



Education for Working Professionals

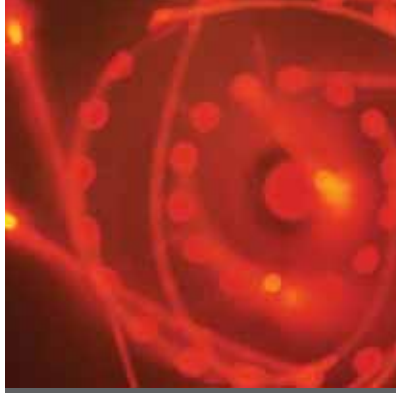
2009-2010

**Troy Campus  
Program Information**

[www.rpi.edu/ewp/troy](http://www.rpi.edu/ewp/troy)



**Rensselaer**



# WELIC

## RENSELAER IN BRIEF

Founded in 1824 “for the purpose of instructing persons ... in the application of science to the common purposes of life,” Rensselaer people have performed the research, developed the technologies, produced the innovations, and formed the enterprises that defined and accomplished the technological agendas of the 19th and 20th centuries, and are continuing to do so in the 21st century. Rensselaer is the nation’s oldest technological university, educating the leaders of tomorrow for technologically based careers. The Institute is especially well-known for its success in the transfer of technology from the laboratory to the marketplace so that new discoveries and inventions benefit human life, protect the environment, and strengthen economic development.

# come

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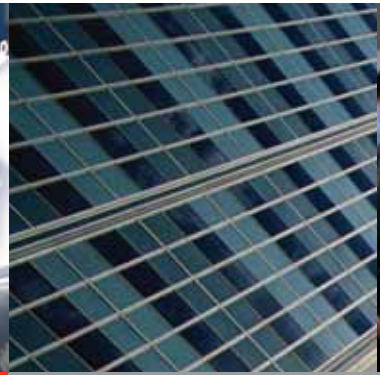
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## About Education for Working Professionals

Education for Working Professionals (EWP) is one of Rensselaer's four 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. Rensselaer supports this vision by forging strategic partnerships with businesses, governments, universities, and innovative professionals who impact society and technology around the nation and the world.

The mission of EWP is to educate business and technical leaders with the knowledge, analytical skills, creativity, and inspiration to think strategically, lead change, and create breakthrough solutions that meet the technological and business challenges of the global environment now and in the future. 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, and Rensselaer responds to this need through the EWP enterprise.



## An Interactive Learning Environment

PROGRAMS THAT FIT YOUR GOALS. CLASSES THAT



### Troy Campus

Working professionals are invited to enroll in degree and certificate programs on Rensselaer's Troy, N.Y. campus while remaining fully employed. Programs delivered in evening and weekend formats are available from all five of Rensselaer's schools. Available offerings include: Aeronautical Engineering; Applied Science; Business Administration; Civil Engineering; Computer and Systems Engineering; Electrical Engineering; Environmental Engineering; Human-Computer Interaction; Industrial and Management Engineering; Information Technology; Management; Materials Science and Engineering; Mechanical Engineering; and Nuclear Engineering.

Troy's campus facilities include a 218,000-square-foot Center for Biotechnology and Interdisciplinary Studies which ranks among the world's most advanced research facilities focused on the application of engineering and the physical and information sciences to the life sciences; studio classrooms that allow students at wired workstations to utilize Web-based technologies, full-motion video, and computer simulation, among other technologies; and a new Experimental Media and Performing Arts Center that supports the intersection of art, media, technology, and research. Rensselaer's 275-acre campus is alive with the spirit of exploration, collaboration, and discovery. Built into a hillside, it overlooks the historic city of Troy, N.Y. and the Hudson River. While there's no substitute for a personal visit to campus, the Rensselaer Virtual Tour is the next best thing. Check it out at: <http://www.rpi.edu/tour>.



ASSES THAT FIT YOUR SCHEDULE. EXPERIENCES TO CHANGE YOUR LIFE.

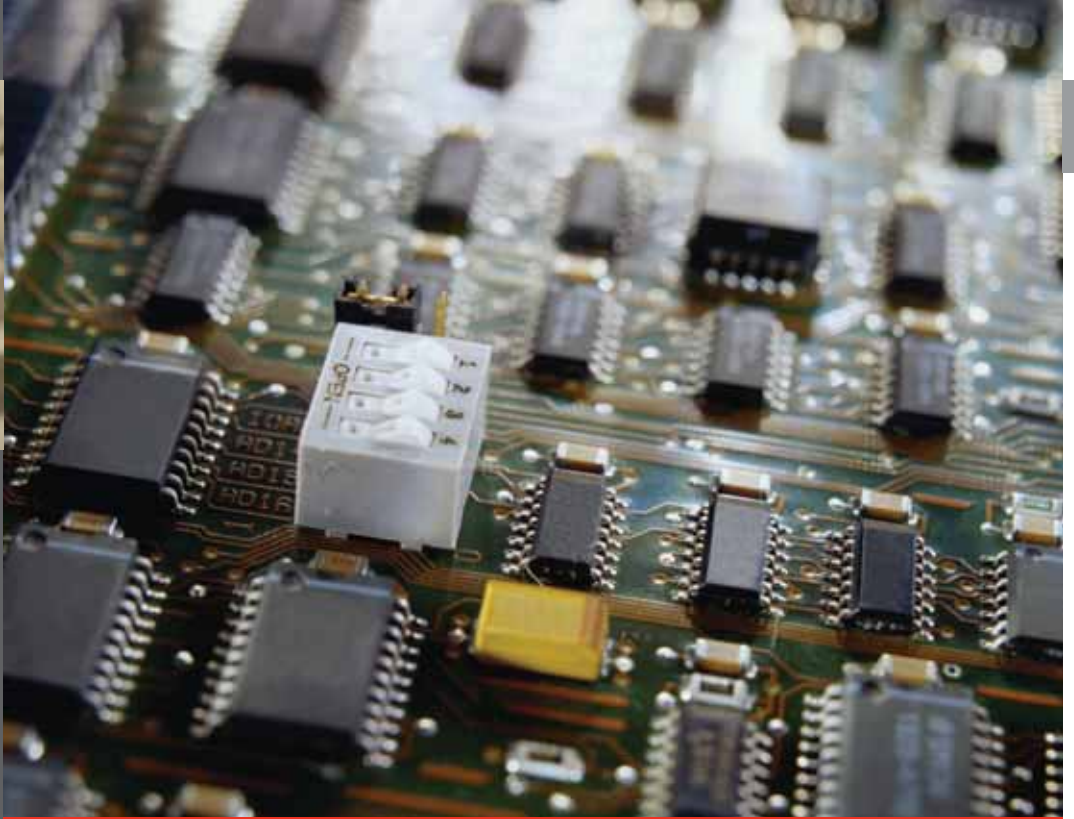
### Hartford Campus

Rensselaer's Hartford campus provides a challenging educational environment and a dynamic learning experience for students who need to balance their professional, academic, and personal lives. More than 1,200 students attend classes at Rensselaer's Hartford campus and southeastern Connecticut regional site.

Rensselaer Hartford offers graduate programs in Management, Computer and Systems Engineering, Computer Science, Electrical Engineering, Engineering Science, Information Technology, and Mechanical Engineering. Specialized programs include Dual Master's Degrees, the Weekend MBA, the Elite Master's Program, and the International Scholars Program, as well as several graduate certificates in Computer and Information Sciences and Engineering. 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 from a global perspective. Each course is designed to meet the needs of working professionals seeking to advance their careers and enhance their organizations' successes. Rensselaer graduates are entrepreneurial and personify the Institute's slogan, "Why not change the world?"

### Distance Learning

For over two decades, Rensselaer has pioneered the application of state-of-the-art technologies to deliver high-quality, interactive learning experiences in distributed environments. A leader in graduate-level, distributed education programs for working professionals, Rensselaer provides online course delivery combined with face-to-face interaction with faculty to enhance the online learning experience. Individuals from leading corporations and government agencies worldwide participate in distance courses that originate from Rensselaer's Troy, Hartford, and southeastern Connecticut site campuses and are supported by course Web sites and other technologies that provide communication and collaboration tools to facilitate interaction between students and faculty and among students. Rensselaer is known for excellence in content, delivery, and services, and has received considerable national recognition and numerous awards. Degree and certificate programs in Engineering, Human-Computer Interaction, Information Technology, and Management, have been available via distance. However, effective for the Fall 2009 semester, Rensselaer is phasing out the delivery of degree and certificate programs via distance.



Our high-end, customized degree, certificate, and professional development programs ensure that EWP graduates have an education that empowers them to become architects of their own futures.





