Outline of Master’s Studies for Full-Time Students

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

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

This document outlines the major milestones of the MS/ME program in the Department of Civil and Environmental Engineering (CEE) at Rensselaer. It describes general requirements of the program and provides guidance in meeting such requirements, including suggested timelines. This document complements (but is not intended to replace) the policies or 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://gradoffice.rpi.edu/setup.do.
PREFACE

This document is intended to serve as a guide for any accepted graduate students pursuing the Master of Science (MS) or Master of Engineering (ME) degree in the Department of Civil and Environmental Engineering at Rensselaer Polytechnic Institute.

This manual was reviewed and updated during fall semester, 2012. The faculty of the departmental graduate committee assisted in the development of this document. Questions about the policies and procedures outlined in this document should be directed to the Department Head. Future changes to policies and procedures as announced by the Institute will be incorporated to this document on as needed basis.

Those who work with graduate students will also want to periodically check the Rensselaer Catalog and the web page (http://gradoffice.rpi.edu/setup.do).

Departmental Graduate Committee

December 5, 2012
INTRODUCTION

This document provides new and prospective graduate students as well as their advisors with useful information about procedures and policies pertaining to graduate students pursuing an MS or ME degree in the Department of Civil and Environmental Engineering. This document is intended to be a guideline and may be updated by the department, school or institute as needed. The content of this document is subject to change as a result of action by the Trustees of Rensselaer, the administration of the Institute, or the CEE department. Detailed information and examples of forms can be found in the Appendices in this document. Additional information can be found on the Rensselaer web page (www.rpi.edu).

All graduate students of Rensselaer are advised to seek and obtain answers to questions and concerns through advisor(s) and Department Head. The need to solve issues outside the department is rare and should be referred to the Office of Graduate School. Student’s rights and responsibilities are outlined in the Rensselaer Handbook. An important issue to be considered is plagiarism as well as other forms of cheating, which are serious violations of the trust between student and advisor, and among students. Penalties for such violations are severe, and are detailed in the Rensselaer Handbook.
The department offers two types of Master's degrees (i.e., Master of Science (MS) and Master of Engineering (ME). These degrees are intended to extend the engineering bachelor’s degree to ensure mastery in a specific field of study in Civil and Environmental Engineering. If a student decides to undertake graduate work without a bachelor’s degree in civil or environmental engineering, he/she will generally be required to take additional undergraduate courses as prerequisites to ensure that he/she has the background required for success in graduate studies. The MS and ME programs are supervised by the Office of Graduate Education. Therefore, the application is made through the Graduate Admissions Office.

a) MS Degree
A MS degree is a 30-credit requirement beyond the bachelor’s degree that is obtained by taking 24 credits of course work and 6 credits of research (e.g., thesis credit). A master’s thesis should provide evidence that the graduate student has conducted a meaningful research project supervised by an advisor. In addition, the MS thesis has to be approved by the MS committee. A master’s thesis and subsequent oral presentation is required to successfully obtain the degree. A detailed flow chart is provided in Appendix 1A for graduate students seeking an MS degree. The student will work with their research advisor to form a committee that will consist of the research advisor and two (2) additional committee members (see Sections VI, VII, and IX). The Office of Graduate Education’s website has further information about the style and formatting requirements of the thesis (e.g., Rensselaer Writing Manual for Dissertations and Theses). In addition, thesis word processing templates are available on the Academic Computing web site.

b) ME Degree
A ME degree requires 30-credits beyond the bachelor’s degree but in this case it is generally all course work without preparation of a thesis. The ME student has the option to conduct research in terms of a master’s project (or independent study) of three (3) credits. The degree is awarded after satisfying all the degree requirements (see Section IX). A detailed flow chart for graduate students seeking an ME degree is provided in Appendix 1B.
II. Identification of an Advisor

The identification of a suitable advisor is an important aspect of the MS/ME program. This is due to the amount of time the student and advisor will be working together to ensure the Plan of Study (see Section IV) and/or the research project is progressing satisfactorily. If the student decides to undertake an MS degree, a unique kind of apprenticeship involving the student and advisor will develop in the research project. In each case, it is very important that both the student and advisor develop a good professional working relationship.

Upon admission, every MS/ME student will be assigned either an academic only or a (academic and research) faculty advisor. As explained below, the nature of the advisor will depend on whether he/she is a MS or ME candidate and how the student was recruited. If an individual faculty member recruits the student, the faculty member becomes the student's permanent advisor.

