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Welcome

Welcome to the Department of Civil and Environmental Engineering. This handbook should assist students in understanding the role of Civil and Environmental Engineers and how best to negotiate their degree at Rensselaer.

Civil Engineering Program

Civil engineers are involved in providing the physical infrastructure that supports civilization, including shelter, transportation, water supply and waste disposal and/or recycling. Constructed facilities, their planning, analysis, design, construction, maintenance and operation, are the forte of civil engineering. Civil engineers use computational tools, engineered and natural materials and human creativity to design, construct and maintain the physical infrastructure, which supports the quality of life of the Earth's population.

For the individual who has a strong interest in innovative planning, design and construction, civil engineering offers far ranging opportunities for applying knowledge and creativity in making the world a better place to live. Students in civil engineering study the two year common core curriculum in engineering, followed by core civil engineering courses in structural engineering, geotechnical engineering, transportation engineering and environmental engineering. These courses are supplemented by elective concentrations in any one of the sub-areas listed above, as well as in the area of construction engineering in cooperation with the School of Architecture.

Civil Engineering Program Educational Objectives

Undergraduate concentrations include construction, environmental, geotechnical, structural, and transportation engineering. Following the sample four-year schedule is the recommended collection of courses for each of these concentrations.

- Contribute to the body of knowledge in Civil Engineering as professionals engaged in problem-solving, design, discovery, and responsible application of technology;
- Further develop leadership skills by accepting increasing levels of responsibility in engineering practice, communicating in professional and civic forums, and progressing toward professional licensure;
- Continue to develop both professionally and personally through graduate study, participation in professional societies, continuing education, and community service.

The Rensselaer bachelor’s program in Civil Engineering builds upon a broad base of studies in mathematics, basic science, and fundamental engineering topics. Students then concentrate in geotechnical, structural, transportation, or environmental engineering with a culminating senior-design experience in the Civil Engineering Capstone Design course. A minimum of 128 credit hours is required for this curriculum.

Qualified students may pursue a professional program leading to the Master of Engineering (M.Eng.) degree as well as the B.S. degree. For this program, an additional 30 credit hours are required beyond the B.S. degree.
Environmental Engineering Program

The Environmental Engineering program brings together dedicated people to study and work on the pressing environmental issues of our time. We prepare students for environmental careers in consulting engineering practice, private industry, national and international research laboratories, government agencies and academia, as well as in many cross-disciplinary areas of engineering, science and public policy. The department maintains close ties with people and organizations in all these career venues through an active research agenda and a vibrant alumni community. 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.

Our long-standing tradition of education in environmental problem solving at Rensselaer spans from the pioneering work on water analysis by William Pitt Mason in the later 1800's to the visionary environmental engineering ideas of Edward J. Kilcawley who introduced environmental engineering as an option in the mid-1940's and as a degree program in the mid-1950's. In addition to the Department of Civil and Environmental Engineering, there are faculty members at Rensselaer with teaching and research interests in environmental problem solving in the Departments of Biology, Chemical Engineering, Chemistry, Earth and Environmental Sciences and Applied Math.

Environmental Engineering Program Educational Objectives

While certain objectives of an undergraduate education in engineering are common to all programs, there are subtle but important differences depending upon the student’s chosen field. In this regard, Environmental Engineering baccalaureate will:

- Contribute to the body of knowledge in Environmental Engineering as professionals engaged in problem-solving, design, discovery, and responsible application of technology;
- Further develop leadership skills by accepting increasing levels of responsibility in engineering practice, communicating in professional and civic forums, and progressing toward professional licensure;
- Continue to develop both professionally and personally through graduate study, participation in professional societies, continuing education, and community service

The Rensselaer bachelor’s program in Environmental Engineering builds upon a broad base of studies in chemistry, life sciences, mathematics and engineering sciences, including such topics as elementary mechanics, computer aided design, fluid mechanics, applied statistics, probability, and professional development.

The Environmental Engineering course sequence addresses environmental issues associated with air, land, and water systems and associated environmental health impacts; integrated laboratory experiences prepare students to design experiments and critically analyze and interpret data. Engineering topics treated at an advanced level include water purification, chemical fate and transport, air quality, hydrology and hydraulics. Design experiences are integrated throughout the curriculum, culminating in the capstone Environmental Process Design course. A minimum of 128 credit hours is required for this curriculum.

Qualified students may pursue a professional program leading to the Master of Engineering (M.Eng.) degree as well as the B.S. degree. An additional 30 credit hours are required beyond the B.S. degree.
Contact Information

Department Head:                Chris Letchford, DPhil (Oxf) letchc@rpi.edu  JEC 4052

Associate Head for Academic Affairs:                    Michael O'Rourke, Ph.D. orourm@rpi.edu  JEC 4046

Administrative Staff:
  Graduate Admissions     Kim Boyce boycek@rpi.edu  JEC 4049

Faculty

There are 18 regular faculty in civil and environmental engineering, with doctorates from internationally recognized programs. Many of the faculty have extensive practical experience, and all are determined to prepare our students for the challenges of civil and environmental engineering careers.

Graduate Programs

The Department offers graduate opportunities leading to Master of Engineering (ME), Master of Science (MS), and Doctor of Philosophy (PhD) degrees in civil engineering, environmental engineering and transportation engineering.

Employment and Research Opportunities

There are numerous opportunities for employment in the summer, as well as co-op assignments during the regular academic year, in the design and construction industries and with government agencies. Many of our students take advantage of the opportunity to participate in on-campus undergraduate research projects with our faculty.

Useful Links:

Advising and Learning Assistance Center:  http://alac.rpi.edu/setup.do
Career Development Center:  http://www.rpi.edu/dept/cdc/
Co-Op / Internships:  http://www.rpi.edu/dept/cdc/students/experience/coop/index.html
Course Catalog:  http://www.rpi.edu/academics/catalog/
International Programs:  http://undergrad.rpi.edu/update.do?catcenterkey=81
Registrar Forms:  http://srfs.rpi.edu/update.do?catcenterkey=29
Student Information System:  http://sis.rpi.edu/
Undergraduate Research Program:  http://undergrad.rpi.edu/update.do?catcenterkey=77
## CIVIL ENGINEERING

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Department</th>
<th>Office</th>
<th>Extension</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarek Abdoun</td>
<td>Professor</td>
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<tr>
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Civil Engineering Bachelor’s Degree Requirements

The requirements of the BSCE program are outlined as follows:

- The BSCE degree requires a minimum of 128 credit hours.
- The minimum grade point average (GPA) is 2.0.
- The course content in humanities and social sciences must total a minimum of 24 credit hours, including at least eight credit hours in the humanities and eight credit hours in the social sciences. For engineering students, four of these credits are satisfied with Professional Development courses (PDI, II and III). For information on additional requirements see the School of Humanities, Arts, and Social Sciences section of the course catalog.
- Every Civil Engineering student is required to take at least two communication-intensive (CI) courses. One of these (CI) courses must be taught in the School of Humanities, Arts, and Social Sciences (HASS). A list of HASS (CI) courses is available on the Student Information System (SIS) homepage. The other CI course for Civil Engineering is CIVL 4920 CE Capstone Design.
- The student must be registered full-time for a minimum of four semesters. Two semesters of part-time study at Rensselaer will be considered equivalent to one semester of full-time study. In addition, the student must complete a minimum of 48 credit hours at Rensselaer, all of which will be applied to the baccalaureate degree. If a transfer student elects to study abroad through the REACH Program, no more than 12 such credits may apply to the 48 needed for the bachelor’s degree.

A degree candidate must earn the last 30 credits in courses completed on this campus or through a program formally recognized by the Institute. Transfer courses are limited to two courses or eight credits counting toward the student’s last 30 credits and require approval of the director of the Advising and Learning Assistance Center.

Dual Majors

Undergraduate students who fulfill all the degree requirements for two curricula and who have met the conditions below will have completed a dual major. They will receive one diploma noting both majors. (1) The student must designate a first-named and second-named major in writing at least one semester prior to graduation, and have the appropriate department(s) approve this designation prior to filing the dual major form with the registrar. (2) Each student will be assigned an adviser in each department who will monitor progress towards degrees in that specific department. (3) The degree clearance officer in each department will certify that the student has met the degree requirements in that department. (4) The 24-credit-hour mathematics/science requirement and the 24-credit-hour humanities and social sciences requirement will satisfy the Institute requirements for both majors.
REQUIRED NAMED COURSES FOR B.S. IN CIVIL ENGINEERING

FIRST YEAR FALL:

CHEM-1100 - Chemistry I
Principles of chemistry, with particular focus on atomic and molecular structure and bonding, periodicity, basic thermodynamic principles, introduction to acid-base chemistry and elementary chemical equilibrium, and introduction to organic chemistry. Students cannot get credit for both this course and CHEM-1110. Fall term annually. 4 credit hours

ENGR-1100 - Introduction to Engineering Analysis
An integrated development of linear algebra and statics emphasizing engineering applications and also incorporating computer exercises involving matrix techniques and calculations using available software packages. Fall, spring, and summer terms annually. 4 credit hours

CIVL-1200 - Engineering Graphics for Civil Engineers
An introduction to the elements of computer aided design for Civil and Environmental Engineers using AutoCAD Civil 3D. Students will be introduced to basic AutoCAD drafting techniques as well as learn the key features of Civil 3D that aid site development design and analysis. Topics covered will include general AutoCAD techniques, existing conditions development and analysis using field collected survey data and GIS information, pipe network design, grading design, and roadway corridor layout. Spring term annually. 3 contact hours, 1 credit hour

Note: CIVL 1200 may be replaced with ENGR 1200.

MATH 1010 - Calculus I
Functions, limits, continuity, derivatives, implicit differentiation, related rates, maxima and minima, elementary transcendental functions, introduction to definite integral with applications to area and volumes of revolution. Fall and spring terms annually. 4 credit hours

FIRST YEAR SPRING:

CIVL-1100 – Introduction to Civil and Environmental Engineering
Deals with the practice of Civil and Environmental Engineering. Not a highly analytical course, as the course is primarily intended for first year students. Some topics: history of Civil Eng.; present practice; typical employers; typical projects; design philosophy; professional topics including organizations, registrations, ethics. Discuss case histories, bring in outside speakers. Students attend CE Capstone presentations. Spring term annually. 1 credit hour

Note: CIVL 1100 may be replaced with ENGR 1300.

MATH-1020 - Calculus II
Techniques and applications of integration, polar coordinates, parametric equations, infinite sequences and series, vector functions and curves in space, functions of several variables, and partial derivatives. Prerequisite: MATH 1010. Fall and spring terms annually. 4 credit hours

PHYS-1100 - Physics I
The first semester of a two-semester sequence of interactive courses. Topics include linear and angular kinematics and dynamics, work and energy, momentum and collisions, forces and fields, gravitation, oscillatory motion, waves, sound and interference. Corequisite: MATH 1010 or equivalent or permission of instructor. Credit cannot be obtained for both Physics 1050 and Physics 1100. Fall and spring terms annually. 4 credit hours
SECOND YEAR FALL:

ENGR-2050 - Introduction to Engineering Design
A first course in engineering design which emphasizes creativity, teamwork, communication, and work across engineering disciplines. Students are introduced to the design process through a semester-long project which provides a design-build-test experience. Oral and written communication are important elements of the course. The course meets with ENGR 1010. Prerequisites: ENGR 1100 and ENGR 1200. Corequisite: PHYS 1200.
Fall, spring, and summer terms annually. 4 credit hours

MATH-2400 - Introduction to Differential Equations
First-order differential equations, second-order linear equations, eigenvalues and eigenvectors of matrices, systems of first-order equations, stability and qualitative properties of nonlinear autonomous systems in the plane, Fourier series, separation of variables for partial differential equations. Prerequisites: MATH 1020 and some knowledge of matrices.
Fall and spring terms annually. 4 credit hours

PHYS-1200 - Physics II
The second semester of the two-semester sequence of interactive courses. Topics include electric and magnetic forces and fields, Gauss’s Law, dc and ac circuits, Ampere’s Law and Faraday’s Law, electromagnetic radiation, physical optics, and quantum physics. Prerequisite: PHYS 1100 or equivalent or permission of instructor. Corequisite: MATH 1020.
Fall and spring terms annually. 4 credit hours

SECOND YEAR SPRING:

CSCI-1190 - Beginning C Programming for Engineers
This course teaches elementary programming concepts using the MATLAB environment for engineering students with little or no prior programming experience. Concepts include variables, looping, and function calls. Students cannot get credit for CSCI 1190 after earning credit for CSCI 1100 or any higher level CSCI course. Fall and spring terms annually. 1 credit hour
Note: CSCI 1190 may be replaced with CSCI 1100 Computer Science I or CSCI 1010 Introduction to Computer Programming.

