequency domains. Analysis of finite word length effects. Theory and applications of discrete Fourier transforms and the FFT algorithm. Applications from the communication, control, and radar signal processing areas. Prerequisite: ECSE-4960.

ECSE-6630 Digital Image and Video Processing
Theory of multidimensional signal processing and its application to digital image and video processing. The first half will cover signals and systems, Fourier transform, z-transform, discrete Fourier transform, FIR and IIR filters and their design. The emphasis will be on the unexpected and important differences from the one-dimensional case. The second half consists of applications in image and video signal processing, e.g., compression coding, noise reduction, motion estimation, deblurring, and restoration. Prerequisites: ECSE-6620.
ECSE-6660 Broadband and Multimedia Networking
Review of fundamental concepts and protocols for broadband and multimedia networking. The course addresses various traffic management techniques for providing QoS in ubiquitous TCP/IP networks. These include traffic classification and conditioning, packet scheduling, buffer management, and congestion control. Both differential services and integrated services models of the Internet are discussed. Multi Protocol Label Switching (MPLS) as the next generation QoS enabled network platform is then presented. The course provides detailed coverage of Internet multimedia protocol architecture that supports real-time delivery of multimedia information. Protocols for real-time interactive applications are considered in detail, including RTP, RTCP and SIP including SIP based implementation of Voice over IP telephony (VoIP). The course concludes with the study of ATM networks and technology options for broadband access and transport. Prerequisite: ECSE-4670, ECSE-6510.

ECSE-6770 Software Engineering I
Engineering approach to the development of large programming projects. Successive steps of requirements analysis, specification, design (e.g., top-down modularization), coding (e.g., structured programming), debugging, testing, maintenance, and thorough documentation, as illustrated by examples and papers from current literature. Team project is required. Prerequisites: CISH-4020.

ECSE-6780 Software Engineering II
(Continuation of ECSE-6770)
Current techniques in software engineering with topics selected from portability, security, public key cryptosystems, legal protection of software, reliable software, management of large projects, charging for computing resources, and source-to-source transformations for optimization. Prerequisite: ECSE-6770.

ECSE-6960 Topics in Electrical Engineering
ECSE-6960 Topics in Electrical Engineering: Applied Digital Signal Processing
DSP chip architecture. Implementing signal processing algorithms on a DSP chip; Fixed point implementations and DSP programming. DSP software development tools, code optimization. Take several algorithms from a high level implementation such as MATLAB to a low level implementation on a DSP chip using C programming. Students will complete a design project(s) on a commercially available DSP board. Prerequisites: ECSE-6620, knowledge of C language and MATLAB programming is required.

ECSE-6960 Topics in Electrical Engineering: Cryptography and Network Security
Principles of number theory and the practice of network security and cryptographic algorithms. Topics include: Primes, random numbers, modular arithmetic and discrete logarithms. Conventional or symmetric encryption (DES, IDEA, Blowfish, Twofish, Rijndael) and public key or asymmetric encryption (RSA, Diffie-Hellman), hash functions (MD5, SHA1, RIPEMD-160, HMAC), digital signatures, certificates and authentication protocols (X.509, DSS, Kerberos), electronic mail security (PGP, S/MIME), web security and protocols for secure electronic commerce (IPSec, SSL, TLS, SET). Prerequisite: ECSE-4670 or permission of the instructor.

ECSE-6960 Topics in Electrical Engineering: Embedded Digital Control Systems
Course focuses on the design of an embedded digital controller that can be relied upon in situations where the systems’ response to external events must be both timely and accurate in real time. The course will cover the following:
(i) Design of a digital controller and its implementation as a real time system using lab equipment (microcontrollers, Lap Pack) and embedded Linux or a commercial available Real Time Operating System (RTOS).
(ii) Development of digital controllers (using finite states) to control systems with discrete states or discrete operating modes. Modeling of systems will be done on examples from industries such as automotive, chemical, communication and robotics.

ECSE-6960 Topics in Electrical Engineering: Mechatronics
Mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computers, all inte-
The application of complex decision making to the operation of physical systems. Mechatronic systems depend on computer software for their unique functionality. This course studies mechatronics at a theoretical and practical level; balance between theory/analysis and hardware implementation is emphasized; emphasis is placed on physical understanding rather than on mathematical formalities. A case-study, problem-solving approach, with hardware demonstrations, either on video or in class, and hardware lab exercises, is used throughout the course. This covers mechatronic system design, modeling and analysis of dynamic physical systems, control sensors and actuators, analog and digital control electronics, continuous controller design and digital implementation, interfacing sensors and actuators to a microcomputer/microcontroller, and real-time programming for control. These are the fundamental areas of technology on which successful mechatronic designs are based. Throughout the coverage the focus is kept on the role of each of these areas in the overall design process and how these key areas are integrated into a successful mechatronic systems design. The course involves 12 weeks of lectures and 6 lab sessions.

Prerequisite: ECSE-4960 or equivalent.

ECSE-6960 Nuclear Power Engineering
Basic plant cycles of PWR and BWR systems, overview of basic radiation and fission process, neutron life cycle and six-factor formula, reactivity and startup rate, reactivity coefficients, fuel and poison loading, delayed neutrons, reactor startup and shutdown, decay heat, overview of heat transfer and fluid flow including natural circulation, reactivity control, reactor protection, print reading (Piping and Instrumentation Diagrams, Electrical Diagrams, Control Wiring Diagrams, and Logic Diagrams), Electrical Distribution and emergency responses (plant trip, loss of offsite power, and safety injection actuation), motor controllers, specified electrical requirements (10CFR, submitted plant design, Technical Specifications, Abnormal and Emergency Operating Procedures), process instrumentation, nuclear instrumentation, Appendix R (Fire Safety and Safe Shutdown) electrical requirements. Prerequisite: ECSE-4960 or equivalent.