## Professional Development

### PROFESSIONAL DEVELOPMENT PROGRAMS

Lifelong learning is essential to continued professional growth. Professional development programs, seminar topics and Academic Short Courses are generally made available to working professionals during the summer and academic year and can be customized, based on need, to allow the working professional an opportunity to learn from experts who will share their knowledge and the latest research being conducted at Rensselaer. Programs and courses can be personalized and offered in a short, intensive format, to minimize the time away from work. Most workshops are designed to address the professional development needs of employees who are looking to learn new skills and stay competitive in their field.

### CUSTOM PROGRAM OPPORTUNITIES

Rensselaer is offering seminar topics and academic short courses from all five schools; Architecture, Engineering, Humanities Arts and Social Sciences, Management, and Science. Customized programs can be developed and delivered upon request, based on faculty availability.

### PROFESSIONAL STAFF DEVELOPMENT -CONSULTATION AND TRAINING PROGRAM

Professional staff development is also available through Rensselaer's premier Archer Center for Student Leadership Development. Consultation sessions are conducted to assess professional development needs and create a customized program designed to meet each organization's needs. Staff development sessions develop employee skills and maximize overall organizational effectiveness.

### EXECUTIVE AND PROFESSIONAL DEVELOPMENT PROGRAMS

These programs teach developing managers as well as seasoned executives how to improve their leadership styles and to be better leaders and team builders. Rensselaer is the only network associate of the internationally renowned Center for Creative Leadership (CCL)<sup>®</sup> in the northeastern United States. Foundations of Leadership (FOL)<sup>®</sup> is a three-day leadership development workshop designed to assist the development of emerging leaders and managers by increasing their personal awareness, interpersonal effectiveness, and managerial abilities. Leadership Development Program (LDP)<sup>®</sup> is an intense, five-day program designed to improve the effectiveness of upper-middle to senior-level managers by helping them to recognize their strengths and weaknesses as leaders.

## Regional Programs

### REGIONAL SITE IN SOUTHEASTERN CONNECTICUT

Rensselaer operates a regional site in southeastern Connecticut. Faculty from Rensselaer's Hartford campus travel to the southeastern Connecticut site to teach courses. Students at Rensselaer's southeastern Connecticut site participate in cohort-based learning programs to complete their degrees.

### NAVY NUCLEAR PROGRAM

Rensselaer operates a regional site in Malta, N.Y. for graduates of the Navy Nuclear Power Training School who are stationed at the Kesselring site in West Milton, N.Y. Navy personnel enter the program with one year's worth of undergraduate coursework and Rensselaer provides the remaining coursework for students to complete a B.S. in Nuclear Engineering within two to three years. Rensselaer courses are primarily taught on-site in Malta by faculty from the Troy campus. In addition, on-site courses are supplemented by one or two online courses each semester.

## Applying to Degree and Certificate Programs

Participation in degree and certificate programs or courses requires admission to Rensselaer. To be considered for admission to Rensselaer, applicants must hold a bachelor's degree in an appropriate field and meet departmental admission standards. Please refer to the individual program descriptions regarding program-specific requirements (i.e., resume, GMAT, GRE, etc.). Students should indicate whether they are applying as a degree-seeking candidate (master's degree admission) or a non-matriculated student (for certificate programs or individual courses). Students may apply online at <http://gradadmissions.rpi.edu>.

## Master's Degree Admission Process

Students must submit the following to the Rensselaer Admissions office:

- (1) Application for admission to graduate study
- (2) Brief statement of background and goals as it applies to the desired program (essay questions required in lieu of statement of background and goals for Management students)
- (3) Two letters of recommendation from managers, supervisors, and/or past instructors
- (4) One official transcript from every previously attended college and university. Transcripts are required whether or not a degree was conferred. To expedite the review process, unofficial transcripts may be submitted with your application; however, official transcripts must be received prior to the second week of your first semester.
- (5) Application fee payable to Rensselaer Polytechnic Institute (this fee is waived for Rensselaer alumni)
- (6) Current resume
- (7) GMAT scores (if applicable)
- (8) GRE scores (if applicable)
- (9) TOEFL (for international students)
- (10) Copy of VISA documents (for international students)

## Certificate and Non-Matriculated Admission Process

Students interested in a certificate program or in taking individual courses must apply for non-matriculated admission to Rensselaer. Admission as a non-matriculated student does not guarantee future admission to a degree program; therefore, students who wish to pursue a master's degree in the future should be aware of the additional admission requirements for the degree program in which they are interested. Admission as a non-matriculated student is based on the applicant's related academic and professional qualifications.

Students must submit the following to the Rensselaer Admissions office:

- (1) Graduate Application for Non-Matriculated Study
- (2) Official copy of your bachelor's (or highest degree) transcript
- (3) Application fee payable to Rensselaer Polytechnic Institute (this fee is waived for Rensselaer alumni)
- (4) Copy of VISA documents (for international students)

Additional notes:

- Non-matriculated students are admitted on a course-by-course basis as space allows.
- A new application must be submitted no later than two weeks prior to the start of each semester for specific course approval.
- Brief statement of background and goals as it applies to the desired program.
- The number of credit hours an individual may take toward a degree as a non-matriculated student varies from department to department; the university wide maximum is 12 credit hours. Each department will determine which courses taken as a non-matriculated student, if any, will count toward an eventual Rensselaer degree.

## Application/Registration

Once your application has been processed, you will be sent a decision letter. If you have not received your notification and want to check on the status of your application, you may call the Admissions Office at (518) 276-6216. Matriculated students register online using Rensselaer's Student Information System (SIS), <http://sis.rpi.edu>. Non-matriculated students must register via mail or in person at the Registrar's office. If you have any questions regarding the registration process, please contact the Registrar's office at [registrar@rpi.edu](mailto:registrar@rpi.edu).

## Registration Verification

Students can verify their registration online by checking Rensselaer's Student Information System (SIS).

## Student Information System (SIS) Access

Online access to the Student Information System ([sis.rpi.edu](http://sis.rpi.edu)) allows admitted students to register for classes, check registration status, grades, and change personal contact information on the Web. Instructions are available online at <http://sis.rpi.edu>.

# Graduate School Policies

## Transfer Credit Approval Policy

Credit for graduate work completed at other accredited institutions may be offered in partial fulfillment of the requirements for a degree at Rensselaer when the work is appropriate to the student's program. As a rule, this work will have been earned prior to admission at Rensselaer. Students already enrolled at Rensselaer who wish to take courses elsewhere must obtain the prior approval of their advisers and the Dean of Graduate Education. Matriculated students may transfer in a maximum of six transfer credits toward a Rensselaer master's degree. A grade of "B-" or better is required for transfer. A course must be pre-approved by a faculty member and the academic adviser, as well as the Graduate Education Office, in order to be used on the student's Plan of Study.

The Transfer Credit Approval form is available at [http://www.rpi.edu/dept/srfs/transfer\\_credit\\_approval.pdf](http://www.rpi.edu/dept/srfs/transfer_credit_approval.pdf). Print out and complete the form and submit to your Rensselaer point of contact for processing.

## Plan of Study

The submission of an official Plan of Study is required within the first year of being admitted to a degree program. A Plan of Study form is available online. Students must submit a revised plan of study if any changes are made after approval.

## 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 or Master of Engineering degree sought.

Students engaged in working 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 working professionals pursuing master's degrees requiring 60 credits must complete the requirements within five years, beginning with the date of the original admissions letter. 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 Dean of Graduate Education for an extension.

# Financial Information

Tuition and any other miscellaneous charges will be billed one month before the start of the semester. Payment is due within 30 days. When a student is sponsored by an employer, official documentation must be on file in the Bursar's office, prior to the drop deadline.

All tuition and fees are due no less than 30 days after the invoice. Listed below are the rates for tuition and fees for the 2009-2010 academic year\*:

## Tuition

- **Tuition Rate — \$1,325 per credit hour**  
To pay your bill online, please go to [finance.rpi.edu](http://finance.rpi.edu).

## Fees

- **Application Fee — \$75\*\***  
(a one-time fee, paid at the time of application)
- **Transcript Fee — \$25\*\***  
(a one-time fee, paid the semester a student is first registered)
- **Late Payment Fee — \$50**  
(this fee is assessed on delinquent accounts)
- **Course Materials**  
The amounts for the items not available through the textbook vendor—business cases, course notes, and software—will be listed on the Web site.

## Payments should be made to:

Rensselaer Polytechnic Institute  
Attn: 3rd Party Billing Specialist  
PO Box 2500  
Troy, NY 12181

## Inquiries on the EWP student and sponsor invoices should be made to:

3rd Party Billing Specialist  
(518) 276-6544 or (518) 276-6610

\*Fall 2009, Spring 2010, Summer 2010

\*\*Waived for Rensselaer alumni

## MASTER OF SCIENCE OR ENGINEERING IN Aeronautical Engineering

Rensselaer's Aeronautical Engineering Master's program provides an educational experience that trains graduate engineers to address emerging needs in the areas of computational and theoretical fluid dynamics, aerodynamics, advanced propulsion, experimental fluid dynamics, energy conversion, dynamics, and optimal design.