The department follows the guidelines of the Institute. Therefore, the following are the options to study towards an MS or ME degree in the department:

a) Teaching Assistant (TA):

Master’s only students are not permitted to undertake a Teaching Assistant (TA) role.

b) Research Assistant (RA):

A graduate student, typically a MS candidate, or a MS/Ph.D. candidate may be recruited to conduct research on a specific topic by a faculty member who offers support in the form of a Research Assistantship (RA). The faculty member will then serve as the student's permanent advisor. In accepting RA support, the student agrees to make satisfactory progress on the project, which will be assessed by the advisor (see also Section IX). Further information about the RA position can be found at (gradoffice.rpi.edu)

a) Self-supported students/Students with Fellowships:

ME Students in this category will be assigned an “academic” advisor upon admittance to Rensselaer. MS students in this category will be assigned a temporary academic advisor. The temporary advisor will assist the student in course selection and will help identify potential research opportunities and eventual handoff to an academic and research advisor... This process must be completed during the student's first semester at Rensselaer (see also Appendix 1 for more information).

III. Course Work

Courses. An MS or ME student may take up to 15 credits of coursework during each of the semesters attending RPI. A master’s student cannot take a course for Pass/No Credit. In addition, graduate students are required to maintain a minimum GPA of 3.0 (B average) during their stay at Rensselaer.
Seminar. A zero (0) credit seminar course is required for graduation with an MS degree in Civil or Environmental Engineering. An MS student is required to present a seminar on a technical topic of his/her choosing once during his/her study at Rensselaer. ME students are not required to present a seminar. All students are highly recommended to attend these seminars.

Independent Study. The number of Independent Studies will be limited to 1-2 courses and 1 course for ME and MS students, respectively. The independent study courses are decided with the consultation of the advisor.

IV. Plan of Study
In consultation with his or her advisor, each student must file a Plan of Study (see Appendix 2A). This plan outlines the student’s planned academic program, including possible research and coursework, for the master’s degree. The Department Head or a designated delegate must approve the Plan of Study and the student must maintain satisfactory grades (B average). The Plan of Study should be proposed in the first semester on campus, but may be revised at any point during the student’s stay at Rensselaer. The Plan of Study will be comprised of 30 credits of course work for an ME degree, or 24 credits of course work and 6 credits research for an MS degree. Also, at least 15 credits must be taken at the 6000 level (i.e., graduate courses) with the rest at the 4000 level. A student can take more than 30 credits but only 30 count toward their degree. The Plan must not list more than 30 credits. A Plan of Study form is enclosed (see Appendix 2A).

Students entering with a bachelor’s degree in another field (of engineering, or science) are expected to complete all degree requirements including additional prerequisite courses within a 2.5-year time frame, per Rensselaer policy. Furthermore, approved Leaves of Absence for medical, military or maternity reasons allow up to an additional two years to complete the graduate degree. The website for Office of Graduate Education (gradoffice.rpi.edu) will provide further information if needed.

V. Core Curriculum
During the first two semesters at Rensselaer, each graduate student is recommended to complete at least four courses identified as the required graduate curriculum outlined by each graduate program (see Appendix 2B), as well as any courses that must be taken on a remedial basis to meet prerequisite requirements.

VI. MS Committee
Each MS student will have an MS committee to direct the student’s academic program, and to evaluate the Master’s thesis. With the assistance of the research advisor, each student must form a master’s committee (see Appendix 2C). This should be undertaken within the first semester after starting the program. The Dean of Graduate Education on the recommendation of the Department Head formally appoints this committee. The MS committee must include at least three (3) full time tenure track faculty as defined by the Rensselaer Faculty Handbook. The Committee Chair must be the student’s academic and research advisor, and at least one other member of the committee must be selected from the CEE department. The other member of the committee can be from outside the CEE department. The outside member may be from another Rensselaer department, or may
be external to Rensselaer, upon approval of the Department Head. An MS committee nomination form is enclosed in Appendix 2C.

VII. MS Thesis Examination

All MS students will be required to successfully pass a research-oriented Oral Examination in the form of a public seminar (see Appendices 2C, D and E). The MS examination will be administered by the student’s MS committee, and the thesis must be submitted to the committee at least two weeks prior to the examination. The master's examination is designed to determine the student’s research accomplishment. It may test the student’s ability to 1) identify a research problem; 2) demonstrate knowledge of the pertinent principles and literature involving the research; 3) structure hypotheses; 4) design experiments with the help of the student's advisor to test stated hypotheses; and 5) propose appropriate analyses, including statistical analyses, modeling, or both. The committee will assess whether the student’s accomplishments meet required standards (e.g., course GPA of 3.0 and satisfactory result for the thesis) of the CEE department and Rensselaer in particular. The student will be responsible for incorporating comments and suggestions from the committee into the thesis prior to submitting the document to the Office of Graduate Education. In addition, a master's thesis checklist can be found in Appendix 2E.