ECSE-6980 Master’s Project in Electrical Engineering
Details may be obtained from the Department of Engineering and Science. 3 to 6 credit hours

ECSE-6990 Master’s Thesis in Electrical Engineering
Details may be obtained from the Department of Engineering and Science. 6 credit hours

ECSE-7010 Optical Fiber Communications
Review of the state-of-the-art in optical fibers, light sources, and photodetectors. Topics include: propagation, coupling, dispersion, loss and cut off characteristics of guided wave models in optical fibers, structural and operating parameters of various types of heterostructure lasers and light-emitting diodes and quantum efficiency, response time and noise characteristics of silicon PAD and PIN diodes. Digital and analog transmission over optical fibers. DWDM systems. Optical amplifiers. Optical networks. Prerequisite: ECSE-4500 or equivalent. ECSE-6560 desirable.

ECSE-7100 Real-Time Programming and Applications
Hardware and software characteristics of real-time systems for analysis and control. Real-time programming techniques, standard interfaces and busses, sensors, data smoothing, digital filtering, and digital control. Prerequisite: CISH-4030 (or ECSE-4730) and CSCI-4210.

MANE Mechanical, Aeronautical, Nuclear, and Engineering Physics
MANE-4240 Introduction to Finite Elements
Introductory course in the Finite Element Method (FEM) beginning with the "direct method" for discrete systems such as springs, trusses, elastic frames, and pipe networks. FEM is then applied to continua, considering one dimensional problems in fluid mechanics, heat transfer, and elasticity using variational and weighted residual methods. Algorithms for the construction and solution of the governing equations.

MANE-4610 Vibrations
Free and forced linear vibrations of damped and undamped mechanical and electrical systems of n degrees of freedom. Continuous system vibration.

MAME-4650 Fracture Mechanics

MAME-4800 Boundary Layers and Heat Transfer
Navier-Stokes equations and boundary layer approximations. Exact solutions and integral methods for incompressible boundary layers. Transition; turbulence. Convective heat transfer in laminar and turbulent flow. Special problems at high temperature.

MAME-5000 Advanced Engineering Mathematics I
A presentation of mathematical methods useful in engineering practice. The course covers analytical and numerical techniques used in linear algebra, the numerical solution of nonlinear equations, the foundations of vector and tensor algebra and an introduction to vector operators. Also covered are methods of polynomial and trigonometric interpolation and approximation, numerical solution methods for initial and boundary value problems for ordinary differential equations and an overview of the fundamentals of probability and statistics including random variables, density and distribution functions and hypothesis testing. Symbolic manipulation and scientific computation software used extensively. Emphasis on reliable computing is made throughout.

MAME-5060 Introduction to Compressible Flow

MAME-5080 Turbomachinery
Representation of performance of turbomachines; mechanism of energy transfer; factors limiting design and performance including surge, choking, and cavitation; two- and three-dimensional flow phenomena; performance analysis including multistage effects and off-design performance.

MAME-5100 Mechanical Engineering Foundations I
A presentation of the principles of macroscopic transport useful in the analysis of mechanical engineering systems. The course covers the formulation energy mass and momentum balances in continua; the development of mathematical models of heat conduction and mass diffusion in solids and of flow in ideal and Newtonian fluids. models are illustrated using examples from mechanical engineering. Particular attention throughout is devoted to the development of the ability to create realistic and reliable models.

MAME-6180 Mechanics of Composite Materials

MAME-6200 Plates and Shells

MAME-6410 Celestial Mechanics
Introduction to celestial mechanics, orbits, and perturbations, exterior ballistics, powered flight trajectories, space flight trajectories.

MAME-6420 Multibody Dynamics
Analytical and numerical analysis of dynamic behavior of multibody mechanical systems. Emphasis on understanding all aspects of modeling and analysis process associated with real (spacecraft, automotive, biomechanical, etc.) systems. Review of traditional dynamic analysis methods (Newtonian-Euler, Lagrange, etc.), presentation of more efficient, powerful, recently developed methods (including Kane’s method). Comparison of the different formulations and their applicability to computer simulation. Treatment of constraints, extraction of data from equations of motion, and computational issues.

MAME-6490 Plasticity
Stress invariants. Polyaxial stress-strain relation for strain-hardening materials. Ideal plasticity, various

MANE-6530 Turbulence
Navier-Stokes and energy equations, exact solution, weighted residuals methods, linearized viscous flow, inner and outer solutions, boundary layer theory, existence and uniqueness, higher order approximations, transition, mathematical models of turbulent flow, applications. Prerequisite: MANE-4800 or equivalent.

MANE-6540 Advanced Thermodynamics

MANE-6550 Theory of Compressible Flow
General equations of compressible flow. Specialization to inviscid flows in two space dimensions. Linearized solutions in subsonic and supersonic flow. Characteristic equations for supersonic flow with applications in external and internal flow. One dimensional non-steady compressible flow.

MANE-6630 Conduction Heat Transfer
Analytical, finite difference and finite element solutions of steady and transient heat conduction problems. Illustrated with applications from engineering practice.

MANE-6640 Radiation Heat Transfer
Introduction to radiation heat transfer in diathermanous media and participating media. Selected applications from spacecraft design, furnace design, meteorology, temperature measurement, environmental control.

MANE-6650 Convective Heat Transfer
Fundamental study of convection heat transfer in laminar and turbulent, internal and external flows. Unsteady flows, combined heat and mass transfer, conjugated unsteady heat transfer and buoyancy induced convection. Selected applications from aeronautics and heat exchanger design. Prerequisite: MANE-4800 or equivalent.

MANE-6720 Computational Fluid Dynamics
Course focuses on computational approaches to solve the Navier-Stokes equations. Course assumes knowledge of numerical methods and therefore directly attacks the obstacles to applying these methods to the Navier-Stokes equations. Issues concerning implementation of finite difference methods (FDM), finite volume methods (FVM) and finite element methods (FEM) will be discussed. These issues include: the discrete formulation, non-linear equation iterator (steady)/marcher(time-accurate), linear equation formation, boundary condition prescription and linear equation solution. Prerequisite: MANE-6660 or equivalent.