ENGR-2090 - Engineering Dynamics
An integrated development of modeling- and problem-solving techniques for particles and rigid bodies emphasizing the use of free-body diagrams, vector algebra, and computer simulation. Topics covered include the kinematics and kinetics of translational, rotational, and general plane motion, energy and momentum methods. Prerequisites: ENGR 1100 and PHYS 1100. Corequisite: MATH 2400. Fall and spring term annually. 4 credit hours

ENGR-2250 - Thermal and Fluids Engineering I
Application of control volume balances of mass, momentum, energy and entropy in systems of practical importance to all engineers. Identification of control volumes, properties of pure materials, mass and energy conservation for closed and open systems, second law of thermodynamics, Bernoulli equation, fluid statics, forces and heat transfer in external and internal flows, conduction and radiative heat transfer. Prerequisites: ENGR 1100 and PHYS 1100. Corequisite: MATH 2400. Fall, spring, and summer terms annually. 4 credit hours
ENGR-2530 - Strength of Materials
Concept of stress and strain, generalized Hooke’s law, axial load, torsion, pure bending, transverse loading, transformation of stress and strain components in 2-D, design of beams and shafts for strength, deflection of beams, work and energy, columns. Prerequisite: ENGR 1100.
Fall, spring and summer terms annually. 4 credit hours

THIRD YEAR FALL:
CIVL-2030 - Introduction to Transportation Engineering
Introduction to basic concepts in transportation engineering including planning, design, and operations. Introduces the challenges and issues in modeling transportation problems. Studies of various concepts related to the design of highway facilities, level of service, and demand for transportation services. Concepts related to signal optimization. Policy implications. Basics of transportation planning. Prerequisite: MATH 2400. Fall term annually. 4 credit hours

CIVL-2630 - Introduction to Geotechnical Engineering
The application of the basic laws and phenomena of science to particulate matter, specifically soils. Basic physical and mechanical structural characteristics of soil. Equilibrium and movement of water. Flow through porous media. Effective stress. Stress-strain-time relations. Basic laboratory work as related to practice. Prerequisite: ENGR 2530. Fall term annually. 4 credit hours

CIVL-2670 - Introduction to Structural Engineering
Introduction to the elastic behavior of structural components. Analysis of statically determinate systems. Deflection calculations by virtual work and elastic load methods. Analysis of simple statically indeterminate structures. Influence lines. Interaction of structural components. Typical structural engineering loads. Prerequisite: ENGR 2530 or equivalent. Fall term annually. 4 credit hours

ENVE-2110 - Introduction to Environmental Engineering
The application of basic principles and equations dealing with water, air, and solid and hazardous wastes; material and energy balances; and chemical and biochemical cycles. Topics include water resources, water quality and pollution, air quality and pollution, solid and hazardous wastes, and environmental legislation. Prerequisite: CHEM 1100; Corequisite: MATH 2400, ENGR 2250.
Fall term annually. 4 credit hours

THIRD YEAR SPRING:
ENVE-4310 - Applied Hydrology and Hydraulics
Physical processes governing occurrence and distribution of precipitation, infiltration, evaporation, and surface water runoff. Statistical hydrology, unit hydrograph theory, and watershed modeling. Floodplain hydrology and open channel hydraulics. Urban hydrology, hydraulics and design of storm sewers, and design of detention structures for flood control. Design project using the Army Corps of Engineers Hydraulic Engineering Center HEC-1 flood hydrograph package. Prerequisite: ENGR 2250 or CHME 4010. Spring term annually. 4 credit hours
ENGR-4760 - Engineering Economics
The objective is to help engineering students recognize and understand the importance of cost factors that are inherent in all engineering decisions. Development of ability to handle engineering problems that involve economic factors. The course includes economic environment, selections in present economy, value analysis, critical path economy, interest and money-time relationships, depreciation and valuation, capital financing and budgeting, basic methods for undertaking economic studies, risk, uncertainty and sensitivity, selections between alternatives, fixed, increment, and sunk costs, the effects of income taxes in economic studies, replacement studies, minimum cost formulas, economic studies of public projects, economic studies in public utilities. Effects of inflation are considered at each step. Students cannot obtain credit for both this course and ENGR 4750. Spring term annually. 3 credit hours

FOURTH YEAR FALL:
ENGR-2600 - Modeling and Analysis of Uncertainty
Appreciation and understanding of uncertainties and the conditions under which they occur, within the context of the engineering problem-solving pedagogy of measurements, models, validation, and analysis. Problems and concerns in obtaining measurements; tabular and graphical organization of data to minimize misinformation and maximize information; and development and evaluation of models. Concepts will be supported with computer demonstration. Applications to problems in engineering are emphasized. Prerequisite: MATH 1010. Fall and spring terms annually. 3 credit hours

FOURTH YEAR SPRING:
CIVL-4920 - Civil Engineering Capstone Design
Open-ended design project in which students work in teams. Oral presentations and written reports cover alternates considered, design assumptions, cost, safety, and feasibility. This is a communication-intensive course. Prerequisites: senior status and CIVL 4070 and CIVL 4080, or CIVL 4010 and CIVL 4150, or CIVL 2030 and CIVL 4660 or CIVL 4640 or ENVE 2110 and either ENVE 4200, ENVE 4350, ENVE 4310 or ENVE 4340. Spring term annually. 3 credit hours

ENGR-4010 - Professional Development III
Students will study issues associated with working in teams in a modern work environment. Various styles of leadership, the definitions of power and empowerment and their applications in industry and team settings will be studied. Additionally, other topics to be explored include vision, values and attitudes, and organizational culture. The course format will include small and large group discussions, case studies, experiential exercises, and regular participation from industry guests. Offered in conjunction with senior courses. 1 credit hour
Note: Can be taken either semester of the senior year.

Additional Requirements
A minimum of 128 credit hours is required for this curriculum. Non-engineering courses grades satisfactory/unsatisfactory cannot be applied toward this 128-credit hour requirement. The Pass/No Credit option can be used only for humanities and social sciences electives subject to Institute-wide HASS core requirements and free electives having a department code other than CIVL or ENVE (per Institute policy, no more than 12 credits total can be taken Pass/No Credit). All other courses used to satisfy the degree requirements must be taken on a graded basis.
# CIVIL ENGINEERING CURRICULUM

<table>
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<tr>
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<th>FIRST YEAR</th>
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<tr>
<td>CHEM 1100 Chemistry I</td>
<td>CIVL 1100 Intro to Civil &amp; Env. Eng</td>
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<td>MATH 1010 Calculus I</td>
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<td>ENGR 1100 Intro. to Eng. Analysis</td>
<td>PHYS 1100 Physics I</td>
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<td>CIVL 1200 Eng. Graphics for Civil Eng</td>
<td>CIVL 1100 Eng. Graphics for Civil Eng</td>
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<td>MATH 2400 Intro. to Differential Eqns.</td>
<td>ENGR 2090 Engineering Dynamics</td>
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<td>PHYS 1200 Physics II</td>
<td>ENGR 2250 Thermal &amp; Fluids Eng. I</td>
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<td>ENGR 2050 Intro. to Eng. Design</td>
<td>ENGR 2530 Strength of Materials</td>
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<td>Hum., Arts or Soc. Sci. El.</td>
<td>CSCI 1190 Beginning C Prog. for Eng.</td>
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<td>CIVL 2030 Intro to Transp. Eng.</td>
<td>CIVL 4010 CE Capstone Design</td>
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<td>ENVE 4310 Applied Hydrology &amp; Hydr.</td>
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<td>CIVL 2670 Intro to Structural Eng.</td>
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<td>ENVE 2110 Intro to Env. Eng.</td>
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<td>Free Elective</td>
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<table>
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<tr>
<td>ENGR 2600 Model. &amp; Analysis of Uncert</td>
<td>CIVL 4920 CE Capstone Design</td>
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<td>CE Design Elective</td>
<td>ENGR 4010 Professional Devel. III</td>
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<td>Free Elective</td>
<td>CE Tech. Elective</td>
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<td>Math and Science Elective</td>
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</tr>
<tr>
<td>7</td>
<td>Hum., Arts or Soc. Sci. El.</td>
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</tbody>
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1. CIVL 1200 may be replaced with ENGR 1200 or ENGR 1400.
2. Any 4-credit course in the School of Science with a prefix of ASTR, BIOL or ERTH.
3. CIVL 1100 may be replaced with ENGR 1300.
4. CIVL 1100 may be replaced with CSCI 1100 or CSCI 1010.
5. Text below lists the allowable courses.
6. This course will be fulfilled from a list published at the start of each semester.
7. Any 4-credit course in the School of Science with a prefix of ASTR, BCBP, BIOL, CHEM, ERTH, MATH or PHYS.
8. Can be taken either semester of the senior year.

128 credits minimum

## CE DESIGN ELECTIVES AND CONCENTRATIONS

**Construction Engineering**
- CIVL 4010 Foundation Engineering (Fall)
- CIVL 4070 Steel Design (Fall)
- CIVL 4080 Concrete Design (Spring)
- CIVL 4150 Experimental Soil Mechanics (Spring)

**Geotechnical Engineering**
- CIVL 4010 Foundation Engineering (Fall)
- CIVL 4140 Geoenvironmental Eng. (Fall)
- CIVL 4150 Experimental Soil Mechanics (Spring)

**Structural Engineering**
- CIVL 4070 Steel Design (Fall)
- CIVL 4080 Concrete Design (Spring)

**Transportation Engineering**
- CIVL 4620 Mass Transit Systems (Spring)
- CIVL 4640 Transp. Facility Design & Planning (Spring)
- CIVL 4660 Traffic Engineering (Fall)
- CIVL 4670 Highway Engineering (Spring)

**Environmental Engineering**
- ENVE 4200 Solid and Hazardous Waste Eng. (Spring)
- ENVE 4340 Physicochemical Processes in Env. Eng. (Spring)
- ENVE 4350 Biological Processes in Env. Eng. (Fall)

**CE TECHNICAL ELECTIVES**
- CIVL 2040 Professional Practice
- CIVL 4240 Intro. to Finite Elements
- CIVL 4270 Construction Management
- CIVL 4440 Advanced Structural Analysis
- CIVL 4450 Conceptual Structural Systems
Civil Engineering Curriculum Helpful Hints

Following the CE curriculum presented above will allow students to graduate with a BSCE Degree in 4 years. However, in the case of Co-op, Semester Abroad, Transfer, deviation from the template and graduating in four years is still possible. Listed below are helpful hints on which deviations from the standard template are possible and which should be avoided.