While it is recognized that every student will develop their research at a different rate, and research progress can be difficult to predict or control, it is recommended that all students plan to complete the thesis examination before the end of their fifth semester at Rensselaer and apply for the MS or ME degree using a Degree Application form (see Appendix 2F). A request for a waiver from the Office of Graduate Education is needed beyond the fifth semester.

VIII. Dissemination of Research

Dissemination of each student's research in the form of a public presentation to obtain the MS degree is required by Office of Graduate Education. The department encourages presentations at professional meetings and/or publication in peer-reviewed journals and proceedings. 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. Note that individual faculty members within the CEE department may have additional requirements; furthermore, students planning an academic career should be aware that a strong publication record is essential for success.

IX. Satisfactory Progress

It is imperative that students make satisfactory progress toward the MS degree on a continuous basis during their period at Rensselaer. Continued financial support is contingent upon such progress, which includes: 1) completing coursework with a B average (i.e., 3.0 GPA) or better; 2) satisfactory completion of assigned duties, including research assistance; and, 3) progress toward identifying and meeting research goals. Making satisfactory progress in research means working toward a thesis (for MS students) or master’s project (for ME students who choose this option). 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. All students will also fill out a Graduate Student Exit Survey (see Appendix 2H) offered by Rensselaer Graduate School.
X. Safety

Laboratory, electrical, computer, field trip, and outside data collection safety is a priority for the department. A primary aim of the department is to reduce chances of any accidents to an absolute minimum by establishing procedures and conditions in our laboratories and courses that emphasize the safe performance of research and instruction. An additional aim is to minimize the consequence of any accident that may occur by ensuring awareness of proper responses among all students and faculty. All students must take the responsibility for both of these aims of safety to be allowed to work in the laboratories within the department. Anybody who is not prepared to commit to the safety of him/her and others is a hazard to everybody and has no place in a laboratory. Eye protection is required in all laboratories where chemicals are involved and no exception will be made to this Institute wide rule. Each entering MS/ME student is required to take one safety course during his or her stay at Rensselaer. This course will be typically offered during the week of Orientation.
APPENDIX 1: FLOW CHARTS
Appendix 1A. Flow chart for a student obtaining an MS degree.
Appendix 1B. Flow chart for a student obtaining an ME degree.
APPENDIX 2: FORMS AND OTHER INFORMATION
Appendix 2A: Graduate Plan of Study.

Graduate Plan of Study
For instructions, see next page

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Total credit hours

Signatures

Student's
Date

Advisor's
Date

Department's
Date

Submit
☐ Original to Registrar
☐ Copies to Office of Graduate Education
☐ Student
☐ Department
☐ Advisor
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.
Appendix 2B: List of recommended and elective courses for each of the areas in the department.

**Recommended and elective courses for the MS and ME Degree**

### Environmental

<table>
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<th>Course Code</th>
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<tr>
<td>ENVE 4110</td>
<td>Aqueous Geochemistry (ERTH 4690)</td>
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<tr>
<td>ENVE 6110</td>
<td>Advanced Groundwater Hydrology</td>
</tr>
<tr>
<td>ENVE 6140</td>
<td>Stream Pollution Control</td>
</tr>
<tr>
<td>ENVE 6230</td>
<td>Math Modeling in ENVE</td>
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<tr>
<td>ENVE 6200</td>
<td>Hazardous Waste Management</td>
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**Elective Courses Take according to interest**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>CHEM 4810</td>
<td>Chemistry of the Environment</td>
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<tr>
<td>CHME 4400</td>
<td>Chromatographic Separation Processes</td>
</tr>
<tr>
<td>CHME 4430</td>
<td>Introduction to Biochemical Engineering</td>
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<tr>
<td>CHME 6410</td>
<td>Advanced Membrane Concepts</td>
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<tr>
<td>CHME 6510</td>
<td>Advanced Fluid Mechanics</td>
</tr>
<tr>
<td>CHME 6570</td>
<td>Chemical and Phase Equilibria</td>
</tr>
<tr>
<td>CHME 6610</td>
<td>Mathematical Methods</td>
</tr>
<tr>
<td>CIVL 6550</td>
<td>Advanced Geoenvironmental Engineering</td>
</tr>
<tr>
<td>CIVL 6530</td>
<td>Seepage, Drainage, and Groundwater</td>
</tr>
<tr>
<td>CIVL 4570</td>
<td>Analytic Methods in Civil Engineering Systems</td>
</tr>
<tr>
<td>CIVL 4240</td>
<td>Intro to Finite Elements (MANE 4240)</td>
</tr>
<tr>
<td>DSES 4240</td>
<td>Engineering Project Management</td>
</tr>
<tr>
<td>DSES 4260</td>
<td>Industrial Safety and Hygiene</td>
</tr>
<tr>
<td>DSES 4140</td>
<td>Statistical Analysis</td>
</tr>
<tr>
<td>ENG 4100</td>
<td>Business Issues for Engineers and Scientists</td>
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<tr>
<td>ENG 4760</td>
<td>Engineering Economics</td>
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<tr>
<td>ERTH 4540</td>
<td>Organic Geochemistry</td>
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<tr>
<td>ERTH 4190</td>
<td>Environmental Measurements</td>
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<td>ERTH 4500</td>
<td>Global Environmental Change</td>
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<td>ERTH 6960</td>
<td>Geographic Information Systems</td>
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### Geotechnical