To accommodate a student's career plans and interests in these areas, the master's program requirements are structured so that there is great flexibility in choosing appropriate courses while ensuring sufficient depth and breadth. Each graduate student has an adviser who has the knowledge to make suggestions of specific courses to further the student's educational goals.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree in engineering
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- TOEFL score of 600 or above (required for international students)
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- At least 18 credits must be at the 6000 level
- At least 21 credits from MANE
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY (30 credit hours)

#### I. MANE Courses (21 credits) (M.Eng. only)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

#### II. Culminating Experience (6-9 credits)

The culminating experience may be fulfilled with one of the following options:

- An approved sequence of three integrated or related courses; at least two courses must be in MANE; only one 4000-level course accepted. One of the courses must involve a project or design experience which integrates or synthesizes knowledge from the other courses taken in the Master's program.  
OR
- A 6 credit project  
OR
- An internship/practicum - minimum of one summer/one semester full-time work in approved setting

#### III. Electives (0-9 credits)

1. \_\_\_\_\_

#### NOTE:

1. A maximum of 6 credits may be taken from outside of Engineering or Science; courses outside of Management are allowed only by pre-approval of a faculty adviser.
2. Students interested in applying for a research oriented M.S. degree should discuss details related to curriculum and graduation requirements with a faculty adviser.

## MASTER OF SCIENCE IN Applied Science

### (EXAMPLE CONCENTRATION: BIOINFORMATICS AND COMPUTATIONAL BIOLOGY)

This degree is for working professionals with traditional discipline-oriented backgrounds who want to increase their effectiveness in industry, government, and other interdisciplinary arenas. The goals are to expand students' technical expertise and assist them in crossing boundaries between disciplines. Course plans are strongly individualized to suit student needs and interests. Among the concentration options that students can design are: analytical and environmental chemistry, applied groundwater science, biochemistry/biophysics, bioinformatics, chemistry and entrepreneurship, database management systems, microelectronics manufacturing, optimization and statistics, scientific computation, polymer science and engineering, and software engineering.

One example concentration for the M.S. in Applied Science is Bioinformatics and Computational Biology. Dramatically expanding use of computer algorithms and computational models in biology and medicine has led to a greatly increased need for well-trained computational biologists. State of the art approaches that are used include statistical modeling, simulation, database development, sequence analysis, and image analysis. These tools are applied to cross-discipline problems in medicine, molecular biology, biochemistry, ecology, and physiology.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Evidence of strong quantitative and problem-solving skills
- Grades of "B" or better in courses completed since bachelor's degree
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Draft Plan of Study, prepared in cooperation with a Program Adviser
- GRE General Test is preferred
- TOEFL required for international students
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated Status
- Approved Plan of Study
- At least 15 credits must be at the 6000 level
- At least 15 credits must be from the School of Science
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY—Sample Illustration (30 credit hours)

#### I. Core Courses: Establish basis for advanced study in Concentration (6-12 credits)

BIOL-6410	Bioinformatics I: Sequence Analysis
BIOL-6420	Bioinformatics II: Molecular Modeling
CSCI-4020	Computer Algorithms
MATP-4600	Probability Theory and Applications

#### II. Specialization Courses: Fundamental to Concentration area (6-12 credits)

CSCI-6210	Design and Analysis of Algorithms
CSCI-6390	Database Mining
DSES-6180	Knowledge Discovery with Data Mining
CHEM-6510	Computational Chemistry

#### III. Elective Courses: Allow focus within Concentration and provide skills intersecting Concentration with other disciplines (6-18 credits)

BIOL-6690	Advanced Molecular Biology
BCBP-6879	Protein Structure Determination
BIOL-6360	Microbial Genetics
BCBP-6780	Protein Folding
CHEM-6300	Medicinal Chemistry
CHEM-6330	Drug Discovery
CSCI-6460	Advanced Database Management Topics

### PARTICIPATING FACULTY (this concentration)

#### Biology:

C. Bystroff, J. Koretz, S. Nierzwicki-Bauer

#### Chemistry and Chemical Biology:

C. Breneman, M. Wentland

#### Computer Science:

M. Magdon-Ismail, L. Newberg, B. Yener, B. Szymanski, M. Zaki

#### Mathematical Sciences:

K. Bennett, M. Zuker, P. Kramer, M. Holmes, D. Drew

#### Physics:

S. Nayak, A. Garcia

#### Chemical and Biological Engineering:

S. Garde, J. Dordrick

#### Decision Sciences and Engineering Systems:

M. Embrechts

## MASTER OF

### Business Administration Evening MBA Cohort Program

The MBA is the Lally School's premier program and offers students both depth and breadth in management education with an emphasis on innovation and entrepreneurship. The focus on "innovation" is concerned with organizational, financial, and technological innovation, while the emphasis on "entrepreneurship" involves both individually-driven new start-ups and the launch of new businesses within larger corporations. The curriculum provides a strong grounding in managerial fundamentals while highlighting the strategic role that technology plays in enhancing business performance and creating sustainable competitive advantage.

The MBA curriculum is built around five, year-long interdisciplinary courses called "streams of knowledge," each of which addresses the challenge of innovation. Taken together, these streams provide students not only with the basic tools and concepts of the business leader, but also with the critical creative problem-solving expertise considered essential for meeting both the strategic and day-to-day challenges of running a successful business in today's rapidly changing global marketplace. The streams concentrate on the five following themes: 1) creating and managing the enterprise; 2) value creation, managing business/technology networks, and driving innovation; 3) developing innovative new products and services; 4) formulating and implementing competitive business strategy; and 5) managing the business implications of emerging technologies.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree with strong academic performance from an accredited undergraduate institution
- Grades of "B" or better in courses completed since bachelor's degree
- Undergraduate GPA of 3.0 or higher
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals: answers to application essay
- Two letters of recommendation
- TOEFL required for international students
- GMAT (600 or above) required
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- Minimum 3.0 GPA

#### PLAN OF STUDY (60 credit hours)

<b>Year 1</b>	
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
<b>Summer 1</b>	Elective #1
<b>Year 2</b>	
MGMT-7730	Economics and Institutions
MGMT-6060	Business Implications of Emerging Technologies I
MGMT-6030	Financial Management II
MGMT-XXXX	Elective #2 (MGMT-7XXX Commercializing Advanced Technologies available)
<b>Summer 2</b>	Elective #3
<b>Year 3</b>	
MGMT-6080	Networks, Innovation & Value Creation I
MGMT-7050	Developing Innovative New Products/Services I
MGMT-XXXX	Elective #4
MGMT-7060	Developing Innovative New Products/Services II
<b>Summer 3</b>	Elective #5
<b>Year 4</b>	
MGMT-7030	Strategy, Technology, and Competition I
MGMT-7750	Global Business and Social Responsibility
MGMT-XXXX	Elective #6
MGMT-7070	Managing on the Edge
<b>Summer 4</b>	Elective #7

NOTE: The Lally MBA program does not include the traditional 3 credit course in statistics. Rather, students are expected to have a basic understanding of statistics before entering the program. To ensure this, students are expected to complete an on-line statistics review and tutorial before the completion of their first semester. A faculty instructor will be available for students needing assistance.

## MASTER OF

### Business Administration Executive MBA Program

Established in 1987, Rensselaer's Executive MBA program is designed for professionals who want to strengthen their management and leadership skills, develop a global perspective, and attain the depth necessary to recognize and cope with new challenges in the business world. Our new curriculum will be launched for the fall 2008 cohort. The rigorous design aims to develop strategic leaders in technology driven environments. Executive MBA participants at Rensselaer increase their competence and confidence through continued interaction with successful colleagues and a distinguished academic staff. Classes are held Friday and Saturday of alternate weekends for two academic years (September to May) to allow participants to continue in their careers while earning their degrees. After successfully completing the program, participants receive the Master of Business Administration degree from Rensselaer.

#### ADMISSION REQUIREMENTS

- Ten years of professional work experience with at least six of the years in a managerial role
- Current employment in a middle to senior level position
- Bachelor of Science degree with strong academic performance from an accredited undergraduate institution\*
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Two letters of recommendation
- Current Resume
- Interview with the Program Director

\* Exceptional candidates without undergraduate degrees will be considered.