MANE-6830 Combustion
Review of fundamentals of thermodynamics, chemical kinetics, fluid mechanics, and modern diagnostics. Discussion of flame propagation, thermal and chain explosions, stirred reactors, detonations, droplet combustion, and turbulent jet flames. Introduction to computational tools for complex equilibrium and kinetic calculations. Applications to problems such as pollutant formation. Prerequisite: permission of the instructor.

MANE-6840 Introduction to Multiphase Flow and Heat Transfer I
This course is intended to give students a state-of-the-art understanding about single and multicomponent boiling and condensation heat transfer phenomena. Applications include the analysis of nuclear reactors, oil wells, and chemical process equipment. Student satisfactorily completing this course are expected to thoroughly understand the current thermal-hydraulics literature on multiphase heat and mass transfer and be able to conduct independent research in this field. Prerequisite: A working knowledge of fluid mechanics and heat transfer.

MANE-6960 Topics in Mechanical Engineering

MANE-6960 Advanced Fracture Mechanics
This course covers Linear and Non-linear Fracture Mechanics. The following are the course topics: Tensor Analysis, Stress, Strain, Equilibrium, Compatibility, Constitutive equations. Theory of elasticity solutions for a cracked body, Linear Elastic Fracture Mechanics (LEFM), Energetics of cracked bodies, The J integral, Plastic zones, Fracture Toughness and R curve analysis, Elastic-Plastic Fracture Mechanics (EPRM), Dugdale-Barenblatt and Bilby-Cottrell-Swinden (BCS) solutions using yield strips, Hult-McClintock solutions, Hutchinson-

MANE-6960 Topics in Mechanical Engineering: Mechatronics
Mechatronics, as an engineering discipline, is the synergistic combination of mechanical engineering, electronics, control engineering, and computers, all integrated through the design process. It involves the application of complex decision making to the operation of physical systems. Mechatronic systems depend on computer software for their unique functionality. This course studies mechatronics at a theoretical and practical level; balance between theory/analysis and hardware implementation is emphasized; emphasis is placed on physical understanding rather than on mathematical formalities. A case-study, problem-solving approach, with hardware demonstrations, either on video or in class, and hardware lab exercises, is used throughout the course. This covers mechatronic system design, modeling and analysis of dynamic physical systems, control sensors and actuators, analog and digital control electronics, continuous controller design and digital implementation, interfacing sensors and actuators to a microcomputer/microcontroller, and real-time programming for control. These are the fundamental areas of technology on which successful mechatronic designs are based. Throughout the coverage the focus is kept on the role of each of these areas in the overall design process and how these key areas are integrated into a successful mechatronic systems design. The course involves 12 weeks of lectures and 6 lab sessions. Students will need a laptop computer for lab session. Students who have previously taken MANE-4490, 4250, or Sensors and Actuators are not eligible to take this course for credit.

MANE-6960 Advanced Topics in Finite Element Analysis
The basic concepts of the finite element method are developed. Direct, Galerkin and variational approaches to element formulations are emphasized. Although the procedures presented are general, the majority of examples and special topics are from solid mechanics including two and three dimensional elasticity, plate banding and shells. In addition to the fundamentals of finite element, the student will be exposed to the analysis of example problems.

MANE-6960 Friction and Wear of Materials
A study of Tribology with emphasis on friction and wear phenomena in materials. Examination of the physical and chemical characteristics of real material surfaces and the interactions between neighboring solid surfaces in relative motion. Contact phenomena, lubrication, wear mechanisms and design against wear.

MANE-6960 Topics in Mechanical Engineering: Modeling and Analysis of Machining Systems
A hands-on exposure to modeling, analysis, and simulation methodologies applicable to the investigation of the efficiency of metal machining systems. Topics covered include the physical principles of metal chip forming processes, thermo mechanical finite element analysis of metal cutting processes, materials science modeling, machine tool path simulation modeling, machine tool vibration dynamics, machine shop scheduling and sequencing, discrete event simulation, and economic modeling of machining systems and processes. Students working in teams and individually will develop expertise in selected modeling techniques by carrying out term-long research projects.

MANE-6980 Master’s Project in Mechanical Engineering
Details may be obtained from the Department of Engineering and Science. 3-6 credits

MANE-6990 Master’s Thesis in Mechanical Engineering
Details may be obtained from the Department of Engineering and Science. 6 credits

MANE-7000 Advanced Engineering Mathematics II
A continuation of the advanced presentation of mathematical methods useful in engineering practice. The course covers the Frobenius method for the solution of boundary value problems; the representation of arbitrary functions by characteristic functions; calculus of functions of more than one variable including the study of extreme; overview of calculus of variations; principles of vector and tensor analysis; analytical and numerical techniques for the solution of initial and boundary value problems in partial differential equations. Symbolic manipu-
lation and scientific computation software used extensively. Emphasis on reliable computing is made throughout.

**MANE-7100 Mechanical Engineering Foundations II**
A presentation of the most common physical and mathematical modes used in the description of the mechanical behavior of materials. The course covers the microstructural and thermodynamic foundations of constitutive material behavior of interest in mechanical engineering applications; overview of elasticity and plasticity and their relationship to microstructural features; principles of rheology; viscoelasticity and creep; failure mechanisms including fracture crack propagation and fatigue crack growth. Particular attention throughout is given to the development of the ability to utilize the mathematical models to assess the reliability and life of mechanical engineering components at the design state.

**MTLE Materials Science and Engineering**

**MTLE-4260 High-Temperature Alloys**
Basic characteristics of nickel, cobalt, and iron-base superalloys, and refractory metals such as columbium, tantalum, tungsten, and molybdenum for gas turbine, steam turbine, and space power applications. Characterization of systems, relationship of mechanical properties to microstructure, processing by casting and working, joining and heat treatment, oxidation and protection of alloys, applications and future trends, invited lectures.

**MTLE-6960 Topics in Materials Engineering: Creep and Fatigue of Metals**
A presentation of mechanical behavior and metallurgical phenomena encountered at high and intermediate temperatures and also under cyclic loading conditions. The course discusses measurement and testing of creep and fatigue, description of micro structural processes, data presentation and scatter, design aspects, instabilities and the parameteric representation of creep-rupture data.