1) ENGR 2530 Strength of Materials is a prerequisite for both CIVL 2630, Intro. to Geotech and CIVL 2670, Intro. to Structures. Hence, ENGR 2530 should be taken no later than Spring/Sophomore year. If that is not possible, take ENGR 2530 in the summer before Fall/Junior year.

2) The four CEE Intro. courses – CIVL 2030, CIVL 2630, CIVL 2670 and ENVE 2110 – are only offered Fall semester. It is best to take these Fall semester of the Junior year. If taking all four Fall/Junior year is not possible, then take the Intro. courses in your specific area of interest and defer others (i.e., if you are interested in structural engineering, take CIVL 2670 Fall/Junior year and defer CIVL 2030 or ENVE 2110 to Fall/Senior year).

3) CIVL 4920, CE Capstone Design is only offered Spring semester. If you will be taking 4 ½ years to complete your degree, arrange your courses so that the Capstone pre-requisite (two design course sequence) is completed prior to Spring/Senior year.

4) Except for ENGR 2530, Strength of Materials, students can take most required ENGR courses, specifically ENGR 2090, 2250, 2600, 4760 whenever the prerequisite/corequisite is completed.

5) If you are planning to be away from campus for either the Co-op or Study Abroad program, the best time to pursue these programs is the Spring semester, Junior year.
Civil Engineering Required Courses Flowchart

Year One
- MATH 1010 Calculus I
- PHYS 1100 PHYSICS I
- CHEM 1100 Chemistry I
- Basic Science Elective (ASTR, BIOL, ETRH)

Year Two
- MATH 2010 Intro to Differential Equations
- PHYS 2100 PHYSICS II
- ENGR 1010 Intro to Engineering Design
- HASS

Year Three
- ENGR 2020 Materials Engineering
- ENGR 2250 Fluids Engineering
- ENGR 2400 Solid Mechanics
- HASS

Year Four
- ENGR 2530 Strength of Materials
- CIVL 2670 Intro to Geotechnical Engineering
- ENGR 4760 Engineering Economics
- HASS

Design Component
- ENGR 4220 Civil Engineering Capstone Design

Co-Requisite
- Professional Development
- Basic Science
- Math and Science Elective
- ENGR 4010 Professional Development III

Prequsite
- Engr 2110 Introduction to Environmental Engineering
- Engr 2120 Advanced Civil Eng.

- Design component
- Co-Requisite
- Prequsite
Environmental Engineering Bachelor’s Degree Requirements

The requirements of the BSEE program are outlined as follows:

- The BSEE degree requires a minimum of 128 credit hours.
- The minimum grade point average (GPA) is 2.0.
- The course content in humanities and social sciences must total a minimum of 24 credit hours, including at least eight credit hours in the humanities and eight credit hours in the social sciences. For engineering students, four of these credits are satisfied with Professional Development courses (PD I, II and III). For more information on additional requirements see the School of Humanities, Arts, and Social Sciences section of the course catalog.
- Every Environmental Engineering student is required to take at least two communication-intensive courses. One of these courses must be communication intensive and taught in the School of Humanities, Arts, and Social Sciences (HASS). A list of HASS (CI) courses is available on the Student Information System (SIS) homepage. The other CI course for Environmental Engineering is ENVE 4180 Environmental Process Design.
- The student must be registered full-time for a minimum of four semesters. Two semesters of part-time study at Rensselaer will be considered equivalent to one semester of full-time study. In addition, the student must complete a minimum of 48 credit hours at Rensselaer, all of which will be applied to the baccalaureate degree. If a transfer student elects to study abroad or enroll in the co-op program, no more than 12 such credits may apply to the 48 needed for the bachelor’s degree.

A degree candidate must earn the last 30 credits in courses completed on this campus or through a program formally recognized by the Institute. Transfer courses are limited to two courses or eight credits counting toward the student’s last 30 credits and require approval of the director of the Advising and Learning Assistance Center.

Dual Majors

Undergraduate students who fulfill all the degree requirements for two curricula and who have met the conditions below will have completed a dual major. They will receive one diploma noting both majors. (1) The student must designate a first-named and second-named major in writing at least one semester prior to graduation, and have the appropriate department(s) approve this designation prior to filing the dual major form with the registrar. (2) Each student will be assigned an adviser in each department who will monitor progress towards degrees in that department. (3) The degree clearance officer in each department will certify that the student has met the degree requirements in that specific department. (4) The 24-credit-hour mathematics/science requirement and the 24-credit-hour humanities and social sciences requirement will satisfy the Institute requirements for both majors.
REQUIRED NAMED COURSES FOR B.S. IN ENVIRONMENTAL ENGINEERING

FIRST YEAR FALL:
CHEM-1100 - Chemistry I
Principles of chemistry, with particular focus on atomic and molecular structure and bonding, periodicity, basic thermodynamic principles, introduction to acid-base chemistry and elementary chemical equilibrium, and introduction to organic chemistry. Students cannot get credit for both this course and CHEM-1110. Fall term annually. **4 credit hours**

ENGR-1100 - Introduction to Engineering Analysis
An integrated development of linear algebra and statics emphasizing engineering applications and also incorporating computer exercises involving matrix techniques and calculations using available software packages. Fall, spring, and summer terms annually. **4 credit hours**

CIVL-1200 - Engineering Graphics for Civil Engineers
An introduction to the elements of computer aided design for Civil and Environmental Engineers using AutoCAD Civil 3D. Students will be introduced to basic AutoCAD drafting techniques as well as learn the key features of Civil 3D that aid site development design and analysis. Topics covered will include general AutoCAD techniques, existing conditions development and analysis using field collected survey data and GIS information, pipe network design, grading design, and roadway corridor layout. Spring term annually. **1 credit hour**

*Note: CIVL 1200 may be replaced with ENGR 1200.*

MATH 1010 - Calculus I
Functions, limits, continuity, derivatives, implicit differentiation, related rates, maxima and minima, elementary transcendental functions, introduction to definite integral with applications to area and volumes of revolution. Fall and spring terms annually. **4 credit hours**

FIRST YEAR SPRING:
CIVL-1100 – Introduction to Civil and Environmental Engineering
Deals with the practice of Civil and Environmental Engineering. Not a highly analytical course, as the course is primarily intended for first year students. Some topics: history of Civil Eng.; present practice; typical employers; typical projects; design philosophy; professional topics including organizations, registrations, ethics. Discuss case histories, bring in outside speakers. Students attend CE Capstone presentations. Spring term annually. **1 credit hour**

*Note: CIVL 1100 may be replaced with ENGR 1300.*

MATH 1020 - Calculus II
Techniques and applications of integration, polar coordinates, parametric equations, infinite sequences and series, vector functions and curves in space, functions of several variables, and partial derivatives. Prerequisite: MATH 1010. Fall and spring terms annually. **4 credit hours**

PHYS-1100 - Physics I
The first semester of a two-semester sequence of interactive courses. Topics include linear and angular kinematics and dynamics, work and energy, momentum and collisions, forces and fields, gravitation, oscillatory motion, waves, sound and interference. Corequisite: MATH 1010 or equivalent or permission of instructor. Credit cannot be obtained for both Physics 1050 and Physics 1100. Fall and spring terms annually. **4 credit hours**
SECOND YEAR FALL:

ENGR-2250 - Thermal and Fluids Engineering I
Application of control volume balances of mass, momentum, energy and entropy in systems of practical importance to all engineers. Identification of control volumes, properties of pure materials, mass and energy conservation for closed and open systems, second law of thermodynamics, Bernoulli equation, fluid statics, forces and heat transfer in external and internal flows, conduction and radiative heat transfer. Prerequisites: ENGR 1100 and PHYS 1100. Corequisite: MATH 2400.
Fall, spring, and summer terms annually. 4 credit hours

Note: ENGR 2250 may be replaced by CHME 4010.

ENVE-2110 - Introduction to Environmental Engineering
The application of basic principles and equations dealing with water, air, and solid and hazardous wastes; material and energy balances; and chemical and biochemical cycles. Topics include water resources, water quality and pollution, air quality and pollution, solid and hazardous wastes, and environmental legislation. Prerequisite: CHEM 1100; Corequisites: MATH 2400, ENGR 2250. Fall term annually. 4 credit hours

MATH-2400 - Introduction to Differential Equations
First-order differential equations, second-order linear equations, eigenvalues and eigenvectors of matrices, systems of first-order equations, stability and qualitative properties of nonlinear autonomous systems in the plane, Fourier series, separation of variables for partial differential equations. Prerequisites: MATH 1020 and some knowledge of matrices. Fall and spring terms annually. 4 credit hours

PHYS-1200 - Physics II
The second semester of the two-semester sequence of interactive courses. Topics include electric and magnetic forces and fields, Gauss’s Law, dc and ac circuits, Ampere’s Law and Faraday’s Law, electromagnetic radiation, physical optics, and quantum physics. Prerequisite: PHYS 1100 or equivalent or permission of instructor. Corequisite: MATH 1020. Fall and spring terms annually. 4 credit hours

SECOND YEAR SPRING:

CSCI-1190 - Beginning C Programming for Engineers
This course teaches elementary programming concepts using the MATLAB environment for engineering students with little or no prior programming experience. Concepts include variables, looping, and function calls. Students cannot get credit for CSCI 1190 after earning credit for CSCI 1100 or any higher level CSCI course. Fall and spring terms annually. 1 credit hour

Note: CSCI 1190 may be replaced with CSCI 1100 Computer Science I or CSCI 1010 Introduction to Computer Programming.

ENGR-2050 - Introduction to Engineering Design
A first course in engineering design which emphasizes creativity, teamwork, communication, and work across engineering disciplines. Students are introduced to the design process through a semester-long project which provides a design-build-test experience. Oral and written communication are important elements of the course. The course meets with ENGR 1010. Prerequisites: ENGR 1100 and ENGR 1200. Corequisite: PHYS 1200. Fall, spring, and summer terms annually. 4 credit hours
ENGR-2600 - Modeling and Analysis of Uncertainty
Appreciation and understanding of uncertainties and the conditions under which they occur, within the context of the engineering problem-solving pedagogy of measurements, models, validation, and analysis. Problems and concerns in obtaining measurements; tabular and graphical organization of data to minimize misinformation and maximize information; and development and evaluation of models. Concepts will be supported with computer demonstration. Applications to problems in engineering are emphasized. Prerequisite: MATH 1010. Fall and spring terms annually. 3 credit hours

THIRD YEAR FALL:
CHEM-2250 - Organic Chemistry I
Structure and chemical behavior of organic molecules with particular emphasis on reaction mechanisms as pathways for understanding their reactions. Stereochemistry, synthesis, and spectroscopic methods for the identification of organic functional groups are among the topics included. Prerequisite: CHEM 1100 or 1110 or equivalent. Fall term annually. 3 credit hours

ENVE-4330 - Introduction to Air Quality
Quantitative introduction to the engineering methods for the study of air quality. Topics include but are not limited to: estimation procedures for air pollution emissions; indoor air quality problems, impacts and control strategies; sources, impacts and control strategies for greenhouse gases; dispersion modeling for point sources; pollutant acidification of lakes; chemistry of stoichiometric and non-stoichiometric combustion; assessment methods for human exposure to air pollutants. Includes experimental analysis of air quality and air quality control processes, emphasizing experimental design, data evaluation, and report writing. Prerequisite: ENVE 2110. Fall term annually. 4 credit hours

THIRD YEAR SPRING:
ENVE-4310 - Applied Hydrology and Hydraulics
Physical processes governing occurrence and distribution of precipitation, infiltration, evaporation, and surface water runoff. Statistical hydrology, unit hydrograph theory, and watershed modeling. Floodplain hydrology and open channel hydraulics. Urban hydrology, hydraulics and design of storm sewers, and design of detention structures for flood control. Design project using the Army Corps of Engineers Hydraulic Engineering Center HEC-1 flood hydrograph package. Prerequisite: ENGR 2250 or CHME 4010. Spring term annually. 4 credit hours