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- Minimum 3.0 GPA

#### PLAN OF STUDY (48 credit hours)

##### Year 1

- Accounting and Finance Basics
- Managerial/Cost Accounting
- Business Economics
- Organizational Design and Development
- Marketing Concepts
- Elective Option 1: Strategic Use of IT
- Elective Option 2: Macroeconomy and Financial Institutions
- Financial Management
- Using Data to Structure and Solve Problems
- Operations Strategy
- Ethics, Law, Governance and Social Responsibility
- Leadership Development
- Corporate Strategy

##### Year 2

- Impact Project Kickoff
- Managing the Enterprise in Global Political, Financial and Economic Environments, International Residency
- Corporate Financial Strategy
- Negotiations
- Planning and Budgeting Processes
- Getting and Keeping Customers
- Decision Making Under Uncertainty
- Monitoring and Exploiting Technological Change
- The Business Ecosystem
- Strategic Leadership
- Developing and Managing the Innovation Function
- Impact Project
- International Residency: Second Year Field Experience

#### International Residency: Second Year Field Experience

The International Residency provides an in-depth immersion into the world of international business as the class visits companies throughout Europe. Company visits, cultural experiences and guest lectures by business and government leaders give Executive MBA participants an appreciation of ways of doing business in the global market.

#### CONTACTS FOR PROGRAM INFORMATION

Executive Programs  
(518) 276-6200  
emba@rpi.edu  
<http://lallyschool.rpi.edu/emba>

## MASTER OF ENGINEERING IN Civil Engineering

Civil and environmental engineers are responsible for providing the world's constructed facilities and the infrastructure on which modern civilization depends. These facilities can be large and complex and require that the engineer be broadly trained and able to deal with the latest technologies.

Civil and environmental engineers focus on the analysis, design, construction, maintenance, and operation of large-scale physical systems. To ensure the proper construction and care of these complex systems and environments, Rensselaer civil and environmental engineers develop a full range of skills in design, analysis, fabrication, communication, management, and teamwork. The current rebuilding of the world's roads, bridges, water, and sewer systems, and other physical facilities has heightened society's awareness of the profession and given it added prominence. The growing panoply of sensors, instrumentation, intelligent facilities, and new materials is also highlighting the high-tech character of the discipline; creating new educational challenges and redefining the skill set that civil and environmental engineers need to succeed. At Rensselaer, civil engineering has a long and distinguished history. In 1835, the Institute became the first U.S. school to issue a civil engineering degree.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree in engineering or the physical or natural sciences from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE General Test is required
- TOEFL general test is required for international students
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study and worksheet
- At least 15 credits must be at the 6000 level
- At least 21 credits must be from Civil Engineering
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY

(minimum of 30 credit hours, must also conform to the graduation requirements)

**Concentration Areas: Select one area of concentration**

1. Geotechnical/Earthquake Engineering
2. Structural/Earthquake Engineering
3. Transportation

#### I. Core Courses (15-18 credits)

##### Geotechnical/ Earthquake Engineering

CIVL-6510	Advanced Soil Mechanics
CIVL-6520	Advanced Foundations of Earth Structures
CIVL-6550	Advanced Geoenvironmental Engineering
CIVL-6450	Structural Dynamics
CIVL-6540	Dynamics of Soil and Soil Foundation Systems

##### Structural/Earthquake Engineering

CIVL-4240	Introduction to Finite Elements
CIVL-6200	Plates and Shells
CIVL-6210	Structural Stability
CIVL-6310	Advanced Concrete Structures
CIVL-6450	Structural Dynamics
CIVL-6540	Dynamics of Soil and Soil Foundation Systems

#### II. Elective Courses (12-15 credits)

CIVL-6170	Mechanics of Solids
CIVL-6480	Designing with Geosynthetics
CIVL-6490	Earthquake Engineering
CIVL-6530	Seepage, Drainage, and Groundwater
CIVL-6660	Fundamentals of Finite Elements
CIVL-6670	Nonlinear Finite Element Methods
CIVL-6680	Finite Element Programming

#### I. Core Courses (12 credits)

##### Transportation Engineering

CIVL-6230	Transportation Economics
CIVL-6250	Transportation Systems Planning
One 4000 or 6000 Level Statistics or Operations Research/Optimization Course	
One Graduate Level Free Elective	

#### II. Elective Courses (18 credits)

CIVL-4620	Mass Transit Systems
CIVL-4640	Transportation Facility Design and Planning
CIVL-4660	Traffic Engineering
CIVL-4670	Highway Engineering
CIVL-6270	Traffic Control Systems
CIVL-6280	Traffic Flow Theory
CIVL-6260	Transportation Algorithms
CIVL-6960	Intelligent Transportation Systems
CIVL-6961	Critical Issues in Transportation
CIVL-6961	Dynamic Transportation Modeling

#### NOTES:

Students interested in applying for a research-oriented M.S. degree should notify their faculty adviser for details on curriculum and graduation requirements.

Some elective courses can be taken in departments other than civil engineering. For example: Mathematics, Earth Sciences and Environmental Engineering. M.S. candidates typically take all the courses listed in their chosen area of concentration.

## MASTER OF ENGINEERING IN

### Computer and Systems Engineering

Computer and Systems Engineering is the fastest-growing branch of engineering. Rensselaer's Electrical, Computer and Systems Engineering Department offers several courses specifically geared toward working professionals that provide a concentration in networking and software engineering. Students may also take courses in management, manufacturing, or computer science to satisfy a breadth requirement. The Master of Engineering degree in Computer and Systems Engineering provides the tools needed for the success of professional engineers.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in computer engineering, electrical engineering, or computer science from an accredited undergraduate institution
- Undergraduate coursework or work experience in programming, computer organization, computer architecture, discrete mathematics, data structures, probability, and signals and systems
- Undergraduate GPA of 3.2 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- TOEFL score of 570 or above (required for international students)
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study and worksheet
- At least 18 credits must be at the 6000 level
- At least 21 credits must be from Electrical, Computer, and Systems Engineering (up to 6 of these credits can be from related technical areas with the approval of the faculty adviser, e.g. Computer Science, Electric Power Engineering, Materials Engineering, Physics, etc.)
- Minimum 3.0 GPA; minimum of 30 credits

#### PLAN OF STUDY

(minimum of 30 credit hours, must also conform to the graduation requirements listed above)

##### I. Concentration Courses (9-10 credits)

Select three courses

ECSE-4670	Computer Communication Networks
ECSE-4750	Computer Graphics
ECSE-6600	Internet Protocols
ECSE-6660	Broadband and Optical Networking
ECSE-6770	Software Engineering I
ECSE-6780	Software Engineering II

##### II. Two Course Sequence to Provide Breadth (6-7 credits)

These must be outside of, and not directly related to, Electrical, Computer, and Systems Engineering and must be approved in advance by the Graduate Program Director. Examples include, but are not limited to:

DSES-6110	Introduction to Applied Statistics
DSES-6230	Quality Control and Reliability
MGMT-6450	Manufacturing Systems Management
MANE-6800	Manufacturing Systems Integration

##### III. Electives (15-16 credits)

At least two of these must come from Electrical, Computer, and Systems Engineering (ECSE) to meet the required 15 credits in ECSE.

Select five courses, possible options include:

CISH-6120	Distributed Database Systems
CISH-6220	Lans, Mans, and Internetworking
CISH-6510	Web Application Design and Development
CSCI-4220	Network Programming
CSCI-4380	Database Systems
CSCI-6140	Computer Operating Systems
ECSE-4670	Computer Communication Networks
ECSE-4750	Computer Graphics
ECSE-6600	Internet Protocols
ECSE-6660	Broadband and Optical Networking
ECSE-6770	Software Engineering I
ECSE-6780	Software Engineering II

NOTE: Some of the courses listed in Sections I, II, and III above may not be available. Also, a student may wish to deviate somewhat from the selections listed here. Substitutions approved by the ECSE Graduate Program Director are permitted, on a case-by-case basis.

Students interested in applying for a research-oriented M.S. degree should notify their Rensselaer point of contact for details on admission, curriculum, and graduation requirements.

## MASTER OF ENGINEERING IN

### Electrical Engineering with a Concentration in Microelectronics

The rapid and accelerating development of microelectronics technology has led to an expansion of the body of knowledge used by electronics engineers and to an increased sophistication of device models and CAD tools used in microelectronics design and manufacturing. To become and remain competitive, electronics engineers need graduate and continuing education that reflects changes in technology, and yet provides the fundamental core needed to contribute to future generations of technology. Rensselaer has both a department and research center committed to microelectronics technology and design: the Electrical, Computer, and Systems Engineering (ECSE) Department, and the Center for Integrated Electronics (CIE).