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<tr>
<td>CIVL 6450</td>
<td>Structural Dynamics</td>
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<tr>
<td>CIVL 6510</td>
<td>Adv. Soil Mechanics</td>
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<tr>
<td>CIVL 6520</td>
<td>Adv. Foundations</td>
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<tr>
<td>CIVL 6540</td>
<td>Dynamics of Soil</td>
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</table>
## Elective Courses to Take according to interest

### Geotechnical Engineering
- **CIVL 6480** Designing with Geosynthetics
- **CIVL 6530** Seepage, Drainage and Groundwater

### Other Civil Engineering Courses
- **CIVL 4240** Intro to Finite Elements (MANE 4240)
- **CIVL 4440** Advanced structural analysis
- **CIVL 6170** Mechanics of solids (Mane 6170)
- ^ **CIVL 6180** Mechanics of composite Materials (MANE 6180)
- ^ **CIVL 6200** Plates and Shells (MANE 6200)
- ^ **CIVL 6210** Structural Stability (MANE 6210)
- * **CIVL 6310** Adv. Concrete Structures
- **CIVL 6320** Adv. Steel Design
- ^ **CIVL 6460** Advanced structural Dynamics (MANE 6460)
- * **CIVL 6490** Earthquake Engineering
- **CIVL 6660** Fundamentals of Finite Elements
- **CIVL 6670** Nonlinear Finite Element Methods (MANE6670)
- ^ **CIVL 6680** Finite Element Programming (MANE6680)
- ^ **CIVL 6690** Advanced Finite Element Formulations (MANE6690)
- ^ **CIVL 6700** Finite Element Methods in Structural Dynamics (MANE6700)
- ^ **CIVL 6780** Numerical Modeling of Failure Processes in Materials (MANE 6780)

### Environmental Engineering
- **ENVE 4200** - Solid and Hazardous Waste Engineering
- **ENVE 4210** - Industrial Waste Treatment and Disposal
- **ENVE 6130** - Land Applications of Wastewater
- **ENVE 6140** - Stream Pollution Control
- **ENVE 6150** - Limnology
- **ENVE 6160** - Environmental Impact Analysis
- **ENVE 6170** - Atmospheric Chemistry
- **ENVE 6180** - Air Pollution Meteorology
- **ENVE 6200** - Hazardous Waste Management I
- **ENVE 6210** - Hazardous Waste Management II
- **ENVE 6230** - Mathematical Modeling of Environmental Engineering Systems
- **ENVE 6300** - Bioremediation of Hazardous and Toxic Compounds

### Earth and Environmental Science
- **ERTH 6710** - Advanced Groundwater Hydrology

### Mechanical, Aerospace and Nuclear Engineering
- **MANE 4650** Fracture Mechanics
- **MANE 4670** Mechanical Behavior of Materials
- **MANE 6250** Continuum Mechanics
- **MANE 6260** Application in Linear Elasticity
MANE 6400  Analytical Dynamics
MANE 6430  Nonlinear Vibrations
MANE 6490  Plasticity

**Mathematics**

MATH 4100  Linear Algebra
MATH 4300  Introduction to Complex Variables
MATH 4400  Ordinary Differential Equations and Dynamical Systems
MATH 4600  Advanced Calculus
MATH 4700  Foundations of Applied Mathematics
MATH 4800  Numerical Computing