**MTLE-6960 Topics in Materials Engineering: Intermediate Temperature Degradation and Protection**
A course about protection against degradation of materials exposed to many industrial environments including gas turbine engines in the intermediate temperature range. It builds on High Temperature Coatings Engineering, previously offered. Tribological phenomena such as Friction, Wear, Erosion, and Impact will be addressed in practical as well as theoretical terms. Interaction of the tribological processes with foreign materials deposition, and resulting corrosion and oxidation will also, be highlighted. Protection against degradation by the above phenomena will be covered. These will include surface treatments, lubrication, and wear and erosion coatings.

**MTLE-6960 Topics in Materials Engineering: Light Metal Alloys**
Concentrates on aluminum, magnesium, and titanium with fully half of the course devoted to titanium. Production of alloys, fabrication, properties, and microstructure, corrosion resistance, and more are covered. Emphasis on the use of alloys of all three light metals in engineering applications. Textbooks available on titanium and on light metal alloys in general.

**MTLE-696x High-Temperature Coatings Engineering**
Background and working knowledge about the oxidation and hot corrosion behavior of high-temperature materials (primarily nickel-cobalt-and iron-based alloys and the protective coatings for application from about 1000°F to 2200°F. The course includes detailed discussion of types of coating, processing methods, characterization, properties, and evaluation techniques. Upon completion of this course a student will have a familiarity with and be able to make informed judgements on the selection of coatings for high-temperature service.

**MTLE-7061 Casting and Joining Processes**
Management and Technology

The course numbering system is alphanumeric beginning with a four-letter department name followed by a dash, a three-digit course number, and a zero. All courses are 3 credit hours unless otherwise indicated. Below is the four-letter subject code for Management and Technology.

**Acronym**
MGMT Management

**Suffix Numbers**
- 6000-6990  Courses designed for advanced graduate credit
- 7000-7990  Graduate-level courses offered in Hartford and at the Southeastern Connecticut Site

**CAPSTONE Courses**
Asterisk (*) denotes courses that satisfy the CAPSTONE requirement for the M.S. in Management programs.

**Schedule of Course Offerings**

Students should contact their faculty advisor for guidance in creating the Plan of Study. Plan of Study forms can be found at: [www.ewp.rpi.edu/registrar/](http://www.ewp.rpi.edu/registrar/).

**MGMT-6020 Financial Management I** *(Formerly MGMT-6310)*
The purpose of this course is to develop a working understanding of the major investment and financial decisions of the firm. Emphasis will be placed upon identifying and solving the problems commonly faced by financial managers. The course presents the needed theory and develops financial problem solving skills through individualized problem solving, structured case analysis, and industry and company analysis using Internet sources.

**MGMT-6030 Financial Management II**
This course, built on the Economic & Financial Analysis I, provides a conceptual framework whereby accounting, corporate finance and investment decisions can be viewed and understood in a unified context of risk and return as it is applicable to all types of businesses and organizations. The course prepares students for future specialized courses in advanced accounting, corporate finance, financial institutions and markets, investment theory, and entrepreneurial finance. The contemporary issues covered in this course include risk and diversification; asset pricing models; capital structure and financing alternatives; dividend and stock repurchases; corporate governance; mergers, acquisitions and takeovers; financial distress and reorganization; and different international financial.

**MGMT-6040 Creating and Managing an Enterprise I** *(Formerly MGMT-6710)*
This course is designed to help students understand the critical challenges and tasks associated with developing, growing, and managing a successful business. Students learn how to lead and manage an enterprise as well as gain a fundamental understanding of each functional department required to operate a business and how each fits into the greater scope of the business organization.

**MGMT-6050 Creating and Managing an Enterprise II**
This course builds upon the principles learned in Creating and Managing the Enterprise I within the context of start-ups, internal new ventures, strategic alliances, joint ventures, and other organizational forms. Success in creating and managing any business is contingent upon careful analysis and management of five key segments—people, product, market, finances, and competition. Students have an opportunity to put into practice the latest man-
COURSE DESCRIPTIONS

Management theory while balancing the resources and constraints of these five segments.

MGMT-6060 Business Implications of Emerging Technologies I
(Formerly MGMT-6610-Global Strategic Management of Technological Innovation)
This course investigates the business dimensions of major technological advances, highlighting how industry structures and organization, the dynamics of competition, patterns of innovation, operational decisions, and financial investment are all influenced by various types of technical breakthrough. Students also get to explore the interplay between emerging technology development and commercialization. The challenges associated with intellectual property protection and utilization, as well as the socio-economic and ethical dimensions of new technology adoption, are explored. Each year, a different set of key technologies will be examined and analyzed.

MGMT-6080 Networks, Innovation and Value Creation I
This course considers the evolving new models of value creation and business growth being introduced across different industries and examines such critical issues as product and process technology strategy, operational innovation, IT strategies and infrastructures, networks and organization, and finance. Utilizing a series of case studies from across a range of industry networks, students will have a chance to learn how companies can participate in such networks and what unique business resources and capabilities they can employ to enhance their probability of commercial success.

MGMT-6100 Statistics and Operations Management I
An introduction to deterministic and probabilistic methods for business applications and particularly quantitative approaches applied to managerial problem solving and decision-making. Topics include basic descriptive and inferential statistics, probability distributions, hypothesis testing, analysis of variance and regression analysis. Extensive use of computers allows students to explore the various quantitative techniques for analyzing, interpreting and communicating a wide range of business-related quantitative data and information.

MGMT-6110 Statistics and Operations Management II
Continues the study of collection, analysis, and use of information in a technologically advanced setting. This course shifts focus from statistical methods to other problem solving approaches including regression analysis, linear programming, network models, queuing systems, and simulation. The emphasis is on integration of analysis techniques to address the management issues at hand, with application drawn from production, finance, project management, and system design. Prerequisite: MGMT-6100.