The M.Eng. program builds upon a strong base of research and education in microelectronics, including the interdisciplinary Microelectronics Manufacturing Engineering program. While this degree program includes some of the same processing-oriented courses as electives, the emphasis is on semiconductor devices. The program is taught by full-time tenure track Rensselaer faculty, augmented by the expertise of some of the best engineers and scientists working at the forefront of the microelectronics industry. The opportunities offered by both online video instruction and new web-based educational tools make the joint instruction and on-site delivery feasible.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in electrical engineering or a closely-related discipline from an accredited undergraduate institution
- Undergraduate GPA of 3.2 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- TOEFL score of 570 or above (required for international students)
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study and worksheet
- At least 18 credits must be at the 6000 level
- At least 21 credits must be from Electrical, Computer, and Systems Engineering (up to 6 of these credits can be replaced by courses from related technical areas with the approval of the faculty adviser, e.g. Computer Science, Electric Power Engineering, Materials Engineering, Physics, etc.)
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY

**(minimum of 30 credit hours, must also conform to the graduation requirements listed above)**

##### I. Core Courses (9 credits)

Select at least three courses	
ECSE-4720	Solid State Physics
ECSE-6230	Semiconductor Devices and Models I
ECSE-6260	Semiconductor Power Devices
ECSE-6290	Semiconductor Devices and Models II
ECSE-696X	Modern Power Devices
ECSE 696X	Phys Foundations of Solid-State Devices

##### II. Two-Course Sequence to Provide Breadth (6–7 credits)

These must be outside of, and not directly related to, Electrical, Computer, and Systems Engineering and must be approved in advance by the Graduate Program Director. Examples include, but are not limited to:

DSES-6110	Introduction to Applied Statistics
DSES-6230	Quality Control and Reliability
MGMT-6450	Manufacturing Systems Management
MANE-6800	Manufacturing Systems Integration

##### III. Electives (15-16 credits)

Select five courses, possible options include:	
EPOW-4080	Semiconductor Power Electronics
ECSE-6270	Optoelectronics
ECSE-6770	Software Engineering I
EPOW-6850	Electric and Magnetic Fields in Electric Power Engineering
MTLE-696X	Advanced Device Processing
MTLE-4290/ ECSE-4290	Electronic Packaging

NOTE: Some of the courses listed in Sections I, II, and III above may not be available. Also, a student may wish to deviate somewhat from the selections listed here. Substitutions approved by the ECSE Graduate Program Director are permitted, on a case-by-case basis.

Students interested in applying for a research-oriented M.S. degree should notify their Rensselaer point of contact for details on admission, curriculum, and graduation requirements.

## MASTER OF ENGINEERING IN

### Engineering Science: Systems Engineering and Technology Management

The SETM program is a multidisciplinary Master of Engineering program designed to provide engineering students with an opportunity to extend their understanding of emerging technologies within their disciplines while providing fundamental background in technical decision making methods and technology management. The program provides essential background in the financial metrics of business performance, the analytical modeling tools for applying these metrics in organizational and technical decision making systems, and the critical challenges associated with new models of value creation and business growth across different industries. Students will be prepared for technical management roles as they simultaneously extend their technical expertise in the undergraduate engineering discipline beyond the Bachelor's level. Graduates of the program will be prepared to assume management responsibilities sooner upon entering the professional workforce.

This program is open to all engineering majors and is specifically designed for individuals seeking a Master's program that integrates decision sciences/management skills with the undergraduate engineering discipline, while simultaneously extending technical depth in the engineering discipline beyond the bachelor's degree. Based on a review of the SETM curriculum by corporate recruiters, a wide variety of corporations have expressed interest in recruiting graduates of this program including IBM, General Motors, General Electric, Fidelity Investments, United Technologies, Shell Oil, Pfizer, Cisco Systems, Target, W.L. Gore and others.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree from an accredited undergraduate institution
- Strong undergraduate performance
- Evidence of strong quantitative and problem-solving skills
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- GRE required
- TOEFL required for international students
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated Status
- Approved Plan of Study
- At least 15 credits must be at the 6000 level
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY (30 credit hours)

##### I. Systems Engineering and Technology Management Core Courses (15 credits)

DSES-6610 Systems Modeling in Decision Sciences  
DSES-6620 Discrete Event Simulation  
MGMT-7740 Accounting for Reporting and Control  
MGMT-6020 Financial Management I  
MGMT-6080 Networks Innovation and Value Creation I

##### II. Technical Concentration (15 credits)

(select a concentration of courses with your adviser in one of the following areas)

Civil Engineering  
Industrial Engineering  
Electrical Engineering  
Computer Systems Engineering  
Aeronautical Engineering

As an alternative to the four-to-five course culminating technical concentration, students can elect a three-to-four course technical concentration plus an engineering Master's project for 3 credit hours.

To complete this requirement, students must register for three credit hours under the 6980 Master's project course in their engineering discipline and complete a project directly related to the technical concentration.

## MASTER OF ENGINEERING IN

### Environmental Engineering

Environmental engineers design municipal water supply processes, design treatment systems to control water and air pollution, remediate contaminated sites, and design sanitary waste disposal systems in an effort to both protect public health and protect the environment.

The Rensselaer Environmental Engineering program prepares students for careers in consulting engineering practice, private industry, national and international research laboratories, government agencies and academia. Student needs and career objectives are met through a well-crafted, rigorous, and interdisciplinary curriculum that stresses hands-on learning, grounding in fundamentals, and practical experience. In addition to the Department of Civil and Environmental Engineering, faculty members in the Departments of Biology, Chemical Engineering, Chemistry, Earth and Environmental Sciences and Applied Math have teaching and research interests in environmental problem solving.

Faculty expertise includes such areas as water treatment using adsorption, membrane, and advanced oxidation processes; biotechnology, including phytoremediation; fate and transport of contaminants; biological and abiotic industrial and hazardous waste treatment; soil and sediment remediation; and air quality, with an emphasis on indoor air quality and the health effects of aerosols, including allergens. Our research and teaching activities are supported by state-of-the-art analytical facilities in the Environmental Engineering Laboratories and the Keck Water Quality Laboratory.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in engineering or the physical or natural sciences from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE General Test is required
- TOEFL general test is required for international students
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study and worksheet
- At least 15 credits must be at the 6000 level
- At least 18 credits must be from Environmental Engineering
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY

**(minimum of 30 credit hours, must also conform to the graduation requirements)**

##### I. Core Courses (15 credits)

ENVE-6960	Physicochemical Processes in Environmental Engineering
ENVE-6961	Biological Processes in Environmental Engineering
ENVE-6962	Environmental Chemodynamics
ENVE-6963	Environmental Biotechnology
ENVE-6964	Atmospheric Pollution

##### II. Electives (15 credits)

ENVE-6965	Mass Transfer Processes
ENVE-6250	Bench Scale Design
ENVE-6300	Bioremediation of Hazardous and Toxic Compounds
ENVE 6140	Stream Pollution Control
ENVE-4110	Aqueous Geochemistry
CHEM-4540	Organic Geochemistry
CHEM-4190	Environmental Measurements
CHEM-4810	Chemistry of the Environment
ERTH-6710	Advanced Groundwater Hydrology
ERTH 6960	Geographic Information Systems
CIVL-6550	Advanced Geoenvironmental Engineering
CIVL-6530	Seepage, Drainage, and Groundwater

NOTE: Students interested in applying for a research-oriented M.S. degree should discuss details related to curriculum and graduation requirements with a faculty adviser.

## MASTER OF SCIENCE IN

### Human-Computer Interaction

The integration of computer systems, the Internet, and the World Wide Web into the working world and home life have highlighted the need for professionals who can design human-computer interactions that allow people to work intuitively and with less dependence on long, detailed instructions. Rensselaer's M.S. in Human-Computer Interaction (HCI) will combine coursework in human-computer interaction, technical communication, human factors, information design, cognitive science, and computer science to provide the education designers of such systems will need in the future.

The program will integrate theory of computer usability and human communication theory with research and practice in designing and evaluating human-computer communication systems. While the program will provide HCI implementation skills, the focus is on the study of basic problems in human-technology communication. Our degree emphasizes fundamental principles and evaluation of human-computer interfaces, performance support systems, and system usability, rather than focusing on the hardware or software tools used to implement products.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in an applicable area from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- TOEFL required for international students
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- At least 15 credits must be at the 6000 level
- Minimum 3.0 GPA

#### PLAN OF STUDY (30 credit hours)

##### I. Core Course Requirements (21 credits)

Students complete the HCI certificate as part of the M.S. program. Studio Design in HCI constitutes the capstone course.

COMM-6420	Foundations of HCI Usability
COMM-6750	Communication Design for the World Wide Web
COMM-6760	Electronic Coaching Systems
COMM-6810	Studio Design in HCI
COMM-696X	Information Architecture
COMM-6480	Theory and Research in Technical Communication and HCI

Select one of the following courses:

COMM-6XXX	Research Methods in HCI
COMM-6530	Communication Research I

NOTE: Students may substitute COMM-696x Professional Master's Project (Terminal M.S. students only) or COMM-6990 Master's Thesis (Ph.D. track) as their Capstone Requirement instead of COMM-6810 Studio Design in HCI.