ENVE-4320 - Environmental Chemodynamics
The movement of chemicals in air, water, and soil is presented to demonstrate the relation of physiochemical principles in the behavior of chemicals in the environment. Topics include chemical and thermal equilibrium at environmental interfaces, transport fundamentals, and the fate and transport of chemicals in various environmental compartments. Includes experimental analysis of natural and engineered chemical and thermodynamic processes, emphasizing experimental design, data evaluation, and report writing. Prerequisites: ENVE 2110, CHEM 2250. Spring term annually. 4 credit hours

ENVE-4340 - Physicochemical Processes in Environmental Engineering
Physical and chemical processes governing water quality in natural and engineered systems with applications to potable water treatment. Topics include reactor dynamics, coagulation and flocculation, sedimentation, filtration, gas transfer, adsorption and ion exchange, and membrane processes. A design project for which students develop a computer model of an environmental process is required. Includes laboratory experiments to measure physicochemical process parameters, emphasizing experimental design, data evaluation, and report writing. Corequisite: ENVE 4320. Spring term annually. 4 credit hours
FOURTH YEAR FALL:
ENGR-4010 - Professional Development III
Students will study issues associated with working in teams in a modern work environment. Various styles of leadership, the definitions of power and empowerment and their applications in industry and team settings will be studied. Additionally, other topics to be explored include vision, values and attitudes, and organizational culture. The course format will include small and large group discussions, case studies, experiential exercises, and regular participation from industry guests.
Offered in conjunction with senior courses. 1 credit hour
Note: Can be taken either semester of the senior year.

ENVE-4350 - Biological Processes in Environmental Engineering
The study of biochemical and biological processes common to environmental engineering. Introductory physiology, biochemistry and ecology of bacteria, yeasts, fungi. Laboratory work in microbial techniques. Development of reaction rate and mass balances on biological processes for pollution control. Includes experimental analysis of natural and engineered biological processes, emphasizing experimental design, data evaluation, and report writing. Prerequisite: ENVE 4320. Fall term annually. 4 credit hours

FOURTH YEAR SPRING:
ENVE-4180 - Environmental Process Design
The design of equipment, processes, and systems of interest in environmental engineering through application of scientific, technological and economic principles. Emphasis is placed on problem formulation and conceptual, analytical and decision aspects of open-ended design situations. Students will integrate knowledge and skills gained in previous and concurrent courses, and learn research techniques to find and use resources from the technical literature. Health and safety issues are presented. Professional development topics are presented including professional ethics and registration. Students will develop communication skills through proposal preparation, report writing, oral presentation. This is a communication-intensive course. Prerequisite: Senior status and ENVE 2110. Spring term annually. 3 credit hours

ERTH-4180 - Environmental Geology
A consideration of technical and scientific aspects of key geo-societal issues. Case studies and analysis of current and historic data bases will be used to illustrate topics including, but not limited to, climate modification, energy resources, future energy, water resources, water pollution, and health risks posed by lead, mercury, and emerging pollutants. Spring term annually. 4 credit hours

A minimum of 128 credit hours is required for this curriculum. Non-engineering courses grades satisfactory/unsatisfactory cannot be applied toward this 128-credit hour requirement. The Pass/No Credit option can be used only for humanities and social sciences electives (subject to Institute-wide HASS core requirements) and free electives having a department code other than CIVL or ENVE (per Institute policy, no more than 12 credits total can be taken Pass/No Credit). All other courses used to satisfy the degree requirements must be taken on a graded basis.
## ENVIRONMENTAL ENGINEERING CURRICULUM

<table>
<thead>
<tr>
<th>FALL</th>
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<th>YEAR</th>
<th>SPRING</th>
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<td>CHEM 1100</td>
<td>Hum., Arts or Soc. Sci. El.</td>
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<tr>
<td>MATH 1010</td>
<td>Calculus I</td>
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<tr>
<td>ENGR 1100</td>
<td>Intro. to Eng. Analysis</td>
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<tr>
<td>CIVL 1200</td>
<td>Eng. Graphics for Civil Eng(^1)</td>
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<td>MATH 2400</td>
<td>Intro. to Differential Eqns.</td>
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<td>PHYS 1200</td>
<td>Physics II</td>
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<tr>
<td>ENGR 2250</td>
<td>Thermal and Fluids Eng(^4)</td>
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<td>Intro to Env. Eng.</td>
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### Second Year

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<td>ENVE 4330</td>
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### Third Year

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<td>ENVE 4330</td>
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### Fourth Year

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<th>YEAR</th>
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<td>Prof. Development III</td>
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<tr>
<td>ENVE 4350</td>
<td>Biol. Processes in ENVE</td>
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1. CIVL 1200 may be replaced with ENGR 1200 or ENGR 1400.
2. Choose CHEM 1200 and either BIOL 1010 or another biology course chosen in consultation with adviser. Order does not matter.
3. CIVL 1000 may be replaced with ENGR 1300.
4. ENGR 2250 may be replaced by CHME 4010.
5. CSCI 1190 may be replaced with CSCI 1100 or CSCI 1010.
6. This course will be fulfilled from a list published at the start of each semester.
7. Multidisciplinary engineering elective: must be an engineering course, chosen in consultation with the adviser (see examples below).
8. Technical electives must be selected in consultation with the program adviser (e.g., ENVE 4110, ENVE 4200, ENVE 4240, and ENVE 496X).

With adviser approval, courses from other disciplines may also be taken. These include Civil Engineering, Chemical Engineering, and Earth and Environmental Sciences (see examples below).

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### 128 credits minimum

### EE MULTIDISCIPLINARY ENGINEERING ELECTIVES

**Core Engineering**
- ENGR 1600 Materials Science for Engineers (Spring & Fall)
- ENGR 4760 Engineering Economics (Spring)
- ENGR 2530 Strength of Materials (Spring & Fall)

**Transportation Engineering**
- CIVL 2030 Intro. to Transportation Engineering (Fall)

**Geotechnical Engineering**
- CIVL 2630 Intro. to Geotechnical Engineering (Fall)

**Industrial and Systems Engineering**
- ISYE 4260 Human Performance Modeling and Support (Fall)

**Mechanical, Aerospace and Nuclear Engineering**
- MANE 4010 Thermal and Fluids Engineering II (Spring and Fall)

### EE TECHNICAL ELECTIVES

**Environmental Engineering**
- ENVE 4200 Solid and Hazardous Waste Eng. (Spring)
- ENVE 4240 Bench Scale Design (Fall)
- ENVE 4110 Aqueous Geochemistry (Fall)
- ENVE 496X Special Topics announced each semester

**Civil Engineering**
- CIVL 2630 Intro. to Geotechnical Engineering (Fall)
- CIVL 4150 Exp. Soil Mechanics (Spring)
- CIVL 4140 Geoenvironmental Eng. (Fall)

**Chemical Engineering**
- CHME 4030 Chemical Process Dynamics & Control (Fall)
- CHME 4400 Chromatographic Separation Processes (Spring)

**Earth and Environmental Sciences**
- ERTH 4540 Organic Geochemistry (Spring even-numbered years)
- ERTH 4190 Env. Measurements (Fall odd-numbered years)
- ERTH 4710 Groundwater Hydrology (Fall)
Environmental Engineering Curriculum Helpful Hints

Following the ENVE curriculum template will allow students to graduate with a BS ENVE degree in 4 years. However, in the case of Co-op, Semester Abroad, and Transfer, deviation from the template and graduating in four years is still possible. Listed below are helpful hints for such cases.

1) ENGR 2250 Thermal and Fluids Engineering I is a prerequisite for several courses in the Junior year. It is also a corequisite for Intro to Environmental Engineering. Therefore, it should be taken in the Fall of Sophomore year.

2) There are two science electives in the Environmental Engineering curriculum. Students must choose Chemistry II (CHEM 1200) and a biology course; order does not matter. Courses that fulfill the biology requirement include BIOL 1010 - Introduction to Biology and BIOL 2120 - Introduction to Cell and Molecular Biology. Neither course has a prerequisite.

3) Students interested in environmental issues related to soils (landfill design, soil remediation) are encouraged to take CIVL 2630 Intro. to Geotechnical Engineering. It is only offered in the Fall semester. Note that ENGR 2530 Strength of Materials is a prerequisite for CIVL 2630.

4) ENVE 4180, Environmental Process Design, is a capstone design course offered only in the Spring semester. You should arrange your courses to complete ENVE design courses prior to taking ENVE 4180. These include ENVE 4330 Introduction to Air Quality, ENVE 4310 Applied Hydrology and Hydraulics, ENVE 4340 Physicochemical Processes, and ENVE 4350 Biological Processes.

5) If you are planning to be away from campus for either the Co-op or Study Abroad program, preferred semester for ENVE students is Fall- Junior year. CHEM 2250 Organic Chemistry I should be taken in your sophomore year or in the summer between the Sophomore and Junior year. The RPI equivalents of various courses offered by our overseas partners are listed on SIS. If you wish to take the course for which an equivalency has not been established, use the Transfer Credit form and supply the syllabus to the Department on campus that teaches the Rensselaer version.
Registration

When: Registration for the Spring semester generally occurs in early November. Registration for the Fall semester occurs the preceding Spring, usually in early April. Exact dates are included in the Academic Calendar.

How: Use the Student Information System (SIS) to register for your courses.

Where: You can register for your classes using any computer with Internet access.

Time tickets:
As a student at Rensselaer, you are issued a "time ticket," which assigns you a specific window of time during which you may register for the next semester. Your time ticket will be sent to your RPI email address, 2 - 3 weeks before registration.
Your registration time is assigned based on the number of credit hours you have earned as a student. The table below shows the range of earned credit hours associated with each class. Please note that classes which are still in progress or courses which have been graded as "incomplete" do not count towards earned credits, nor do transferred courses and Advanced Placement (AP) credit.

<table>
<thead>
<tr>
<th>Year</th>
<th>Credits</th>
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<tr>
<td>Freshman</td>
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<tr>
<td>Sophomore</td>
<td>31-60</td>
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<tr>
<td>Junior</td>
<td>61-95</td>
</tr>
<tr>
<td>Senior</td>
<td>96-128</td>
</tr>
</tbody>
</table>

CAPP reports:
Your Curriculum Advising and Program Planning (CAPP) report is a planning and advising tool -- available only to undergraduate students -- that allows you to track the progress you're making toward your Bachelor's Degree. You can access your CAPP report via the main menu of the Student Information System (SIS)

What do I do if a class I want to register for is full?
Meet with the instructor of the course and request to be admitted to the course. If the class is a core/required course every effort will be made to accommodate the request. If this is an elective course you may be asked to take it in a subsequent semester.

How do I add/drop a course?
You may use the Student Information System (SIS) to add or drop courses. Generally speaking, from the beginning of the semester, you will have two weeks to add courses and eight weeks to drop them. Please refer to the Academic Calendar for specific add and drop deadline dates. If you wish to petition to add or drop classes after the published deadline, you may do so using a Late Add/Drop Form. Please note that after the instructor’s signature (if required), the form must also be approved by the Advising and Learning Assistance Center.
Student/Advisor Responsibilities

Student's responsibilities:

- To know their advisor's office hours and advising schedule.
- To make an appointment and prepare for registration advising by reviewing the Catalog, Class-Hour Schedule, and the students Curriculum Advising & Program Planning (CAPP) report.
- To formulate questions regarding curriculum, course selections, career options, etc.
- To be aware of their academic and personal needs and to seek assistance when needed.
- To understand that the role of their advisor is to advise, not to make decisions. Each student needs to realize that it's his or her education at stake, and that, with advisement; they are ultimately responsible for making any final decisions.