MGMT-6140 Information Systems for Management
Analyzes the use of information and communications technology to improve performance and to achieve organizational goals. Examines information systems in sales, marketing, finance, and operations. Provides a framework for understanding and evaluating IS contributions to product services and managerial effectiveness. Focuses upon implementation of information technology as a strategic weapon for productivity and competitive advantage. Lectures, case discussion, projects, and technical supplements.

MGMT-6170 Advanced Systems Analysis and Design
An advanced course in systems analysis and design that presents conceptual material about both traditional approaches to systems development such as process-oriented and data-oriented methodologies and, evolving approaches such as object-oriented development methods. Key stages of the systems development life cycle including planning, analysis and design are the focus of this course. Models and procedures for understanding and modeling an organization’s existing and planned information systems are presented. Computer-Aided Software Engineering tools are used to provide hands-on experience in designing information systems. A case-based approach is used to provide students an opportunity to apply the analytical and design techniques covered in the course. In addition, students are expected to do a real-life systems development project. The course also focuses on the issues and challenges in managing systems development. Prerequisite: MGMT-6140.
MGMT-6180 Strategic Information Systems Management
Information technology (IT) is a strategic asset that is being used to mold competitive strategies and change organizational processes. As IT and its uses become more complex, developing strategies and systems to deliver the technology has become more difficult. The net result is a growing need for guidance on the issues, strategies, and tactics for managing the use of information technology. This course is designed to partially fulfill this need and to enable students to integrate concepts and theories learned in previous IT courses. Prerequisite: MGMT-6140

MGMT-6290 Macroeconomics and International Environments of Business
This course identifies major forces acting on the enterprise from the macroeconomic and international environment. Key factors include national income and output, interest rates, economic growth and business cycles, international trade and balance of payment, exchange rates, monetary and fiscal policy. Factors are analyzed in terms of their impact on the economic and technological decisions of the enterprise.

MGMT-6320 Investment Analysis I
Introduction to investment instruments and modern methods of pricing them. Basic components of viable investment programs are outlined. Topics include expected utility theory and risk aversion, modern portfolio theory, equilibrium in capital markets (CAPM, APT), index models, futures and options, theory of active portfolio management. Prerequisite: MGMT-6020.

MGMT-6330 Investment Analysis II
Advanced study in investment analysis, decision making and practice. Emphasis on bond market analysis and bond portfolio management, including asset-backed securities, high-yield bonds, venture capital, and derivative securities. Topics include bond pricing, the term structure and risk structure of interest rates, duration concepts and immunization strategies, analysis of embedded options in fixed income securities. Application of strategies to real data set. Prerequisite: MGMT-6320 or permission of instructor.

MGMT-6340 Financial Markets and Institutions
Focus on U.S. and international banking and financial markets, new instruments and techniques for financing, risk management and its application to financial institutions. Overview of U.S. financial systems, including the Federal Reserve System, bank supervision, and monetary policy - and its counterparts in other countries. Emphasis on impact of technology on securities markets and banks. Discussion of current issues in securities markets and banking, such as securitization, financial derivatives, junk bonds, bank failures, mergers and acquisitions, and international banking. Prerequisite: MGMT-6020.

MGMT-6380 Advanced Corporate Finance
The overall objective of this course is to study advanced corporate finance issues and test empirically the stock market reaction to financing decisions and the issuance of securities. Corporate finance topics include shareholder value and economic value added concepts, as well as corporate governance issues. Financing decisions include venture capital and initial public offerings, seasoned equity offerings, stock splits, corporate bonds and bank loans, stock listings on foreign exchanges. Other topics are mergers and acquisitions, pension fund management, financial analysis and planning. Real stock prices and case studies are used to apply the theoretical concepts. Prerequisite: MGMT-6020.

MGMT-6390 International Operations (Formerly MGMT-6350)
This course provides a foundation in the facts and ideas underlying the globalization of production and delivery of goods and services. Topics include: designing global supply chains, managing risks of cross border business relationships, international logistics, establishing world class manufacturing service and R&D in developing countries, integrating superior operating practices and technologies from across the world in diverse national environments, and political and societal issues associated with global operations.

MGMT-6400 Financial Econometrics Modeling
This course addresses financial modeling as an empirical activity. Several key issues and assumptions of finance are addressed through empirical
modeling. Topics may include asset pricing, event studies, exchange rate movements, term structure of interest rates, and international linkages among financial markets. Computers are used extensively both in and out of class.

**MGMT-6450 Manufacturing Systems Management**
An overview of how product and service requirements are translated into manufacturing facilities, procedures, and organizations. The control systems considered include demand forecasting, inventory planning, production scheduling, quality control, MRP, and project control. In addition, a management perspective is used to examine decisions having a long-term manufacturing impact: capacity planning, location, and distribution, manufacturing processes, factory layout and factory focus. The course concludes with an introduction to manufacturing policy.

**MGMT-6470 Management of Quality, Processes, and Reliability**
Definitions; corporate, economic, and government environments; international considerations; business processes and physical processes in manufacturing and services; control and enhancement of processes; organizing for and effecting change; experimental design for design and change; information systems; Deming approach; product and processes development; capital investment; empowerment of workers; people make it happen. Prerequisite: MGMT-6100 or permission of instructor.

**MGMT-6480 Service Operations Management**
Discusses the role of services in an economy, managing services for competitive advantage, structuring the service enterprise, managing service operations, service productivity, quality, and growth.

**MGMT-6490 Competitive Advantage and Operations Strategy**
Includes topics such as manufacturing as a competitive weapon; management of quality; manufacturing technology implementation; strategic impact of advanced manufacturing technologies; and manufacturing's role in new product development. Prerequisite: MGMT-6450 or permission of instructor.

**MGMT-6540 Marketing Communication and Promotion Strategy**
Advanced study of the promotion management process including market situation analysis, media selection, spending plans, copy strategy, and advertising research methods. The focus is on integrating promotion strategies with buyer needs, product conceptualization, distribution strategies, and new communication technologies. Prerequisite: MGMT-7100 or permission of instructor.