**Engineering**

ENG 4100  Business Issues for Engineers and Scientists
ENG 4760  Engineering Economics

**Structures**

* CIVL 6310  Advanced Concrete Structures
CIVL 6320  Advanced Steel Design
CIVL 6450  Structural Dynamics
CIVL 6540  Dynamics of Soil
* CIVL 6940  Earthquake Engineering
* CIVL 6961  Advanced Mech. Concrete

**Recommended**

* CIVL 6310  Advanced Concrete Structures
CIVL 6320  Advanced Steel Design
CIVL 6450  Structural Dynamics
CIVL 6540  Dynamics of Soil
* CIVL 6940  Earthquake Engineering
* CIVL 6961  Advanced Mech. Concrete

**Elective Courses Take according to interest**

**Civil Engineering**

CIVL 4240  Intro to Finite Elements (MANE 4240)
CIVL 6170  Mechanics of solids (Mane 6170)
^ CIVL 6180  Mechanics of composite Materials (MANE 6180)
^ CIVL 6200  Plates and Shells (MANE 6200)
^ CIVL 6210  Structural Stability (MANE 6210)
^ CIVL 6460  Advanced structural Dynamics (MANE 6460)
CIVL 6520  Advanced Foundation and Earth Structures
CIVL 6540  Dynamics of Soils and Soil-Foundation Systems
CIVL 6660  Fundamentals of Finite Elements
CIVL 6670  Nonlinear Finite Element Methods (MANE6670)
^ CIVL 6680  Finite Element Programming (MANE6680)
^ CIVL 6690  Advanced Finite Element Formulations (MANE6690)
^ CIVL 6700  Finite Element Methods in Structural Dynamics (MANE6700)
^ CIVL 6780  Numerical Modeling of Failure Processes in Materials (MANE 6780)

**Mechanical, Aerospace and Nuclear Engineering**

MANE 4650  Fracture Mechanics
MANE 4670  Mechanical Behavior of Materials
MANE 6250  Continuum Mechanics
MANE 6260  Application in Linear Elasticity
MANE 6400  Analytical Dynamics
MANE 6430 Nonlinear Vibrations
MANE 6460 Fracture Mechanics and Fatigue of Materials
MANE 6490 Plasticity

Mathematics
MATH 4100 Linear Algebra
MATH 4300 Introduction to Complex Variables
MATH 4400 Ordinary Differential Equations and Dynamical Systems
MATH 4600 Advanced Calculus
MATH 4700 Foundations of Applied Mathematics
MATH 4800 Numerical Computing

Engineering
ENG 4100 Business Issues for Engineers and Scientists
ENG 4760 Engineering Economics

Transportation

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| **Plan 2** |
| CIVL-4570 Analytic Methods in Civil Engineering Systems |
| CIVL-4660 Traffic Engineering |
| CIVL-6240 Intelligent Transportation Systems |
| CIVL-6260 Transportation Algorithms |
| CIVL-6961 Freight Systems |
| CIVL-6961 Critical Issues in Transportation |

Elective Courses Take according to interest

**Decision Sciences and Engineering Systems**
DSES-4140 Statistical Analysis
DSES-4210/6600 Design of Man. Systems Supply Chains
DSES-4610 Operations Research Methods I
DSES-4620 Operations Research Methods II
DSES-4760 Mathematical Statistics
DSES-4770 Mathematical Models of OR
DSES-4961 Optimization Algorithms
DSES-6100 Time Series Analysis
DSES-6530 Decision Support and Expert Systems
DSES-6610 Applied Operations Research
DSES-6620 Discrete-Event Simulation
DSES-6770 Linear Programming
DSES-6870 Introduction to Neural Networks

**Management**
MGMT-4370 Risk Management
MGMT-6550 Market and Market Research

**Economics**
ECON-4150 Economics of Govt. Regulation
ECON-4160 Public Finance
ECON-4210 Cost-Benefit Analysis
ECON-4570 Econometrics
ECON-6210 Advanced Cost-Benefit Analysis
ECON-6570 Advanced Econometrics

Applied Mathematics and Mathematics
MATP-4600 Probability Theory and Applications
MATP-4820/6610 Computational Optimization
MATP-6600 Nonlinear Programming
MATP-6620 Comb. Opt. and Integer Programming
MATH-6790-01 Markov Chains & Monte Carlo

Computer Science
CSCI 6963 Algorithmic Game Theory

^: Course has not been offered recently
*: Course is offered in alternate years
Appendix 2C: Nomination of the MS thesis committee.