##### II. HCI Implementation Course (3 credits)

Select one of the following courses:

COMM-696X	HCI Prototype Production
COMM-696X	HCI Implementation: Flash
COMM-6961	Interactive Narrative

##### III. Advanced HCI Topics Elective (6 credits)

COMM-69XX	Seminar in Human-Computer Interaction Research
COMM-696X	Advanced Topics in HCI

Courses designated as HCI topics courses may be added in the future.

NOTE: Students who apply for a waiver for one of the above requirements may substitute the following courses offered on the Troy campus:

- Additional courses in Research Methods/Usability Testing such as COMM-6963 Ethnography and Cultural Analysis or PSYC-6570 Advanced Behavioral Statistics
- Additional courses in Human Factors/Cognitive Psychology such as PSYC-6240 Cognitive-Systems Engineering
- Electives in Communication chosen from department offerings. Courses available in Web Design, Interface Design, Characters for Games, and other areas.

## MASTER OF ENGINEERING IN

### Industrial and Management Engineering

Industrial and Management Engineering (IME) draws upon specialized knowledge in the mathematical, physical and behavioral sciences as well as principles of engineering analysis and design to specify, predict, evaluate, maintain, and improve the performance of productive systems. It is an engineering discipline that emphasizes interpersonal as well as technical skills. Rensselaer's Master's in IME is designed to educate engineers who can develop, implement and integrate systems made up of people, machines, materials, information and technology. Graduates from the program are prepared to lead efforts aimed at achieving productivity growth, quality leadership, cultural change in the workplace, the application of new technologies, and other important initiatives affecting the competitiveness and effectiveness of organizations. The prerequisites for the program are introductory courses in applied statistics and operations research; they may be taken as part of the master's degree plan of study. The program includes core courses in information systems, simulation modeling, strategic management of technological innovation, analytical models in manufacturing and logistical systems, and a restricted elective in applied statistics such as a quality control course. The core courses provide a foundation in the areas of information systems, computer based modeling, analytical modeling, statistical analysis, and management. Based on the student's interest and technical background, a concentration area is selected which provides depth in at least one area of specialization. In most cases, the concentration builds directly on one or more core courses.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree from an accredited undergraduate institution
- Strong undergraduate performance
- Evidence of strong quantitative and problem-solving skills
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- GRE required
- TOEFL required for international students
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated Status
- Approved Plan of Study
- At least 15 credits must be at the 6000 level
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY (30 credit hours)

The department offers the Master of Science and Master of Engineering degrees in Industrial and Management Engineering. Both degrees require a minimum of 30 credit hours. The Master of Science degree requires a thesis. The Master of Engineering degree is a non-thesis option. Prerequisite requirements for the Master's programs include the following courses or their equivalents:

DSES-4140	Statistical Analysis (or equivalent)
DSES-6610	Systems Modeling in Decision Sciences (or equivalent)

To complete the Master's degree requirements, students must include a minimum of 24 credits from the list of approved Industrial and Information Systems Engineering courses for the Master's program. The courses selected may include the two required prerequisite courses listed above but must simultaneously define an advisor-approved, application-focused concentration area, (e.g., manufacturing logistics, optimization, information security, etc.). A minimum of 50% of credit hours in the plan of study must be at the 6000 level or higher.

The following courses may be included among the 24 credits of restricted electives:

#### Approved Industrial and Information Systems Engineering Courses for the Master's Program:

DSES-4200	Design and Analysis of Work Systems
DSES-4210	Design and Analysis of Supply Chains
DSES-4230	Quality Control
DSES-4240	Engineering Project Management
DSES-4250	Facilities Planning and Industrial Logistics
DSES-4260	Industrial Safety and Hygiene
DSES-4290	Discrete Event Simulation Modeling and Analysis
DSES-4750	Probability Theory and Applications
DSES-4760	Mathematical Statistics
DSES-4780	Computational Optimization
DSES-4810	Computational Intelligence
DSES-4960	Optimization Algorithms and Applications
DSES-6010	Applied Regression Analysis
DSES-6020	Design of Experiments
DSES-6100	Time Series Analysis
DSES-6140	Exploratory Data Analysis
DSES-6180	Knowledge Discovery and Data Mining
DSES-6210	Theory of Production Scheduling
DSES-6500	Inf. and Decision Technologies for Industrial and Service Systems
DSES-6520	Enterprise Database Systems
DSES-6530	Decision Support and Expert Systems
DSES-6570	Information Technology and Systems for E-Business
DSES-6610	Systems Modeling in Decision Sciences
DSES-6760	Combinatorial Optimization and Integer Programming
DSES-6770	Linear Programming
DSES-6780	Nonlinear Programming
DSES-6820	Queuing Systems and Applications
DSES-6870	Introduction to Neural Networks

## MASTER OF SCIENCE IN Information Technology

Information Technology is the focal point of a revolution in which computer science and computing tools and techniques drive innovation across a wide spectrum of businesses and industries. Rensselaer's interdisciplinary Master of Science program in Information Technology, distinguished by its currency, intensity and rigor, is educating a cadre of leaders in this revolution. Students gain a theoretical grounding in computing not often acquired "on the job" and a significant body of coursework in a technical IT concentration that will qualify them as IT specialists in that field. Rensselaer's IT graduates are able to "do" as well as "talk about" the application of Information Technology.

Master's students complete one course in each of five Core areas: Networking, Software Design, Database Systems, Management of Technology, and Human-Computer Interaction. In addition to the five Core courses, students will select three additional concentration courses plus the IT Capstone course and one additional elective for a total of ten courses.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree with competitive academic record from an accredited undergraduate institution
- Completion of a three semester undergraduate sequence of prerequisite courses that is equivalent to Rensselaer's sequence of CSCI-1100 Computer Science I (Fundamentals of Computer Science), CSCI-1200 Data Structures II (Data Structures, Introductory Algorithm Analysis), and CSCI-2300 Introduction to Algorithms
- An undergraduate course in Database Systems (If not previously completed, this course can be taken at Rensselaer as an addition to the degree requirements)
- Completed application form
- Official transcripts for all academic study
- Statement of background and goals as it applies to the program
- TOEFL required for international students
- GRE required (A waiver may be granted for if applicants have a master's degree, outstanding academic records, or have completed the Certificate in IT)
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated Status
- Approved Plan of Study
- At least 18 credits must be at the 6000 level
- A minimum of 9 credits in an approved concentration
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY (minimum of 30 credit hours)

#### I. Required Core Courses (16 credits)

CSCI-4380	Database Systems
ECSE-4670	Computer Communication Networks
ECSE-6770	Software Engineering I
ITEC-6300	Business Issues for Engineers & Scientists
COMM-6420	Foundations of HCI Usability

#### Advanced Core options for students who have previously completed a Core Course

DSES-6520	Enterprise Database Systems
CSCI-6390	Database Mining
ECSE-6600	Internet Protocols
CSCI-6960	Cryptography & Network Security I
ECSE-6780	Software Engineering II
MGMT-6140	Information Systems for Management
MGMT-6080	Networks, Innovation & Value Creation
MGMT-6610/	Global Strategic Management of
DSES-6470	Technological Innovation

COMM-6760	Electronic Coaching Systems
COMM-6750	Communication Design for the WWW

#### II. Concentrations (9 credits)

Select one area—Students must take three courses to complete the concentration

##### Human-Computer Interaction

COMM-6760	Electronic Coaching Systems
COMM-6750	Communication Design for the World Wide Web
COMM-6810	Studio Design in HCI
COMM-6480	Theory and Research in Technical Communications and HCI
COMM-696X	HCI Prototype Production
COMM-696X	HCI Implementation: Flash

##### Financial Engineering

MATH-4740	Introduction to Financial Mathematics & Engineering
MGMT-696X	Financial Simulations
MGMT-7760	Risk Management

With Advisor approval, choose two additional courses:

CSCI-696X	Computational Finance
DSES-6100	Time Series Analysis
ECON-4120	Quantitative Analysis
ECON-6570	Advanced Econometrics
MATH-4800	Numerical Computing
MATH-4820	Introduction to Numerical Methods for Differential Equations
MATP-4620	Mathematical Statistics
MATP-4700	Mathematical Models of Operations Research
MATP-4820	Computational Optimization
MATP-6640	Linear Programming
MGMT-6370	Derivatives Markets
MGMT-6240	Financial Trading and Investing
MGMT-6410	Investment

##### Information Systems Engineering

DSES-6570 IT & Systems for E-Business (required)

Select two more of the following courses:

DSES-6530	Decision Support and Expert Systems
MGMT-6170	Advanced Systems Analysis & Design
ECSE-6780	Software Engineering II
DSES-6610	Systems Modeling in Decision Sciences
DSES-6620	Discrete Event Simulation
CSCI-6390	Database Mining
DSES-6180	Knowledge Discovery with Data Mining

## MASTER OF SCIENCE IN Information Technology continued

### Management Information Systems

MGMT-6170	Advanced Systems Analysis and Design
MGMT-6080	Networks, Innovation & Value Creation
MGMT-6140	Information Systems for Management
MGMT-6180	Strategic IS Management
DSES-4240	Engineering Project Management
MGMT-4130	Enterprise IT Integration
DSES-6180	Knowledge Discovery with Data Mining
CSCI-6390	Database Mining
DSES-6530	Decision Support & Expert Systems
MGMT-4150	IT Project Management
MGMT-496X	Interactive Marketing & Information Technology

NOTE: A maximum of five MGMT courses may be taken toward the M.S. in IT degree; including Core, Concentration, and Elective courses.