**MGMT-6550 Marketing Research**
Marketing strategy decisions are developed in the framework of many case studies. Marketing research techniques, including questionnaire development and data analysis, are introduced and utilized in a team project. Prerequisites: MGMT-6100 and MGMT-7100.

**MGMT-6580 Marketing High-Tech Products**
This course deals with the peculiarities of marketing products and services in high-tech environments. High-tech environments are characterized by high dynamism, high uncertainty, and compressed time cycles. The course consists of case studies, computer simulations, and a team project. Prerequisites: permission of instructor.

**MGMT-6600 Research and Development Management**
The course deals with the responsibilities of, and operating problems faced by managers of research and development. The following areas are included: technology forecasting, technology planning, selection and evaluation of R&D projects, resource allocation, planning and control, measuring results of R&D. Particular attention is given to creative problem solving, motivating and managing creative individuals, barriers to innovation, and organization alternatives for R&D, including matrix and project organizations. Prerequisite: MGMT-6190.

**MGMT-6610 Global Strategic Management of Technological Innovation**
Helps develop an understanding of and the method for managing technology as a strategic resource of the firm. In doing so, an understanding of the process, roles, and rewards of technological innovation are developed. Integrating the strategic rela-
tionship of technology with strategic planning, marketing, finance, engineering, and manufacturing are covered. Governmental, societal, and international issues are briefly covered. The course uses a variety of cases, readings, reports, and lectures.

MGMT-6620 Principles of Technological Entrepreneurship
An introductory graduate course in initiating new technology-based business ventures and developing them into self-sustaining and profitable enterprises. Examines the process whereby a person decides to become an entrepreneur, screens opportunities, selects an appropriate product/market target, and obtains the necessary resources. Provides the theoretical and practical knowledge for the preparation of formal business plans. Students enrolled in the full-time MBA program cannot use this course on the Plan of Study. This course is intended for students enrolled in the part-time MBA, M.S. in MGT or those seeking degrees in other schools at Rensselaer.

MGMT-6630 Starting Up A New Venture
An understanding of the critical issues related to starting up a new business is gained through team-based experiential learning. Small teams of students develop a comprehensive business plan that can be used to raise money for a new or relatively new venture. The experiential learning process is enhanced through team meetings with faculty and/or course advisers and through oral presentations to the entire class. Prerequisite: MGMT-6620.

MGMT-6660 Strategy, Technology, and Entrepreneurship
Part two of the two-course sequence that begins with MGMT-6650. This course is about strategy implementation and fundamental concepts in implementing strategy both at the corporate level and the business unit level. Prerequisite: MGMT-6650. FOR M.B.A. STUDENTS ONLY.

MGMT-6680 Strategy, Technology, and Global Competitive Advantage *
This course emphasizes the linkage between technology, strategy, and achieving global competitive advantage. Develops the concept and practical tools of strategy, strategic planning, and implementation of both at the business unit and corporate levels. The strategies of technology-intensive international companies are compared. FOR M.S. STUDENTS ONLY.

MGMT-6730 Technological Change and International Competitiveness
Analysis of the differences among technical systems and interactions with industrial growth is undertaken with regard to nation states, industrial sectors, and companies. To develop tools of analysis regarding technological change, industrial policy, and corporate performance. The impact of technological change on industrial growth and competitiveness is viewed from three perspectives: the general manager, the technical professional, and the public official. Prerequisite: MGMT-6390.

MGMT-6750 Legal Aspects of E-Business and Information Technology
Legal, regulatory, and public issues related to E-Commerce/E-Business, the Internet, and Information Technology are explored through an analytic, critical thinking approach. Topics include: e-contracts, digital signatures, B2B and B2C agreements; ownership, protection, and exploitation of intellectual capital including patents, trademarks, copyrights, and trade secrets; regulatory issues; ISP and Web site liability including defamation; copyright infringement, securities regulation, and criminal acts; policy issues including privacy, security and encryption, and obscene materials. Global E-Commerce will be explored.

MGMT-6810 Management of Technical Projects
Enables the technically-oriented manager to select projects of value to the organization, develop a project plan including staffing, perform a risk analysis on the project, and successfully execute the project. Students, working alone or in teams, practice the project management process by planning a current project in the area of new product development, process reengineering, information systems or any other project with business implementation.

MGMT-6940 Independent Study
1 to 6 credit hours.

MGMT-6960 Topics in Management
3 credit hours
MGMT-6960 International Finance I
Examines the financial opportunities and risks involved in the management of a multinational firm. Tool and techniques for measuring and managing currency risk including interest rate and currency swaps, futures, forwards, and option are explored. The international currency markets, including the history of international financial systems (Gold Standard, Bretton Woods, Dollarization, European Monetary System, etc.) are examined. The international banking, bond and equity markets and their role in modern portfolio management is assessed.

MGMT-6960 Lean Strategies for Manufacturing and Services
Lean management uses principles and techniques developed at Toyota to improve performance through the elimination all forms of waste, with the ultimate goal to create additional value for customers. The fundamental concepts of Lean can be applied to manufacturing as well as services operations. Internal business processes, such as product development, R&D, information technology, tooling & instrumentation, and training can also benefit, reducing life cycle costs and improving market responsiveness.

MGMT-6960 Taxation for Business and Investment Planning
An introduction to the tax environment and how taxes affect individual and business decision-making. Topics include examining the economic and social policy implications underlying the tax law, the relationship between tax and financial accounting theory, taxes and technology, the tax consequences of various personal, investment and business activities including the legal factors associated with choice of business entity. The tax compliance and audit process, and effective dispute resolution with the various government taxing authorities will also be addressed. This course will enable students to identify tax issues and opportunities, to become conversant with tax concepts and terminology, to conduct effective tax research, and develop tax planning strategies designed to maximize the after-tax cash flow from a variety of business transactions.

MGMT-7xxx Seminar in Management
Advanced study of selected topics in a particular field. May be taken more than once if subjects are sufficiently different. May be designed as fulfilling the CAPSTONE requirement. Always has one or more prerequisites.