Advisor’s responsibilities:

- To be accessible to students throughout the year at posted office hours. If an advisor will be away from campus for an extended period of time, he or she should post outside their offices the names and office locations of alternate advisors, so that students will have other advising resources.
- To set aside designated times for registration advising and individual discussions.
- To be knowledgeable about current curriculum requirements, academic policies and procedures, referrals and resources on campus, and career opportunities in the major field.
- To guide students through academic programs that will complement their personal, educational, and professional interests.
Student Professional Societies

**ASCE (American Society of Civil Engineers) –**
**Faculty Advisor: Prof. Jack Reilly, JEC 4024**

With 160,000 members nationwide, the American Society of Civil Engineers is the predominate organization of Civil Engineers in the U.S. The Rensselaer student chapter organizes events and lectures by practicing Civil Engineers, as well as the annual Steel Bridge and Concrete Canoe competition. Attendance at student chapter meetings is a great way to determine if Civil Engineering is for you.

RPI's ASCE chapter holds a meeting usually **every other Wednesday in CII 4050**. The meetings are open to anyone interested in civil engineering and are designed to be a relaxed place for students to learn some practical knowledge about what is going on in the Civil Engineering world. (Free pizza and drinks are served). For those who like what they see, becoming a member of ASCE means having access to the many social, community service and networking opportunities that are offered throughout the year.

**SEP (Society of Environmental Professionals) –**
**Faculty Advisor: Prof. Kilduff, JEC 4022**

The purposes of the Chapter are:

- To promote student interest in the environment
- To provide an avenue for the exchange of information and ideas between students and members of professional associations
- To provide a common ground where students from various disciplines related to air, waste, and water environment management can advance their understanding of environmental management through an organized exchange of knowledge
- To promote a better understanding of the scope and opportunities in air, waste, and water environment management
- To present educational programs of general interest topics in the science of air, waste, and water environment management, as well as other related technological fields
- To encourage its members to participate in the Associations’ conferences, meetings, and social events

**Chi-Epsilon National Civil Engineering Honor Society**
**Faculty Advisor: Prof. Xiaokun (Cara) Wang, JEC 4032**

Founded in the Spring of 1922 at the University of Illinois, Rensselaer Polytechnic Institute Chapter was established in 1940. Chi Epsilon is dedicated to the maintenance and promotion of civil engineering as an ideal profession. To this end, initiation into Chi Epsilon distinguishes a person as being exemplary of the qualities of scholarship, character, practicality, and sociability. At the same time, Chi Epsilon members has a responsibility to offer extraordinary service in the advancement of their profession. Chi Epsilon fosters the development and exercise of sound traits of character and ability among civil engineers, always seeking higher standards of professional service. As of January 1, 2014, there are 137 chapters of Chi Epsilon that have initiated over 116,900 members including the late Ralph Peck who was elevated to become a National Member of the Chi Epsilon Honor Society.
Undergraduate Research Program (URP)

Departmental faculty are involved in four areas of research - Environmental, Geotechnical, Structures and Transportation. URP opportunities exist in each. They allow students to interact with faculty on their research, apply knowledge learned in the classroom setting, publish conference and journal articles alongside faculty and receive course credit or supplemental income.

Finding a Project

Most students will solicit URP projects by contacting departmental professors – those they have had in class and others. The key is to determine a project that will interest you as well as finding a faculty member that may want to work with you on a project.

Credit or Funding

You can either earn credit hours (between one and four) for participating in an URP project or you can be paid for the project. If you choose credit, the decision on the number of credit hours is usually decided by the student and the participating faculty member in consultation. Being paid to participate in a URP project can help a student offset some of the costs of college, such as books, lab fees, activities or incidentals that may come up. In the past, students who have participated in the URP for pay have earned up to $2,000 per semester. The majority of participants earn $500 per semester. URP funding comes from two sources:

- Your sponsoring faculty member or department
- The Office of Undergraduate Education

The faculty sponsor or department is responsible for the financial support of your research. In addition, the Office of Undergraduate Education pays URP participants a maximum of $400 per semester in the form of matching funds. Most projects expect eight to twelve hours of work per week.

The URP application should be submitted to the Department Coordinator, Kim Boyce, boycek@rpi.edu
<table>
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<th>Research Areas</th>
<th>Earthquake Engineering</th>
<th>Structural Engineering</th>
<th>Geotechnical Engineering</th>
<th>Transportation Engineering</th>
<th>Computational Mechanics</th>
<th>Pollutant Fate and Transport</th>
<th>Water Treatment</th>
<th>Site Remediation &amp; Bioremediation</th>
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**International Programs**

Many students at Rensselaer study abroad, usually during their junior or senior years. It is important to plan ahead if you wish to study abroad so that you can still take all the courses required to graduate. A list of study abroad options can be found at: [http://undergrad.rpi.edu/update.do?catcenterkey=81](http://undergrad.rpi.edu/update.do?catcenterkey=81)

For more information on study abroad programs, go to the Office of International Programs, located in Walker 4010, or see the Office of Undergraduate Education website at [http://undergrad.rpi.edu](http://undergrad.rpi.edu), Office of International Programs.

**Cooperative Education**

Rensselaer's Co-op program offers a way to apply classroom experience in a business setting. This is important for two reasons:

- As you apply newly-learned technical skills, you will gain an understanding of office dynamics that can only be learned through experience.
- Just as important, you will gain experience that will look good on your resume.

Two things you should consider when planning your co-op assignment are the type of co-op that best suits your needs, and where the co-op assignment fits in your academic plan (please see Helpful Hints above).

For more information on Co-op programs, please go to the following website: [http://eng.rpi.edu/soe/index.php/unique-programs/co-op-education](http://eng.rpi.edu/soe/index.php/unique-programs/co-op-education)
Co-Terminal Degree (BS/MS or BS/ME) Program

The Co-Terminal Graduate degree program offers Rensselaer undergraduates with strong academic records the opportunity to earn both a Bachelor’s and Master’s degree in 5 years while extending their financial aid.

The Advantage of the Co-Terminal program is that Undergraduate financial aid will be continued for co-terminal students through their 9th and 10th semesters of study. Upon graduation, students will earn both their BS and ME/MS degrees simultaneously. The ME is a coursework only degree, while the MS requires a thesis.

Admissions standards for the co-terminal program are the same as those required for Rensselaer's traditional master's programs. Co-terminal applications should preferably be submitted before the end of applicants’ junior year. Students must have:

- **Departmental Requirement of 3.2 GPA.**
- Completed 90 credits of coursework (including AP credits, transfer credits, and courses in progress).

Application is made to the Graduate Admissions Office through the Civil and Environmental Engineering Department. The application form is available online through the Graduate Admissions Office website [http://admissions.rpi.edu/graduate/admission/Co-TerminalBS-MS_Application_and_Procedures.pdf](http://admissions.rpi.edu/graduate/admission/Co-TerminalBS-MS_Application_and_Procedures.pdf). The Graduate Plan of Study Form is available on the Office of Graduate Education website.
Frequently Asked Questions for Co-Terminal Program

Admission

1. **What if the courses I list on the Plan of Study change?**

   If the courses listed change, an updated plan must be filed with your Department, the Graduate School, and the Office of the Registrar.

Financial Aid, Tuition and Fees

1. **Can I receive both Undergraduate Financial Aid and Graduate TA/RA aid?**

   No - If you receive a Graduate TA/RA you are no longer eligible for undergraduate financial aid.

2. **Do I have to file a FAFSA for my 5th year to get the Undergraduate aid?**

   Yes - you must file a FAFSA, if you receive need based aid.

3. **I have a TA from my department. Do I need to notify anyone?**

   No - your department works with the Graduate School to ensure that your TA is processed appropriately. Once you accept a graduate TA, you are no longer eligible for undergraduate financial aid.

Academic

1. **When/how does a student get assigned a graduate adviser?**

   Co-terminal students will continue to work with their undergraduate adviser and should contact their department to be assigned a graduate advisor.

2. **How many credits will I be eligible to register for?**

   For undergraduate students, the maximum number of credit hours is 21. For graduate students, the maximum is 15 credit hours. If most of your courses in a particular semester are at the 6000 level, the 15 credit hour limit would apply.

3. **Should I apply for my undergraduate degree if I will be registered into an 11th semester?**

   If you are continuing into an 11th semester, you will no longer be eligible for undergraduate aid. You should apply for your bachelor's degree at that point.
4. **When do I receive my BS degree? I was supposed to graduate in May but I will be completing 2 more semesters to receive my Master's degree under the co-terminal program?**

   You will receive both degrees at the end of your 10th semester. You should file a degree application with the Office of the registrar for each degree at the beginning of the semester in which you will actually graduate with both degrees. See the academic calendar for deadline information.

5. **Can I use a course for both my undergraduate and graduate degree?**

   No - credits applied toward satisfying requirements of the undergraduate degree cannot be used to satisfy the requirements for the master's degree.

6. **I finished my 9th semester but decided not to continue in the master's program. How do I receive my BS degree?**

   You must first, formally withdraw from the co-terminal program. This is done using the Graduate Student Request for Change of Status form.

   You must then file a Degree Application for the next graduation date. Rensselaer has three official graduation dates - the end of August, the end of December, and end of May. Check the academic calendar for application submission deadlines.

7. **Can I still designate courses as Pass/No Credit?**

   Pass/No Credit can not be used for graduate level (6000 level) courses nor for courses on the students Graduate Plan of Study. As per Civil Engineering department requirements Pass/No Credit can not be used for any CIVL or ENVE course.

8. **Can I participate in the Commencement ceremony with my class?**

   You must meet the criteria for participation and file a petition, available in the Registrar's Office.
Outline of Co-Terminal MS/ME Master’s Studies

- Environmental Engineering
- Geotechnical Engineering
- Structural Engineering
- Transportation Engineering

This document outlines the major aspects of the co-terminal MS/ME program in the Department of Civil and Environmental Engineering (CEE) at Rensselaer. It describes the program general requirements and provides guidance in meeting these requirements. The document complements (but is not intended to replace) the policies and requirements outlined in the Rensselaer Catalog, and supplements them where CEE department-specific policies are warranted. The policies and requirements set out in the Rensselaer catalog are available on-line at http://www.rpi.edu/dept/grad.
1. General Information, Application and Admission

The co-terminal MS/ME program is intended for undergraduate students who wish to continue their education at Rensselaer and obtain a Master’s degree. Co-terminal degree students receive both their Bachelors and Masters upon completion of all requirements for these two degrees. Some portion of the undergraduate financial aid will be continued for the co-terminal students through their fifth year of study (detailed information may be obtained by contacting the Office of Financial Aid). The co-terminal MS and ME degrees are graduate degrees supervised by the Office of Graduate Education, and the application for admission to the program is handled by the Graduate Admissions Office. The general requirements for the co-terminal Master’s degree are the same as those for the regular Masters degree. However, co-terminal students are not eligible to serve as a graduate Teaching Assistant (TA) nor as a Research Assistant (RA).

Criteria for Admission

A student must have completed 90 credits of coursework (including AP credits, transfer credits and courses in progress) in order to be eligible to apply. The applicant must also have a cumulative GPA of 3.2 or higher. Students with a cumulative GPA between 3.0 and 3.2 may be admitted into the program in special circumstances after review of their application.

Application Process

Students are encouraged to apply by the end of their junior year. Applicants with less than 90 credits of completed coursework will be evaluated after the 90-credit requirement is reached. The deadline for the application is the last Friday in September during the student’s senior year.