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

To: The Dean of Graduate Education

From: [Dept Head, please print] [Signature] [Date]

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 Dept. Signature and Date

(1) __________________________, Chair
   Name Dept. Signature/Date

(2) __________________________
   Name Dept. Signature/Date

(3) __________________________
   Name Dept. Signature/Date

For information on giving a required Oral Presentation, please see reverse side for instructions.

OFFICE OF GRADUATE EDUCATION APPROVAL

________________________ For Graduate Education Date _________

cc: Student
    Department
    Registrar’s Office

This form should be used for Master’s students who will submit a thesis and have entered their program starting with the Fall 2010 semester.

November 2010
INSTRUCTIONS:

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

1. Complete form and obtain required signatures.

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

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.

   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.
Appendix 2D: Record of MS thesis presentation form.

RECORD OF MASTER’S THESIS PRESENTATION

Student ___________________________________________ RIN ____________________________

Current Address ________________________________________________________________

City __________ State _______ Zip ______ Phone __________ Email _______________________

Program/Department ______________________ Semester you intend to graduate __________

Check appropriate box: [ ] Master’s Thesis [ ] Master’s Project

Date of Oral Presentation _______________ DigiTool Submission Date: ______________

[ ] Program Seminar [ ] Institute Seminar [ ] Presentation at Symposium/Conference

Thesis or Project Title: ____________________________________________________________

______________________________________________________________________________

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

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 Signature and Date _________________________________________________________

Advisor and Committee Signatures

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

Advisor (Print Name) ______________________________ Signature and Date

Committee Member (Print Name) __________________________ Signature and Date

Committee Member (Print Name) __________________________ Signature and Date

______________________________________________________________________________

OFFICE OF GRADUATE EDUCATION APPROVAL:

Signature __________________________________ Date _________________

Binding Fee Date Paid _______________ No. of Pages ________________

Graduate Education will send copies to:

_____ Registrar _____ Department _____ Graduate Education

(Revised 11/10)
Appendix 2E: Thesis, project or dissertation registration form.

THESIS/PROJECT/DISSERTATION REGISTRATION FORM
Office of the Registrar

INSTRUCTIONS: Use this Thesis/Project/Dissertation Registration Form after the add deadline. Please make a photocopy for your own records. Please allow 7-10 days for processing.

STUDENT: Fill in the entire top half of this form and bring it to your Thesis/Project/Dissertation Advisor for his/her signature. If it is after the add deadline, you must have the approval of Academic Advising and Learning Assistance Center or Office of Graduate Education. Return the form to the Registrar’s Office.

THESIS/PROJECT/DISSERTATION ADVISOR: Please authorize a Thesis/Project/Dissertation Registration Form for this student by signing above.

Date: __________________________

Print Name: ______________________ RIN #: _______ - _____ - _______

(LAST) (FIRST) (M)

E-mail address: ______________________ Day phone: ______________________

Degree: Bachelors Masters Doctorate
(circle one)

Major/Subject Code (e.g. COMM. ENVE): ______

Term/Year: Fall ______ Spring ______ Summer ______ Part of ______ Part of ______ Part of ______

Part of Term I Part of Term II Part of Term III

Circle One: 200 Level 400 Level 600 Level 900 Level (for doctoral level only)

Check one: Bachelors Project (2980) (4980)
Bachelors Thesis (2990) (4990)

BIOL 4970 Non-Thesis Research ______


Credit hours for this thesis/project/dissertation for this term: ______

Print Thesis/Project/Dissertation Advisor's Name: __________________________

Thesis/Project/Dissertation Advisor’s Signature: __________________________

Date: ______ / ______ / ______

For submission after the deadline Required authorization:
- Undergrads: Advising & Learning Assistance Center (Sage Building, Room 2106)
- Grads: The Office of Graduate Education (1516 Peuples Ave)

Authorization by: __________________________ Signature __________________________ Date ______

Print name: __________________________

(2/2010)
Appendix 2F: Master's thesis checklist.

Master's Thesis Checklist

Registrar:

1. Registration for the semester in which the degree will be conferred is required.
2. A Degree Application Form, for the semester you plan to graduate, must be on file with the Registrar's Office.