MGMT-7003 Sustainable Business Development
The course provides a strategic-level perspective on integration of sustainable development, enterprise management, and innovation management and their contributions for creating competitive advantages and exceeding the needs of the global business environment. Sustainable development is a broad management construct that focuses on how an enterprise improves the social, economic, environmental, and business impacts and consequences of its technologies, products processes, and operations. Sustainable development constructs use life-cycle thinking, technological innovation, and product development. Sustainable development requires activity, knowledge, experience, and learning for solving existing problems and managing new challenges. The course focuses on global corporations that are using sustainable development as an integration construct for achieving success in the 21st century. Sustainable development means leading change, dealing with the environmental consequences of products, processes and operations from cradle to grave, and improving every facet of the enterprise.

MGMT-7030 Strategy, Technology, and Competition I (Formerly MGMT-6650 - Technology and Competitive Advantage)
This course covers the fundamentals of business and corporate strategy, integrating these concepts into an environment of technological change, competition, and entrepreneurship. The course includes the following areas of emphasis: concepts of strategy, industry environment, resources and capabilities of the firm, organization and systems of the firm, the dynamics of competitive advantage, strategic alternative analysis, and strategies in different contexts. The course uses business cases and a project to enrich the theoretical concepts.

MGMT-7050 Developing Innovative New Products and Services I (Formerly MGMT-6560)
This course immerses students in the practices and activities that lead to the creation of innovative new
products and services. Through a team-based learning experience, students generate an idea for a new product or service and follow the development process from conception through planning for commercialization. Through lectures, cases, and practical exercises, students learn how to overcome hurdles inherent in new product and service development. Students apply this knowledge in all phases of product development, including concept testing, product design, production planning, and market strategy.

MGMT-7060 Developing Innovative New Products and Services II
This course immerses students in the practices and activities that lead to the creation of innovative new products and services. Through a team-based learning experience, students generate an idea for a new product or service and follow the development process from conception through planning for commercialization. Through lectures, cases, and practical exercises, students learn how to overcome hurdles inherent in new product and service development. Students apply this knowledge in all phases of product development, including concept testing, product design, production planning, and market strategy. The project undertaken in this course provides student teams with an opportunity to create a new venture that may then be carried forward utilizing Rensselaer’s technological resources such as the Incubator Program and Rensselaer’s Technology Park.

MGMT-7100 Marketing and Product Management
Examines tasks required to manage products and services in U.S. and global marketplaces to maximize revenue and profits. These include customer acquisition and retention, pricing, product redesign or repositioning, communications management, analysis and prediction of competitor responses, and distribution logistics. Each class session provides students with one or more applications of quantitative methods and/or information technologies to marketing.

MGMT-7120 International Marketing
Theoretical and practical overview of International Marketing; discussion and analysis of International Marketing issues, problems and solutions using text, case studies and examples. This course is designed for professionals involved in corporate strategic planning, export sales, marketing and international management.

MGMT-7210 Acquisition and Venture Analysis
Recent years have seen an accelerated commitment to growth and asset reallocation through acquisitions and corporate restructurings. Indeed the accounting profession is taking a fresh look at how these deals are accounted for in the firms’ financial statements. The rate of deals is exponential and covers the full spectrum from established industries to high technology, computer, biotechnology, and internet firms. Topics covered in this course are reasons for acquisitions, valuing, and structuring a transaction. Determining the currency to be used, achieving strategic and organizational alignment, takeover defenses, and post-deal integration. Students study a recent transaction of their own choosing and prepare an oral and written report focusing on those aspects that made the deal successful. Prerequisite: MGMT-6020 or permission of instructor.

MGMT-7500 Managing Supply Networks
An overview of the set of activities related to flow of information, goods, and services from raw material through production to the end-use customer. Course will focus on the planning, analysis, decision making, and measuring methods used to manage supply networks in order to improve customer satisfaction. A comparison of different supply chain strategies will be presented with an emphasis on the application of business strategies that minimize waste.

MGMT-7540 Leadership and Organizational Improvement
An advanced course in leadership that closely examines the relationship between operating practices and behaviors. Comparisons are made between leadership behaviors, business metrics, and decisions that are results-focused versus those that are processes-focused and designed to eliminate waste. The impact of the different types of waste on leadership effectiveness, credibility, organizational capability building, stakeholder buy-in, and financial results are critically examined. The framework for this course is the application of Lean principles and practices to a wider range of individual and enter-
prise-level challenges. Prerequisites: MGMT-6040 and MGMT-6190. Recommend MGMT-6450.

MGMT-7700 International Negotiations
Examines international negotiation techniques, practice and styles. Students are given an in-depth profile questionnaire to assess individual strengths and weaknesses in international negotiations. Profiles of international negotiators are examined. Negotiation sessions and group presentations are videotaped and analyzed. Prerequisite: MGMT-6390.

MGMT-7710 Cultural Environment of International Business
The emerging role of the multinational manager, cultural impact of international management, managing culture shock, organizational responsibilities and cultural differences. Foreign deployment, cultural specifics for managerial effectiveness, cultural themes and patterns, American macro- and micro-cultures, working in the global market environment. Prerequisite: MGMT-6390.

MGMT-7730 Economics and Institutions (Formerly MGMT-6300- Business Economics)
The main course objective is to introduce students to basic economics principles and establish economics as a managerial decision-making framework. The course will draw on economic analysis of such concepts as cost, demand, profit, competition, pricing strategy, and market protection and tie them to operational business decisions.

MGMT-7740 Accounting for Reporting and Control (Formerly MGMT-6190)
This course introduces theories and practices of financial as well as managerial accounting. The financial accounting sessions provide an overview of external financial statements. The managerial accounting sessions focus on how accounting information is used in the internal managerial decision making process within a firm as well as cover cost accounting, budgeting, and performance evaluation tools.