The application form for the co-terminal degree is available online from the registrar office: admissions.rpi.edu/graduate/Co-TerminalBS-MS_Application_and_Procedures.pdf. The completed application must be submitted to the CEE department office along with: (1) a copy of the student’s CAPP report, (2) Graduate Plan of Study, and (3) Program Planner (4th and 5th year planner). The application must be signed by the Graduate Program Director, Undergraduate Advisor and Graduate Advisor. Note that the undergraduate and graduate advisors may be the same person (see section 3). The completed 4th and 5th year planner (last page of the application form) must have at least 128 credits applied to the BS and at least 30 to the MS (see below for more information).

2. Credit Requirements

MS Degree (Co-Terminal degree with Thesis)

An MS degree requires: (1) 30 credits beyond the bachelor’s degree (consisting of course work and master thesis credits), (2) a formal master’s thesis approved by a thesis committee and submitted to the Graduate School, and (3) a public oral presentation of the thesis to the committee. The degree is awarded after successfully satisfying all degree requirements (see Sections 3 to 6). A typical student takes 24 credits of coursework and 6 masters thesis credits. The student is required to register for CIVIL or ENVE 6990 (Master’s Thesis) for 1 or 2 semesters. The student must also form a thesis committee that consists of the research advisor and 2 additional committee members (see Section 6).

ME Degree (Co-Terminal degree without Thesis)

An ME degree is a degree that comprises 30 credits of coursework. A student may also take up to six credits as Readings in Civil Engineering (CIVL 6940) or Professional Project (CIVL 6970) under the supervision of a faculty adviser. The Professional Project is evaluated solely by the faculty advisor (since there is no committee for the ME degree). The degree is awarded after successfully satisfying all degree requirements (see Sections 3 to 5).
3. Identification of an Advisor
Identification of a suitable advisor is an important aspect of the co-terminal MS/ME program. Upon admission to the program, co-terminal students continue to work with their undergraduate advisor until they are assigned a graduate advisor. The admitted student and graduate advisor will work together to ensure that the student is following a proper Plan of Study (approved by the office of Graduate Education) and fulfilling all degree requirements.

ME students will be assigned an advisor by the department. Before the start of the fall semester of their co-terminal (5th) year, MS students are required to identify an advisor who is committed to supervising their research. Upon admission to the program, MS students should contact prospective advisors to identify an area of research and reach a mutual agreement on a research project for their MS thesis. The MS advisor plays the role of both academic and research advisors. The MS student and graduate advisor will have a close relationship and interaction that involves research apprenticeship. The student and advisor will work together to ensure that the student is following a proper Plan of Study and fulfilling all degree requirements.

4. Course Requirements
Both the MS and ME degrees require that 30 credits be completed beyond the BS. However, as explained above, the MS degree requires 24 credits of courses while the ME degree requires 30 credits of courses. Credits applied toward satisfying the bachelor’s degree requirements cannot be used to satisfy the Masters degree requirements. Furthermore, for courses that are offered at both the undergraduate and graduate level, a student is not permitted to take the course at the undergraduate level and then repeat the course at the graduate level. The graduate program requirements are set and managed by the Office of Graduate Education. These include the following rules which apply to all courses that are counted toward the Masters degree:

- No course may be taken as "Pass/No Credit".
- No more than 15 credits may be from 4000 level courses.
- Students must take a minimum of 12 credits per semester.
- Courses below 4000 level are not allowed.

Given that graduate courses can be significantly more challenging than undergraduate courses, students should consult with their advisors when selecting courses and maintain an average course load of about 15 credits per semester.

Core Curriculum and other requirements
Co-terminal Master’s degree students must complete at least four courses from the list of core courses outlined for each of the four graduate program areas in Appendix 1. Students must also complete any course needed to meet the prerequisite requirements of the selected core courses.

Students must maintain an overall average of B (3.0) or higher for their Masters courses. Furthermore, while maintaining this average, they are required to earn a C- or higher in any individual course.

5. Plan of Study
As mentioned above, an application for the co-terminal Master’s degree must include a Plan of Study (Appendix 2A). This plan outlines the student academic program and must comprise 30 credits of coursework for ME students and 30 credits of research and coursework for the MS degree (all credits beyond the bachelor’s degree). At least 15 credits are required to be taken at the 6000 level (i.e., graduate courses). Only the credits required to earn the degree should be shown on the Plan of Study (i.e., exactly 30 should be listed on the Plan of Study, even if a student will actually take more than 30 credits). The Plan of Study must be approved by the Graduate Advisor and Graduate Program Director. The Plan of Study may be revised at any time during the student’s tenure at Rensselaer.
6. Additional Requirements for Co-terminal MS students

In addition to the credit requirements (Section 2), the MS degree requires:

- Identification of a research advisor (as described above),
- Establishment of an MS research committee (in collaboration with the advisor),
- Writing an MS thesis, and
- Public defense of the MS research (Oral Thesis Examination).

MS Committee

The purpose of the MS committee is to assess the worthiness of the student’s research and to evaluate the master’s thesis. With the assistance of the research advisor, each student must form a master’s committee (see Appendix 2 for nomination form). This should be done no later than the first semester of the co-terminal (typically 5th) year. The Dean of the Graduate School, on recommendation of the Department Head (who is advised by the Graduate Committee), formally appoints the MS committee. This committee should consist of three full-time, tenure track faculty members from the Civil and Environmental Engineering department. The committee Chair must be the research advisor.

Thesis Examination

MS students are required to successfully pass an oral examination of their Masters thesis. The oral examination is administered by the student’s master’s committee. The thesis must be submitted to the committee at least two weeks prior to the examination. The master’s exam is designed to evaluate the ability of the student to: (1) identify a research problem; (2) demonstrate knowledge of the pertinent principles and literature; (4) design experiments, conduct simulations or perform analyses; and (5) draw appropriate conclusions. A thesis examination form is enclosed in Appendix 2.

Dissemination of Research

Dissemination of each student’s research in the form of presentations at professional meetings and publication in peer-reviewed journals and proceedings is expected. Dissemination of research is important for the student’s career and for Rensselaer, and is often the ultimate academic product required by many funding agencies.

7. Satisfactory Progress

It is imperative that students make satisfactory progress toward the co-terminal degree on a continuous basis. This requires a high level of dedication, commitment, effort and focus. Significant outside obligations, including part-time employment, are likely to prevent satisfactory progress, and are strongly discouraged. Student progress will be evaluated each semester by the student’s advisor and reviewed by the department head.
APPENDIX 1:
Core and elective courses for the Co-Terminal Degree

A list of Core and elective courses is presented in Tables 1A to 1D.
   Table 1A- Environmental Engineering
   Table 1B- Geotechnical Engineering
   Table 1C- Structural Engineering
   Table 1D- Transportation Engineering

The list of elective courses is not exhaustive and students wishing to take other courses must first consult with their advisor.

The following key applies to tables 1A-1D
† : Course has not been offered recently
* : Course is offered in alternate years
Table 1A. Environmental Engineering

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<td>Advanced Groundwater Hydrology</td>
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<td>Hazardous Waste Management</td>
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**Core Courses**

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Elective Courses (take according to interest)

**Civil Engineering Courses**

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**Mechanical, Aerospace and Nuclear Engineering**

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**Mathematics**

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APPENDIX 2: FORMS

2A: Graduate Plan of Study
2B: Nomination of Master’s Thesis Committee, Provisional Thesis Title & Degree Designation
2C: Record of Master’s Thesis Presentation
# Graduate Plan of Study

For instructions, see next page

## Basic Information

**Name**

**Email**

**RIN ID**

**Phone**

**Advisor**

**Expected Graduation Date**

**Degree**

- ☐ M.S.
- ☐ M. Eng.
- ☐ M.B.A.
- ☐ M. Arch.
- ☐ M.F.A.
- ☐ Ph.D.
- ☐ D. Eng.

**Curriculum**

**Plan Status**

- ☐ New plan
- ☐ Revised plan

**Dual Degree**

**Date of previous plan**

---

* F=Fall, S=Spring, U=Summer

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**Total credit hours**

**Signatures**

**Student’s**

Date

**Advisor’s**

Date

**Department’s**

Date

- ☐ Original to Registrar
- ☐ Office of Graduate

Submit Copies to Education

☐ Student ☐ Department ☐ Advisor

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INSTITUTE INSTRUCTIONS

PLEASE NOTE  Awarding of the degree is based on satisfactory completion of institute requirements and on satisfactory completion of all courses listed and the registrar’s approval of any transfer credits.

GENERAL
You must submit the Plan of Study during your first academic year in an RPI graduate program. In the top portion of the form, indicate your degree, curriculum, advisor, and expected graduation date. Also list any previous graduate level degrees that you have received. Dual degree students, please list both degrees.

You must list all courses that will be applied toward the degree. For every course you list, indicate:

- Course subject;
- Course number;
- Course title;
- Credit hours received for the course;
- Semester in which the course has or will be completed; and
- Whether the course is required, elective, transfer or waived.

TRANSFER CREDITS
If a course is listed as a transfer, the transfer credits must be approved by the Registrar’s Office before they can be applied toward the degree. You should verify that the Transfer Credit Approval Form and an official transcript showing the completion of the course are on file with the Registrar’s Office. Because the residence requirement for the master’s degree is 24 credit hours, not more than six credits may be transferred toward the master’s degree. A student may not transfer more than 45 credit hours toward the doctoral degree program of 90 credit hours.

WAIVERS
If a course is listed as waived, it must be replaced by another course to total the appropriate number of credits required for the degree. This does not apply for the part-time MBA degree in Management where up to 12 credits are allowed to be waived.

DUAL MASTER’S DEGREES
If you’re receiving a dual degree, please list your other degree in the “Dual Degree” field. A Plan of Study must be filed simultaneously for both degrees. Please be aware that not more than six credit hours used for a master’s degree in one area can be applied to a second master’s degree.

DOCTORAL DEGREES
The Plan of Study must contain a minimum of 90 credit hours beyond the bachelor’s degree or 60 credits beyond the master’s degree with satisfactory grades.* At least two-thirds of the total credit hours, excluding thesis, must contain the suffix numbers 600-699, with the further limitation that no more than 21 credit hours of 400-499 courses are to be allowed. The degree must be completed within ten years. Please be aware that 200 level courses cannot be applied towards a doctoral degree.

MASTER’S DEGREES
The Plan of Study must contain at least 30 credit hours (60 for the MBA and MFA) beyond the bachelor’s degree with satisfactory grades.* At least half of the total credit hours presented toward the degree must have the suffix numbers 600-699. The master’s degree must be completed within five years. Please be aware that 200 level courses cannot be applied towards a master’s degree.

NOTE
In addition to meeting the institute requirements, the plan must adhere to all departmental regulations.

After you complete the plan, sign it and meet with your adviser for his/her signed approval. After your adviser approves the plan, forward it to the appropriate person in your department for approval.

When the plan receives departmental approval, submit the original to the Registrar. Send photocopies to the Office of Graduate Education, the department, the student, and the advisor.

*SATISFACTORY GRADES
The minimum average of all grades used for credit toward an advanced degree must be B.
Nomination of Master’s Thesis Committee, Provisional Thesis Title & Degree Designation

To: The Dean of Graduate Education

From: Dept Head, please print

Re: Student ( ) Mr. ( ) Ms. ____________________________ Program ________________

RIN ____________________________ E-mail ____________________________

Current Address ____________________________________________________________

The student whose name is given above has arranged to conduct his/her thesis work for the degree of:

☐ M.S. ☐ M.F.A. ☐ M. Arch. with Professor ____________________________

The provisional title for the thesis is: ____________________________

The ____________________________ program recommends the following committee:

PROPOSED COMMITTEE

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*The Electronic Arts program requires a committee of 4 members: a Thesis Advisor (Chair), two Arts Faculty members, 1 outside member. Students who have questions should consult their Graduate Program Director.