Office of Graduate Education:

1. An approved Plan of Study must be on file with the Registrar's Office and a copy on file with the Office of Graduate Education. Courses listed on the Plan of Study must agree with courses shown on your transcript.
2. An approved Nomination of Master's Thesis Committee, Provisional Thesis Title and Degree Designation form must be on file with the Office of Graduate Education.
3. A fully completed original Record of Master’s Presentation form with original committee signatures must be provided to the Office of Graduate Education.
4. One paper copy of the thesis, including the title page with original signatures, in black ink only, printed on white acid-free bond paper with 25 percent cotton content must be presented to the Office of Graduate Education.
5. In addition, you must submit one electronic copy of your thesis and one electronic copy of your title page and abstract. Information and instructions for electronic submission can be found at Rensselaer Research Libraries.
6. A receipt from the Bursar's Office for $10.00 binding fee.
7. The completed Graduate Student Exit Survey.
8. Please Note: To attend commencement in May you must file a degree application with the Registrar’s Office and attend status check. Please visit the Commencement website for more information.
Appendix 2G: Degree application form.

DEGREE APPLICATION – Part I
Office of the Registrar
110 8th Street, Troy, New York 12180-3360 (518) 276-6381 (518) 276-6180 Fax

Fill in the information requested and return to the Registrar by the deadline for the semester in which you intend to graduate. Do not take this form to your advisor; it will be sent to him/her at a later time.

FULL LEGAL NAME

Give First Name) (Middle Name) (Last Name)

**CAREFULLY PRINT YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR DIPLOMA**

STUDENT ID#


CURRICULUM CODE: (Major Codes) (First Named Major) (Dual Major Codes) (Second Named Major) (Undergraduate Dual Major Only)

DATE OF GRADUATION: August ___________ December ___________ May ___________

May Graduate?
Are you attending the commencement ceremony? Yes No

ADDRESS GOOD FOR 3 MONTHS AFTER GRADUATION

DEGREE APPLICATION – Part II

NAME ___________________________ STUDENT ID# ___________________________


CURRICULUM CODE: (See reverse side for codes) (First Named Major) (See reverse side for codes) (Second Named Major) (Undergraduate Dual Major Only)

DATE OF GRADUATION: August ___________ December ___________ May ___________

Degree Candidates must be registered during the semester in which they will graduate.

Are you transferring course(s) your final semester Yes No

Present Address: ___________________________ Phone#: ___________________________

Email Address: ___________________________

If you are receiving another RPI degree this term, please indicate below:*

Degree ___________________________ Curriculum: ___________________________

(*NOTE: You must file a separate Degree Application Form for each degree.)
### UNDERGRADUATE Curriculum Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Program Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERO</td>
<td>Aeronautical Engineering</td>
</tr>
<tr>
<td>APHY</td>
<td>Applied Physics</td>
</tr>
<tr>
<td>ARCH</td>
<td>Architecture (5 yr. B. Arch degree)</td>
</tr>
<tr>
<td>BCBP</td>
<td>Biochemistry and Biophysics</td>
</tr>
<tr>
<td>BEFB</td>
<td>Biometrics &amp; Molecular Biology</td>
</tr>
<tr>
<td>BIOL</td>
<td>Biology</td>
</tr>
<tr>
<td>BMED</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>BMGT</td>
<td>Business and Management</td>
</tr>
<tr>
<td>CHEG</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>CHEM</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CIVL</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>COGS</td>
<td>Cognitive Science</td>
</tr>
<tr>
<td>COMM</td>
<td>Communication</td>
</tr>
<tr>
<td>CSCI</td>
<td>Computer Science</td>
</tr>
<tr>
<td>CSYS</td>
<td>Computer &amp; Systems Engineering</td>
</tr>
<tr>
<td>DSIS</td>
<td>Design, Innovation and Society</td>
</tr>
<tr>
<td>EART</td>
<td>Electronic Arts</td>
</tr>
<tr>
<td>ECON</td>
<td>Economics</td>
</tr>
<tr>
<td>EPOW</td>
<td>Electric Power Engineering</td>
</tr>
<tr>
<td>ELEC</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>EMAC</td>
<td>Electronic Media, Arts &amp; Comm.</td>
</tr>
<tr>
<td>EPHY</td>
<td>Engineering Physics</td>
</tr>
<tr>
<td>ENVE</td>
<td>Environmental Engineering</td>
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<tr>
<td>ENVS</td>
<td>Environmental Science</td>
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<tr>
<td>ESCI</td>
<td>Engineering Science</td>
</tr>
<tr>
<td>GEOL</td>
<td>Geology</td>
</tr>
<tr>
<td>GSAS</td>
<td>Games and Simulation Arts and Sciences</td>
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<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
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<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>IGTE</td>
<td>Industrial &amp; Management Engr.</td>
</tr>
<tr>
<td>ITWS</td>
<td>Information Technology and Web Science</td>
</tr>
<tr>
<td>ISCI</td>
<td>Interdisciplinary Science</td>
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<td>MATE</td>
<td>Materials Engineering</td>
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<td>MATH</td>
<td>Mathematics</td>
</tr>
<tr>
<td>MECL</td>
<td>Mechanical Engineering</td>
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<tr>
<td>NUCS</td>
<td>Nuclear Engineering</td>
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<tr>
<td>PHIL</td>
<td>Philosophy</td>
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<td>PHYS</td>
<td>Physics</td>
</tr>
<tr>
<td>PSYC</td>
<td>Psychology</td>
</tr>
<tr>
<td>STSO</td>
<td>Science, Technology &amp; Society</td>
</tr>
</tbody>
</table>