MGMT-7750 Global Business and Social Responsibility (Formerly MGMT-6800- Ethical, Political, and Legal Context of Business)
The course examines different responses of American, European and Asian firms to a global economy, within an historic and evolving context. Models of economic, social, political, technological, and national development will be introduced. Various conflicting demands of national governments, interest groups, corporations, unions, NGOs and consumers are often expressed in terms of ethical and social responsibility. Cases will be analyzed in terms of models of global business practices and conflicting claims will be critically evaluated.

MGMT-7980 CAPSTONE Project Course
Independent research project. Student must meet with a full-time faculty member to determine the independent study topic. The independent research should result in a high-quality research paper that is suitable for publication in a journal. Such efforts are to be separate and independent of course work used to satisfy other M.S. program requirements.
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Rensselaer’s Centers for Professional Development

Director: Elliot B. Field

Rensselaer’s Centers for Professional Development (RCPD) is a department of Rensselaer Polytechnic Institute focused on providing opportunities for professionals to enhance their knowledge and skills without enrolling in a credit-based academic program. Its mission is to develop superior short programs that address the interface between technical skills, management, and leadership. Courses are offered in the areas of Leadership and Executive Development and include leading in knowledge environments, Computer and Information Technology with a focus on new or creative ways to address old problems, and Technical and Professional Development. RCPD provides an effective means for professionals to understand and make use of new knowledge and information to support themselves and the growth of their organization.

RCPD has two significant partners: the Connecticut Quality Council and the Center for Creative Leadership. The Connecticut Quality Council (CQC) has been affiliated with Rensselaer for over fifteen years and provides the opportunity to integrate knowledge and experience from an active network of organizations at the leading edge of quality implementation. The Center for Creative Leadership is an internationally renowned organization that provides leadership training and is consistently ranked as one of the best in the world.

Many professional development programs are offered in a published open calendar. Anyone may sign up and take these programs. RCPD can also provide customized courses for any organization designed specifically to meet the needs of that organization. A unique advantage of RCPD is the ability to combine components from our various different content offerings and build integrated programs for clients.

Content Areas

Leadership and Executive Development
RCPD offers leadership programs that are designed to provide the most effective enhancement of leadership skills possible. Rensselaer is part of the Center for Creative Leadership’s international network of organizations delivering the Leadership Development Program (LDP)* and the Foundations of Leadership (FOL) program. RCPD also uses its background and experience to offer programs in coaching and leadership specifically designed for challenges faced by technical managers.

Computer and Information Technology
RCPD has both the faculty and facilities to deliver state-of-the-art computer training. Programs focus on a broad range of IT subjects and skill areas with special focus on critical IT management areas. The educational experience involves immediate and direct application of learning in our computer labs.
Technical and Professional Development
RCPD offers a suite of workshops designed to help technical professionals and executives improve their effectiveness in the work environment. These courses tend to be skills-based with a specific objective as the focus. We also offer support to engineers who are interested in receiving the designation Professional Engineer by providing preparatory courses for the Fundamentals in Engineering examination; the Professional Engineering examinations in mechanical, civil, and electrical engineering; and the Land Surveyor examination.

Corporate Training Solutions
Today’s organizations need to be “learning organizations.” One part of this process is to ensure that the organization’s employees have the skills they need to communicate effectively and the values that are critical to the organization. RCPD is able to provide solutions designed specifically for your organizational needs that can integrate the content from any of the areas described above. We also have considerable experience with technical and professional organizations. We work cooperatively with client organizations to complete a needs assessment, design programs specific to those needs, staff and deliver those programs, and evaluate their effectiveness in meeting the stated learning objectives. RCPD can serve as your organization’s partner to deliver high-caliber training.

Connecticut Quality Council

Executive Director: Gary E. Rosentreter
Home Page: www.ctqualitycouncil.org

The Connecticut Quality Council (CQC) is a coalition of business, government, education, and labor that promotes the philosophy and principles of Total Quality and Continuous Improvement as a sound business operating strategy for all organizations. In the fall of 1990, Rensselaer, as the only representative from the educational community, joined with twenty-seven business leaders in the founding of CQC.

CQC’s membership and diversity (in both size and industry) continually increase thereby enhancing the opportunities to benefit from the “stars and scars” of peers and competitors alike. Membership is organizational rather than individual in recognition of the need to involve the entire organization--people, culture, change--in the effort to focus on continuous improvement in services, processes and/or products that satisfy customer needs.

CQC has become a respected and valued resource for high-caliber, Total Quality education and training (both experiential and traditional) as well as for professional networking and information sharing with fellow practitioners.

The mission, vision, and goals of Rensselaer and CQC are complementary. Both organizations strive to work for a fully developed coalition of business, government, labor, education, and community.
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Eberbach, Eugene Clinical Associate Professor; Ph.D. (Warsaw University of Technology, Poland)
Pawlak, Renaud Clinical Assistant Professor; Ph.D. (French National Institute of Arts and Crafts, France)
Younessi, Houman Clinical Professor; Ph.D. (Swinburne University of Technology, Australia)

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Clarke, David L. Adjunct Professor; M.S. (Rensselaer Polytechnic Institute)
Exley, Gerard Adjunct Professor; Ph.D. (University of Connecticut)
Kousen, Kenneth A. Adjunct Professor; Ph.D. (Princeton University)
Labarre, Robert E. Adjunct Professor; Ph.D. (University of Connecticut)
Madison, James Adjunct Professor; Ph.D. (Rensselaer Polytechnic Institute)
McCarthy, Charles F. Adjunct Professor; M.S. (Rensselaer Polytechnic Institute)
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Outreach Programs, Troy Campus
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Assistant .......................................................................................................... Ajuba Jones, B.S.
Assistant Director for Program Operations ...................................................... Connie Grega, M.S.
Program Coordinator ....................................................................................... Mecaila Smith, B.A.
Program Manager for Recruitment ................................................................ Michael Gunther, M.S.A.
Senior Coordinator of Program Operations ..................................................... Anita Lindemann
Senior Program Administrator for Summer Programs ................................ Mary-Teresa Heath, Ph.D.
Student Services Administrator ......................................................................... Ronnie Rowe, M.S.
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