* ____________________________ Name of Outside Member

For information on giving a required Oral Presentation, please next page for instructions.

OFFICE OF GRADUATE EDUCATION APPROVAL

______________________________ For Graduate Education Date __________

cc: Student
Department
Registrar’s Office

Revised Aug. 2012
INSTRUCTIONS:

Nomination of Master’s Thesis Committee, Provisional Thesis Title & Degree Designation

NOTE: This form is only required for students who entered their program starting in Fall 2010 semester and beyond:

1. Complete form and obtain required signatures by the Degree Application due date of the semester the student intends to graduate. See specific date listed in the Academic Calendar.

2. The committee should consist of three full-time, tenure track faculty members from student’s graduate program. However, The Electronic Arts program requires a committee of 4 members: a Thesis Advisor (Chair), two Arts Faculty members, 1 outside member. Students who have questions should consult their Graduate Program Director.

3. The required Oral Presentation, which must be approved by your Advisor, can be one of the following:

   a. Program or Institute Seminar
      Please Note: A presentation announcement must be posted publically within your department (electronic or paper copy) at least two weeks prior to the date of the presentation. A copy of the announcement must be included when you submit the Record of Master’s Thesis Presentation to the Office of Graduate Education. Faculty representation required.

   b. Presentation given at a conference or symposium. A copy of the schedule/announcement must be included when you submit the Record of Master’s Thesis Presentation to the Office of Graduate Education.

   c. Traditional Thesis defense – entire committee required to be present.

Revised Aug. 2012
RECORD OF MASTER’S THESIS & ORAL PRESENTATION

SECTION I - ALL STUDENTS
Semester you intend to graduate

Student ________________________ RIN ________________________ Program/Department ________________________

Current Address

City ________________________ State ________ Zip ________ Phone ________________________ Email ________________________

Check appropriate box: ☐ Master’s Thesis ☐ Master’s Project
Do you wish to delay the release of your thesis? ___Yes ___No
If yes: Length of time ______ Reason ____________________________________________

Advisor signature

Citation Style Used in Bibliography (examples: Chicago, MLA, APA, Turabian): ____________________________________________________________________________

Thesis or Project Title: ____________________________________________________________________________

I hereby attest that the thesis submitted is my own and I have completed this work in a manner consistent with the academic integrity policy of the Institute as given in the Student Handbook.

Student’s Signature and Date

SECTION II - For Master’s students who will submit a thesis and have entered their program starting with the Fall 2010 semester.

Date of Oral Presentation ________________________ (Please refer to instructions page)

☐ Program/Institute Seminar ☐ Presentation at Symposium/Conference ☐ Traditional Defense

The above student has met the requirement for the oral presentation. Please see the attached announcement/schedule.

Advisor Signature: ____________________________________________________________________________

SECTION III – (1) ADVISOR signature for all students; (2) Committee members* (requirement for students admitted Fall 2010 or beyond.)

Advisor (Print Name) ________________________ Signature and Date

Committee Member (Print Name) ________________________ Signature and Date

Committee Member (Print Name) ________________________ Signature and Date

Attention Committee Members:
OGE no longer requires a signed title page.
By signing this form, you are indicating that both the thesis and presentation meet your approval.

*The Electronic Arts program requires a committee of 4 members: a Thesis Advisor (Chair), two Arts Faculty members, 1 outside member. Students who have questions should consult their Graduate Program Director.

Name of Outside Member ________________________ Dept. ________________________ Signature/Date

OFFICE OF GRADUATE EDUCATION APPROVAL:

Signature ________________________ Date ________________________ No. of Pages ________________________

Graduate Education will send copies to: ______ Registrar _______ Department
(revised Dec. 2012)
RECORD OF MASTER’S THESIS & ORAL PRESENTATION

INSTRUCTIONS:

Section I: All students complete

Section II: Oral Presentation

Students entering the program in Fall 2010 or beyond must complete an oral presentation.

The required Oral Presentation, which must be approved by your Advisor, can be one of the following:

a. Program or Institute Seminar
   Please Note: A presentation announcement must be posted publically within your department (electronic or paper copy) at least two weeks prior to the date of the presentation. A copy of the announcement must be included when you submit the Record of Master’s Thesis Presentation to the Office of Graduate Education. Faculty representation required.

b. Presentation given at a conference or symposium. A copy of the schedule/announcement must be included when you submit the Record of Master’s Thesis Presentation to the Office of Graduate Education.

c. Traditional Thesis defense – entire committee required to be present

Section III:

ADVISOR Signature - All students complete

COMMITTEE Signatures - Students entering program in Fall 2010 or beyond only required to complete.

The committee should consist of three full-time, tenure track faculty members from student’s graduate program*.

*The Electronic Arts program requires a committee of 4 members: a Thesis Advisor (Chair), two Arts Faculty members, 1 outside member. Students who have questions should consult their Graduate Program Director.
### Graduate Programs
#### Department of Civil & Environmental Engineering

<table>
<thead>
<tr>
<th>Areas of Study/Degrees</th>
<th>Typical Degree Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering, MS, MEng, PhD</td>
<td>MS 30 credits (24-27 coursework, 3-6 thesis)</td>
</tr>
<tr>
<td>Environmental Engineering, MS, MEng, PhD</td>
<td>MEng 30 credits coursework</td>
</tr>
<tr>
<td>Transportation Engineering, MS, MEng, PhD</td>
<td>PhD 42 credits beyond BS plus doctoral thesis</td>
</tr>
</tbody>
</table>

### Research Areas
We offer a wide range of disciplines that are sufficiently flexible to accommodate individual interests, but the main research areas of interest are separated into several broad categories:

- Earthquake Engineering (Civil)
- Structural Engineering (Civil)
- Geotechnical Engineering (Civil)
- Transportation Engineering (Civil)
- Computational Mechanics (Civil)
- Pollutant Fate and Transport (Environmental)
- Water Treatment (Environmental)
- Waste Treatment (Environmental)
- Site Remediation and Bioremediation (Environmental)
- Environmental Systems (Environmental)
- Environmental Biotechnology (Environmental)
- Indoor Air Quality and Water Quality (Environmental)

### Admission
Submit on-line at: [http://gradadmissions.rpi.edu/](http://gradadmissions.rpi.edu/)

- Deadlines are January 1 for Summer and Fall admission and August 15 for Spring admission
- **You will need:** a well-written Statement of Background & Goals; official transcripts from all colleges attended; at least 2 letters of recommendation (preferably from faculty); official GRE scores (general test only, minimum 550 Verbal/550 Quantitative/4.0 Analytical) or ETS scores (Minimum 156 Verbal/146 Quantitative/4.0 Analytical) and official TOEFL or IELTS scores (required for all international applicants, minimum CBT/iBT/PBT of 230/89/570 TOEFL or IELTS minimum 6.5); Bachelor’s GPA 3.0 or higher; non-refundable application fee.

### Financial Aid/Tuition
Awards are made based on merit, not on need, and priority is given to doctoral candidates.

- Apply for financial aid through the admission application, no separate form is required.
- Financial aid is available in the form of Fellowships, Teaching Assistantships and Research Assistantships.
- International students are eligible for all forms of aid except some fellowships that require US citizenship.
- Tuition for the 2014-2015 academic year is $46,700; fees and insurance are $1,983; Estimated Living expenses are $12,265, and Estimated Books and Supplies are $2,645. Total Estimated Cost of Attendance: $61,993.

### Contact Us
Kimberly Boyce, Department Admissions Coordinator, Department of Civil and Environmental Engineering
Phone: 518-276-6941
Email: boycek@rpi.edu
[http://www.cee.rpi.edu](http://www.cee.rpi.edu)
GRADUATE APPLICATION INSTRUCTIONS

All applicants must submit the following materials for their application to be complete and forwarded for departmental review. Submit all materials in one envelope to Graduate Admissions by the application deadline. (Please do not send to individual departments.)

Note: All applicants should pay particular attention to requirements that apply to specific departments (please see Graduate Admission Requirements).

1. Completed graduate application
2. Nonrefundable application fee of $75
3. Statement of Background and Goals
4. Resume
5. Portfolio, if applicable
6. Two letters of recommendation
7. Official transcripts, in English, of all postsecondary education
8. Official evidence, in English, of any postsecondary degrees earned
9. Official GRE, GRE Subject Tests, or GMAT scores reported from ETS
10. Official TOEFL or IELTS scores, if applicable
11. The ETS Personal Potential Index (PPI) is encouraged

Applicant’s name and date of birth should be printed clearly on all documents.

CONTACT US

If you have any questions during the application process, please feel free to contact us Monday through Friday, 8:30 a.m. – 5 p.m. Eastern time (excluding holidays).

 Graduate Admissions
 Rensselaer Polytechnic Institute
 110 8th Street Troy, NY 12180-3590
 Phone (518) 276-6216 Fax (518) 276-4072
 Email gradadmissions@rpi.edu

Rensselaer seeks diverse and well qualified candidates for study in all graduate programs. This application may be used for full or part time degree programs at the Troy campus of Rensselaer. All applicants must submit the completed application with all supporting documents to Graduate Admissions.

Graduate Admissions will review all of the documents; notify the applicant of missing items, and forward files to the appropriate department for academic review and an admission decision. Graduate Admissions will notify the applicant of the admission decision by email.

A student’s ability to pay for the education has no bearing whatsoever on the admission decision.

Scholarships, fellowships, teaching and research assistantships are awarded by academic departments and the Graduate School. Both admissions and aid decisions are made on the basis of the candidate’s qualifications and suitability to the department’s research activities and needs.
Because admission is highly competitive, and resources for supporting graduate students may be limited, not all admissible candidates will receive offers of financial support. Students who wish to be considered for any form of financial support should submit the application and supporting documentation no later than the January 1 deadline for the fall or summer semester or no later than the August 15 deadline for the spring semester. A decision of financial support may or may not accompany the admission decision.
INSTRUCTIONS

Applicants may apply only to one degree program per term. Multiple applications for one term are not permitted.

1. Complete Application Form
   - Please be sure to include variations of your name as it appears on your official documents (i.e., passport)
   - Complete this application for full or part time degree programs delivered on the Troy campus of Rensselaer. Mail all supporting credentials to Graduate Admissions
     Rensselaer Polytechnic Institute
     110 8th Street Troy, NY 12180-3590

2. Nonrefundable $75 Application Fee
   - If you do not wish to submit payment by credit card, a money order or check drawn on a U.S. bank, payable to Rensselaer Polytechnic Institute, may be mailed to the above address. Include the full name, date of birth, and address of the applicant on money order or check. Do not send cash or stamps.
   - The application fee is waived for Rensselaer alumni, current Rensselaer students (matriculating and non-matriculating), employees, and employee spouses.