### Networking

CSCI-4220	Network Programming
CSCI-696X	Cryptology & Network Security I
CSCI-697X	Network Security II
CSCI-4650	Networking Laboratory I
CSCI-4660	Networking Laboratory II
CSCI-6500	Distributed Computing over the Internet
CSCI-6510	Distributed Algorithms & System
CSCI-696X	Parallel and Distributed Simulation
ECSE-4690	Experimental Networking
ECSE-6600	Internet Protocols
ECSE-6660	Broadband & Optical Networking
ECSE-6670	Local Computer Networks & Multiaccess Communication
ECSE-6820	Queuing Systems & Applications
ECSE-696X	Mobile Wireless Networks

### Software Design

CSCI-4220	Network Programming
CSCI-4440	Software Design and Documentation
CSCI-6500	Distributed Computing Over the Internet
CSCI-696X	Program Analysis for Software Tools & Engineering
MGMT-6170	Advanced Systems Analysis and Design
ECSE-6780	Software Engineering II
COMM-6810	Studio Design in HCI

### Database and Intelligent Systems

DSES-6520	Enterprise Database Systems
CSCI-4020	Computer Algorithms
CSCI-4150	Introduction to AI
CSCI-6460	Advanced Database Management Topics
DSES-6180	Knowledge Discovery with Data Mining
CSCI-6390	Database Mining
CSCI-69XX	Multimedia Database Systems
DSES-6530	Decision Support & Expert Systems
ECSE-6710	Fuzzy Sets & Expert Systems

### Information Security

CSCI-4210	Operating Systems
CSCI-696X	Cryptography & Network Security I
CSCI-696X	Database & Application Security

If only two of the above were chosen, select one more of the following courses:

MATH-4020	Introduction to Number Theory
CSCI-69XX	Network Security II
CSCI-6390	Database Mining
DSES-6180	Knowledge Discovery with Data Mining

### III. Elective (3 credits)

An elective must be selected to add breadth or depth to the IT degree and must be approved by the IT adviser.

### IV. ITEC-6800 IT and Decision Systems Capstone (3 credits)

## MASTER OF SCIENCE IN Management

Rensselaer's Lally School of Management and Technology offers an AACSB accredited M.S. in Management via distance. This 30-credit program builds on Rensselaer's reputation for excellence in programs that focus on the intersection of management and technology. It is based on the conviction that for all firms in the future, sustainable competitive advantage will require a technological foundation. The firms that will lead in global markets will be those that build competitive strength around technological competencies.

The M.S. is a specialized program focused in an area chosen by the student. This unique program includes a core of four courses designed to integrate traditional management concepts with technical functions and issues. Students then tailor the program to their unique educational needs by selecting a 12-credit (four course) concentration. The program also allows for students to take one free elective of their choosing, and ends with a capstone course in Strategy. It is required that students have access to a computer and familiarity with spreadsheet and database software.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree with strong academic performance from an accredited undergraduate institution
- Grades of "B" or better in courses completed since bachelor's degree
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals: answers to application essay
- Two letters of recommendation
- TOEFL required for international students
- GRE or GMAT (GMAT preferred)
- Resume

### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study with concentration defined
- At least 21 credits must be at the 6000 level
- At least 18 credits must be from the Lally School (MGMT)
- Minimum 3.0 GPA
- Culminating Experience

### PLAN OF STUDY (30 Credit hours)

#### I. Management Core (12 credits)

MGMT-6040	Creating and Managing an Enterprise I
MGMT-6050	Creating and Managing an Enterprise II
MGMT-6020	Financial Management I
MGMT-7740	Accounting for Reporting and Control

#### II. Concentration Courses (12 credits)

Select four courses in one concentration, examples include:

##### Management Information Systems

MGMT-6140	Information Systems for Management
MGMT-6170	Advanced Systems Analysis and Design
MGMT-6810	Management of Technical Projects

##### Human-Computer Interaction

COMM-6420	Foundations of HCI Usability
COMM-6750	Communication Design for the World Wide Web
COMM-6760	Electronic Coaching Systems
COMM-6810	Studio Design in HCI

#### Innovation and Entrepreneurship

MGMT-6350	International Business
MGMT-6600	Research and Development Management
DSES-6470	Global Strategic Management of Technological Innovation
MGMT-6810	Management of Technical Projects
MGMT-7050	Developing Innovative New Products and Services I

#### Production and Operations Management

MANE-6800	Manufacturing Systems Integration
MGMT-6350	International Business
MGMT-6450	Manufacturing Systems Management
MGMT-6610	Global Strategic Management of Technological Innovation
MGMT-6810	Management of Technical Projects

Students who wish to design a concentration in other areas such as Mechanical Engineering, Computer Science, or Electrical Engineering may do so with adviser approval.

#### III. Elective (3 credits)

NOTE: If a concentration is chosen outside of the School of Management, then this elective must come from within the School of Management.

1. \_\_\_\_\_

#### IV. Culminating Experience (3 credits)

MGMT-6680	Strategy, Technology, and Global Competitive Advantage
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NOTE: The Lally M.S. program does not include the traditional 3 credit course in statistics. Rather, students are expected to have a basic understanding of statistics before entering the program. To ensure this, students are expected to complete an on-line statistics review and tutorial before the completion of their first semester. A faculty instructor will be available for students needing assistance.

## MASTER OF SCIENCE OR ENGINEERING IN Materials Science and Engineering

The mission of the Graduate Program in Materials Science and Engineering at Rensselaer is to change the world through discovery and development of new materials with novel properties and responses for applications. We are committed to igniting and nurturing creativity in bright minds and to molding future technology leaders through cutting edge scientific research and coursework. We believe in empowering the students to think out-side the box to expand the frontiers of materials science to address and contribute to societal needs in strategic areas including energy, communication, health care, and security.

### MASTER OF SCIENCE

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in materials engineering or a closely-related engineering or science discipline from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- 24 course credits at the 6000 level (18 credits from required courses (see below), and 6 credits from elective courses).
- 6 credits for M.S. these
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY (minimum 30 credit hours)

##### I. Required Courses (18 credits)

MTLE-6030	Advanced Thermodynamics (4 credits)
MTLE-6250	Advanced Mechanical Properties of Materials (4 credits)
MTLE-6060	Advanced Kinetics of Materials Reactions (3 credits)
MTLE-6120	Advanced Electronic Properties of Materials (3 credits)
MTLE-6460	Advanced Structure and Bonding in Materials (4 credits)

##### II. Elective Courses (at least 15 credits)

Any courses at the 6000 level from the School of Engineering or the School of Science.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

### MASTER OF ENGINEERING

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in materials engineering or a closely-related engineering or science discipline from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

#### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- 27 course credits (18 credits from required courses (see M.S.), and 9 credits from elective courses; 6 of the 9 elective credits must be at the 6000 level from the School of Engineering or the School of Science).
- 3 credits for M.S. project
- Minimum 3.0 GPA; minimum 30 credits

#### PLAN OF STUDY (minimum 30 credit hours)

##### I. Required Courses (18 credits)

MTLE-6030	Advanced Thermodynamics (4 credits)
MTLE-6250	Advanced Mechanical Properties of Materials (4 credits)
MTLE-6060	Advanced Kinetics of Materials Reactions (3 credits)
MTLE-6120	Advanced Electronic Properties of Materials (3 credits)
MTLE-6460	Advanced Structure and Bonding in Materials (4 credits)

##### II. Elective Courses (9 credits)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

##### III. M.S. Projects (3 credits)

MTLE-6980	Master's Project
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## MASTER OF SCIENCE OR ENGINEERING IN Mechanical Engineering

Rensselaer's Mechanical Engineering Master's program provides an educational experience that trains graduate engineers to address emerging needs in the areas of engineering computation and high performance computing, multi-scale modeling, mechanics of materials, heat transfer and energy conversion, microsystems including MEMS (micro-electro-mechanical systems), microfluidics, microscale energy transport, nanotechnology, computational dynamics, fluid mechanics, control and automation, design and manufacturing, and tribology. These are applied to a wide range of applications including the design and manufacturing of new materials, fuel cells, and biomedical devices.

To accommodate a student's career plans and interests in these areas, the master's program requirements are structured so that there is great flexibility in choosing appropriate courses while ensuring sufficient depth and breadth. Each graduate student has an adviser who has the knowledge to make suggestions of specific courses to further the student's educational goals.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree in engineering
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- TOEFL score of 600 or above (required for international students)
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- At least 18 credits must be at the 6000 level
- At least 21 credits from MANE
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY (30 credit hours)

#### I. MANE Courses (21 credits) (M.Eng. only)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

#### II. Culminating Experience (6-9 credits)

The culminating experience may be fulfilled with one of the following options:

- An approved sequence of three integrated or related courses; at least two courses must be in MANE; only one 4000-level course accepted. One of the courses must involve a project or design experience which integrates or synthesizes knowledge from the other courses taken in the Master's program.  
OR
- A 6 credit project  
OR
- An internship/practicum - minimum of one summer/one semester full-time work in approved setting

#### III. Electives (0-9 credits)

1. \_\_\_\_\_

#### NOTE:

1. A maximum of 6 credits may be taken from outside of Engineering or Science; courses outside of Management are allowed only by pre-approval of a faculty adviser.
2. Students interested in applying for a research oriented M.S. degree should discuss details related to curriculum and graduation requirements with a faculty adviser.

## MASTER OF SCIENCE OR ENGINEERING IN Nuclear Engineering

Rensselaer's Nuclear Engineering Master's program provides an educational experience that trains graduate engineers in methods, devices, and systems required for peaceful use of nuclear technology, specifically the operation, maintenance, reliability, and safety of current generation nuclear power plants, the development of new medical devices, and the development of next generation nuclear systems.

To accommodate a student's career plans and interests in these areas, the master's program requirements are structured so that there is great flexibility in choosing appropriate courses while ensuring sufficient depth and breadth. Each graduate student has an adviser who has the knowledge to make suggestions of specific courses to further the student's educational goals.

### ADMISSION REQUIREMENTS

- Bachelor of Science degree in engineering
- Undergraduate GPA of 3.0 or higher
- Grades of "B" or better in courses completed since bachelor's degree
- GRE required
- TOEFL score of 600 or above (required for international students)
- Completed application form
- Official transcripts for all undergraduate and graduate work
- Statement of background and goals as it applies to the program
- Two letters of recommendation
- Resume

### GRADUATION REQUIREMENTS

- Matriculated status
- Approved Plan of Study
- At least 18 credits must be at the 6000 level
- At least 21 credits from MANE
- Minimum 3.0 GPA; minimum 30 credits

### PLAN OF STUDY (30 credit hours)

#### I. MANE Courses (21 credits)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

#### II. Culminating Experience (6-9 credits)

The culminating experience may be fulfilled with one of the following options:

- An approved sequence of three integrated or related courses; at least two courses must be in MANE; only one 4000-level course accepted. One of the courses must involve a project or design experience which integrates or synthesizes knowledge from the other courses taken in the Master's program.  
OR
- A 6 credit project  
OR
- An internship/practicum - minimum of one summer/one semester full-time work in approved setting

#### III. Electives (0-9 credits)

1. \_\_\_\_\_

#### NOTE:

1. A maximum of 6 credits may be taken from outside of Engineering or Science; courses outside of Management are allowed only by pre-approval of a faculty adviser.
2. Students interested in applying for a research oriented M.S. degree should discuss details related to curriculum and graduation requirements with a faculty adviser.

## CERTIFICATE IN

### Human-Computer Interaction

Building on a base of experience and expertise, the Department of Language, Literature, and Communication is proud to offer a graduate level Certificate in Human-Computer Interaction (HCI) for working professionals. As the computer industry has matured, the number of software and hardware products has greatly increased and the release time has shortened considerably. These trends have extended computer use beyond a small cadre of specialists to much of the public, and from a small number of calculation-intensive operations to a wide range of computer and communication tasks.

This program, designed in cooperation with industry experts, provides those involved in the design of human-computer interactions with the knowledge and skills they will need to create new and better ways for people to communicate with and through computers. The certificate, comprised of four graduate courses, provides an overview of HCI usability, in-depth work in electronic coaching systems, communication design for the World Wide Web, and a capstone design experience.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree in an applicable area from an accredited undergraduate institution
- Cumulative GPA 3.0 minimum
- Prerequisite requirements for all certificate courses
- Completed application form (requesting non-matriculated status)
- Official transcripts for all undergraduate and graduate work
- TOEFL required for all international students
- Brief statement of background and goals as it applies to the program

#### CREDENTIALS EARNED

- 12 Rensselaer graduate credits
- Certificate in Human-Computer Interaction

#### CERTIFICATE COMPLETION REQUIREMENTS

- Status as a matriculated or non-matriculated Rensselaer student
- Completion of all four courses with a grade of "B" or better

#### PLAN OF STUDY

1. COMM-6420 Foundations of HCI Usability
2. COMM-6750 Communication Design for the World Wide Web
3. COMM-6760 Electronic Coaching Systems
4. COMM-6810 Studio Design in HCI

## CERTIFICATE IN

### Information Technology

Rensselaer's multidisciplinary certificate in Information Technology is designed to provide a comprehensive grasp of a broad range of IT topics, ranging from software development to technical project management. Students must complete courses in four of the five areas listed below. Students with a significant background in one of the areas should complete courses in the remaining areas. A minimum of two of the four courses must be at the 6000 level.

#### ADMISSION REQUIREMENTS

- Bachelor of Science degree with a competitive academic record from an accredited undergraduate institution
- Applicants requesting admission to this certificate must have already completed a minimum of a three-semester sequence in computer science that is equivalent to Rensselaer's courses entitled Computer Science I (Fundamentals of Computer Science), Computer Science II (Data Structures, Introductory Algorithm Analysis), and "Advanced" Data Structures and Algorithm Analysis. Please consult the Rensselaer catalog for full course descriptions.
- Prerequisite requirements for all certificate courses
- Completed application form
- TOEFL required for all international students
- Official transcripts from bachelor's degree or highest degree earned

#### CREDENTIALS EARNED

- 12-14 Rensselaer graduate credits
- Certificate in Information Technology

#### CERTIFICATE COMPLETION REQUIREMENTS

- Status as a matriculated or non-matriculated Rensselaer student
- Completion of all four courses with a grade of "B" or better

#### PLAN OF STUDY

Complete one course from four of the following five areas:

- I. Networking**  
ECSE-4670 Computer Communications Networks
- II. Database Systems**  
CSCI-4380 Database Systems (for entry-level students)  
DSES-6520 Enterprise Database Systems (for students who completed a database course)
- III. Software Engineering**  
ECSE-6770 Software Engineering I
- IV. Management of Technology**  
ITEC-6300 Business Issues for Engineers and Scientists
- V. Human-Computer Interaction**  
COMM-6420 Foundations of HCI Usability

## CERTIFICATE IN

### **Innovation and Technology Management**

The Lally School of Management and Technology certificate program in Innovation and Technology Management combines an introduction to fundamental management best practices with specialist topics in emerging technology, innovation, and entrepreneurship. The program is designed for technology professionals and others committed to developing critical managerial skills to lead technologically intensive initiatives and organizations. Participants will develop, implement and refine an actionable set of management best practices unique to their own organizations.

#### **ADMISSION REQUIREMENTS**

- Bachelor of Science degree from an accredited undergraduate institution
- Undergraduate GPA of 3.0 or higher
- Prerequisite requirements for all certificate courses
- Completed application form
- Official transcripts from bachelor's degree or highest degree earned
- TOEFL required for all international students
- Access to a computer and familiarity with spreadsheet and database software

#### **CREDENTIALS EARNED**

- 12 Rensselaer graduate credits
- Certificate in Innovation and Technology Management

#### **CERTIFICATE COMPLETION REQUIREMENTS**

- Status as a matriculated or non-matriculated Rensselaer student
- Completion of all four courses with a grade of "B" or better

#### **PLAN OF STUDY**

1. MGMT-6040 Creating and Managing an Enterprise I
2. MGMT-6050 Creating and Managing an Enterprise II
3. MGMT-6810 Management of Technical Projects
4. MGMT-696X Managing in the Technology Intensive Enterprise  
or  
MGMT-6620 Principles of Technological Entrepreneurship







**INFORMATION AND CONTACTS:**

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