3. Statement of Background and Goals (including current work/academic activities)
   - Upload a one or two page statement that includes the following information:
     ➢ Your full name and date of birth
     ➢ Your primary educational and research interests
     ➢ An outline of your research experience and a list of any publications and academic honors
     ➢ A description of your background in fields particularly relevant to your study objectives—including any relevant industrial/work or research experience
     ➢ A discussion of specific research topics and methods you might pursue in your thesis research
     ➢ Information outlining your current work/study activities

   • Applicants to the Lally School of Management and Technology M.S. and MBA programs are required to submit answers to the following questions in lieu of the Statement of Background and Goals.
     ➢ Two themes that underlie the Lally MBA are innovation and technology, particularly as these relate to entrepreneurship, financial analysis, and international business development. Tell the story of your career so far and how the Lally MBA would expand your options in these or other areas and enable you to attain the career goals you are considering (max. 500 words).
     ➢ Given our emphasis on innovation and entrepreneurship in both technological entrepreneurship and finance, students who succeed at Lally tend to be creative individuals who are fascinated with new products and new business ideas and are especially good at identifying new opportunities. Please send us an example of your creative thinking. This could be, but should in no way be limited to, one of the following:
       • An idea for a new business
       • An advertising campaign
       • A drawing of a new product idea
       • A physical prototype of a new product or concept (use your creativity to amaze us with your idea!)
A creative application of a new technology or new business idea to a pressing world problem; for example, an environmental problem or a problem relating to quality of life in a third world country (Note that the answer to the last question can also be used as your entry into the ESP scholarship competition).

The only restrictions are that it cannot be larger than 2 cubic feet (1 ft x 1 ft x 2 ft), no heavier than 50 pounds, and if you upload (or send) a written document, no longer than 1,500 words. If you submit something other than a written work, you must also submit a description of not more than 500 words explaining your submission.

4. Resume

5. Portfolio (see Graduate Admission Requirements)

6. Two letters of recommendation

Rensselaer requires two letters of recommendation. Recommendations may be submitted electronically or by postal mail. Please obtain recommendations from two individuals who have supervised your work on the job or at school; we recommend that at least one is a faculty member or an academic dean or adviser familiar with your academic performance.

7. Official transcripts, in English, of all postsecondary education

- Official transcripts of all undergraduate and graduate studies must be submitted. Student printed or downloaded copies of transcripts are not accepted.
  - If you are currently attending a university, a final transcript must be submitted upon completion of your course work. If you have completed your degree, the award of degree must be noted on the transcript. See #8.
  - If your school does not release official transcripts directly to students, you must request that the school mail the official copy directly to Graduate Admissions.
- All international transcripts must be recorded in English or officially translated to English. Transcripts in the original language must accompany all translated documents. Uncertified translations, or translations by students, will not be accepted.
  - Degree seeking students must submit official transcripts from every postsecondary institution attended, whether or not a degree was completed.
  - Do not submit secondary school (high school) exam results or transcripts.

8. Official evidence, in English, of postsecondary degrees earned

If transcripts of previous or current study do not include the award of degree, include a certified copy of the diploma or other official evidence that the degree has been awarded.

9. Official test scores — please see Graduate Admission Requirements for specific departmental requirements Rensselaer Code 2757

- Official test scores are required and must be requested from the testing organization.
- Copies of these scores may be sent to Graduate Admissions, but will be used only until official scores are received.
- GRE or GMAT reports should reflect test scores dated within five years. Older scores are not available from ETS.
- Please be aware that it may take up to four weeks for official test scores to be received by Graduate Admissions.
• The average credentials for admitted students include GRE scores of 550 (verbal), 765 (quantitative), 695/4.5 (analytical).
• Applicants are encouraged to take the Personal Potential Index test and to submit scores.

10. Official TOEFL or IELTS scores, if applicable

The TOEFL or IELTS is required of all international applicants whose native language is not English. A minimum TOEFL score of 230 CBT/89 iBT/570 PBT is required for admissions consideration. Many departments require a higher TOEFL score. Please see Graduate Admission Requirements for details. In lieu of TOEFL, a student may submit IELTS (International English Language Testing System) scores. Only the academic format is acceptable and a minimum score of 6.5 is required for all departments and programs. Additional information about the test may be found on the IELTS website at www.ielts.org. TOEFL/IELTS scores older than two years are no longer available and will not be considered. The TOEFL/IELTS requirement is waived for applicants currently enrolled in fulltime studies in the U.S. and who will have completed two academic years of course work in the U.S. immediately prior to enrolling at Rensselaer.
Reapplication for Graduate Admission

Rensselaer does not postpone/defer admission for graduate study to a later term. Rensselaer maintains prior application documents for two years only. Non-matriculated students wishing to apply for degree status must submit a complete graduate application. Applicants who are applying within two years of the prior application must submit the following:

- Graduate application form
- Nonrefundable $75 application fee
- Updated Statement of Background and Goals (including current work/academic activities)
- Updated Resume
- One additional letter of recommendation. If applicant is currently enrolled in a course of study, the recommendation should be from an academic adviser.
- Official transcripts for all course work taken since submission of the prior application
- Official score reports of all tests (GRE, GMAT, TOEFL, IELTS, etc.) taken since submission of prior application.

Financial Assistance

- Funding for graduate study is based on an applicant’s academic record, recommendations, and the relevance of the applicant’s area of interest to the department’s research efforts. The possible sources of financial support are your department of intent, outside fellowships, and Rensselaer’s Office of Financial Aid. Academic departments are the most important sources of funding for the majority of graduate students. To be considered for financial aid, be sure to check the appropriate item on the financial aid section of the application form. More than seventy percent of Rensselaer’s fulltime graduate students are funded by research assistantships, teaching assistantships, corporate, national, or university fellowships.

  - **Applying for Financial Assistance** Start early. Please visit http://gradadmissions.rpi.edu for more information on funding sources. Many external funding sources have application deadlines earlier than Rensselaer’s admission and financial aid deadlines. Except for Rensselaer financial aid awards, you will need to file a separate application for each type of financial aid.

  - **Office of Financial Aid** Rensselaer Polytechnic Institute 110 8th Street Troy, NY 121803590 Phone (518) 2766813 Fax (518) 2764797 Email financial_aid@rpi.edu

- **Rensselaer Institutional Assistance** Graduate assistantships are awarded by academic departments on the basis of scholastic accomplishments, academic promise, and competence. Appointments are made on an annual basis. The positions usually require 20 hours of work each week under the guidance of Rensselaer faculty. Continuation of Rensselaer financial assistance depends on satisfactory academic standing, research or teaching performance, and aid availability.

- **Teaching Assistants** Students assist Rensselaer faculty in their classroom and laboratory activities, gaining valuable experience as researchers, scholars, and teachers. Departments provide stipends and full tuition waivers. Master’s students may spend a maximum of one year with internal support; doctoral students may spend a maximum of two years with internal support. Continued support can then be provided by means of research assistantships.

- **Research Assistants** Students work with the faculty in research related tasks that further the student’s own graduate career and development as a researcher, scholar, and professional. Research assistants are paid a stipend and are given a full waiver of tuition.

- **Graduate Fellowships** Outstanding students may be awarded a university supported Rensselaer Graduate Fellowship Award, which carries a full tuition and fees scholarship and a minimum stipend...
of $18,000 per academic year. Students are nominated by their departments for Rensselaer Graduate Fellowship consideration.

- **Departmental Fellowships and Scholarships** Some departments may offer additional opportunities for support of graduate students. Contact your intended department for information concerning eligibility requirements and selection criteria. Please see Graduate Admission Requirements for department contact information.

- **External Assistance** Applicants to Rensselaer graduate programs are encouraged to seek external funding sources. Many federal agencies, foundations, and corporations offer financial assistance through fellowships, scholarships, and grants to finance graduate study. Contact agencies directly regarding the application process for these funding opportunities.

- **Loan Programs**
  - **Federal Stafford Loan** U.S. citizens and permanent residents are eligible to receive up to $20,500 under the Federal Stafford Loan Program each year. Eligibility for all federal loan programs is determined by the Rensselaer Financial Aid Office after a review of the Free Application for Federal Student Aid (FAFSA). To obtain the FAFSA, call the Federal Student Aid Information Center at (800) 433-3243 or go online at http://www.fafsa.ed.gov. Be sure to use the institutional code number (002803) to ensure that Rensselaer Polytechnic Institute receives the results of the FAFSA analysis.

  - **Federal PLUS Loan** A new federal loan is available to graduate and professional students who are U.S. citizens or eligible noncitizens. The Federal PLUS Loan supplements the Federal Stafford loans currently available and allows students to borrow up to the full cost of education, including books, living expenses, and more. Application instructions to apply for a Federal PLUS Loan are available at http://financialaid.rpi.edu or by contacting the Financial Aid Office directly.

  - **Private Alternative Loan** The Financial Aid Office has researched a variety of private lenders who offer loans. For international students, the alternative loan companies require a U.S. citizen as a cosigner. An alternative loan brochure is available from the Financial Aid Office and may be found at http://financialaid.rpi.edu.

- **Notification and Acceptance of Financial Assistance** Notification of financial aid begins in January for the fall semester. The Graduate School and each department communicate directly with the selected recipients. Rensselaer subscribes to the Resolution of the U.S. Council of Graduate Schools, which sets an April 15 deadline for the offer and acceptance of financial assistance.

**Establishing Financial Support**

International applicants seeking a student visa (F-1/J-1) and whose financial support will be provided by a source other than Rensselaer must provide official documentation that sufficient funding is available to cover university fees, books, supplies, tuition, and living expenses for themselves and their dependents (if accompanied by family members) for the entire duration of their study at Rensselaer. To assist you, a brief description of acceptable sources of support follows.

- **Rensselaer Financial Award** Your department will provide Graduate Admissions with a copy of your financial aid award. Students accompanied by family members must provide proof of financial support for their dependents for the duration of their study.

- **Self Support** If you have personal savings and intend to use this money for your financial support, a bank official must verify the funds that you have indicated are available. Self-supported students must
have sufficient funding to cover the entire duration of their program as funding for years subsequent to the first is generally not available for those not receiving a first-year award.

- **Parents/Individual Sponsors** If your parents or others are willing to sponsor your studies, they should indicate the amount of support they will provide. Your parent/sponsors must have an official of their bank include a current bank statement (certified and signed by the bank official) to verify their ability to provide the necessary funds for the duration of your program.

4. **Government or Sponsoring Agency** Should your government or an international organization or foundation sponsor you, indicate the name of the agency and include a letter, signed by an authorized representative, detailing the terms of your award. The letter should provide the following information:

- Will the sponsoring agency pay your tuition, fees, and living expenses?
- What is the duration of the sponsorship: one year, two years, or renewable until the degree is awarded?
- Will your sponsor cover living expenses for your spouse and/or children to accompany you during your studies?

5. **Other** You may have other sources of support (sponsors) not included above. Once you are admitted, you will be required to submit current financial support documents, including official bank statements signed by an official of the bank, that indicate the amount and source of support.

**Please Note**

- If your program requires more than one academic year to complete, the official bank documentation or sponsor letter must show the likelihood for future funding through a sufficient bank balance or a bank officer’s statement that assets and income are adequate to cover all tuition and living expenses for the duration of your program. Generally, this would be 2 years for M.S./MFA study.
- All documents must be in English and show the conversion of the national currency into U.S. dollars. Such statements must be dated within three months of the request for the I-20A-B/DS-2019.
- Immigration eligibility documents (I-20A-B/DS-2019) will be issued for full-time study and only when an applicant has been officially admitted, has established satisfactory English proficiency and financial support, and has confirmed his/her intent to enroll. Conditional documents are not issued.
- The official cost of attendance required for issuing the I-20A-B/DS-2019 is announced in March each year. An annual increase of 4 to 8 percent may be expected.

**Visa Information**

- After receiving the immigration document (I-20A-B/DS-2019), each student must apply through a United States Embassy or Consulate for the appropriate visa to enter the United States.
- Any student entering the United States using documents issued by Rensselaer must register for the semester for which admission is granted.
- Verification of arrival and enrollment is electronically tracked through the Student and Exchange Visitor Information System (SEVIS). Any failure to arrive at Rensselaer and enroll as a full-time student will be reported to the U.S. Bureau of Customs and Immigration Services (BCIS, formerly Immigration and Naturalization Service or INS).