### GRADUATE Curriculum Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Program Name</th>
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</thead>
<tbody>
<tr>
<td>AERO</td>
<td>Aeronautical Engineering</td>
</tr>
<tr>
<td>APMA</td>
<td>Applied Mathematics (MS only)</td>
</tr>
<tr>
<td>ARCS</td>
<td>Architectural Sciences</td>
</tr>
<tr>
<td>ASCI</td>
<td>Applied Science</td>
</tr>
<tr>
<td>ARCH</td>
<td>Architecture</td>
</tr>
<tr>
<td>BCBP</td>
<td>Biochemistry/Biophysics</td>
</tr>
<tr>
<td>BIOL</td>
<td>Biology</td>
</tr>
<tr>
<td>BMED</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>CHEG</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>CHEM</td>
<td>Chemistry</td>
</tr>
<tr>
<td>CIVL</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>CMRT</td>
<td>Communication &amp; Rhetoric</td>
</tr>
<tr>
<td>COGS</td>
<td>Cognitive Science</td>
</tr>
<tr>
<td>CSCI</td>
<td>Computer Science</td>
</tr>
<tr>
<td>CSYS</td>
<td>Computer &amp; Systems Engineering</td>
</tr>
<tr>
<td>DSES</td>
<td>Dec. Sci. &amp; Engr. Sys. (PhD only)</td>
</tr>
<tr>
<td>EECO</td>
<td>Ecological Economics (PhD only)</td>
</tr>
<tr>
<td>EEVP</td>
<td>Ecological Economics, Values &amp; Policy</td>
</tr>
<tr>
<td>ECON</td>
<td>Economics</td>
</tr>
<tr>
<td>EMBA</td>
<td>Management (Executive MBA program)</td>
</tr>
<tr>
<td>EPOW</td>
<td>Electric Power Engineering</td>
</tr>
<tr>
<td>ELEC</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>EART</td>
<td>Electronic Arts</td>
</tr>
<tr>
<td>EPHY</td>
<td>Engineering Physics</td>
</tr>
<tr>
<td>ESCI</td>
<td>Engineering Science</td>
</tr>
<tr>
<td>ENVE</td>
<td>Environmental Engineering</td>
</tr>
<tr>
<td>EMAP</td>
<td>Environmental Management &amp; Policy</td>
</tr>
<tr>
<td>FERA</td>
<td>Financial &amp; Risk Analytics</td>
</tr>
<tr>
<td>GEOL</td>
<td>Geology</td>
</tr>
<tr>
<td>HICN</td>
<td>Human-Computer Interaction</td>
</tr>
<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
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<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
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<tr>
<td>HGEO</td>
<td>Hydrogeology</td>
</tr>
<tr>
<td>HKTS</td>
<td>Industrial &amp; Management Eng.</td>
</tr>
<tr>
<td>IARC</td>
<td>Informatics and Architecture</td>
</tr>
<tr>
<td>ITEC</td>
<td>Information Technology</td>
</tr>
<tr>
<td>LGHT</td>
<td>Lighting</td>
</tr>
<tr>
<td>MGMT</td>
<td>Management</td>
</tr>
<tr>
<td>MATH</td>
<td>Mathematics</td>
</tr>
<tr>
<td>MECL</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>MECH</td>
<td>Mechanics</td>
</tr>
<tr>
<td>MEDS</td>
<td>Multidisciplinary Science</td>
</tr>
<tr>
<td>NSCI</td>
<td>Natural Sciences</td>
</tr>
<tr>
<td>NUCL</td>
<td>Nuclear Engineering</td>
</tr>
<tr>
<td>NUCL</td>
<td>Nuclear Eng &amp; Science (PhD only)</td>
</tr>
<tr>
<td>NUCS</td>
<td>Natural Sciences</td>
</tr>
<tr>
<td>PHYS</td>
<td>Physics</td>
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<tr>
<td>PHYS</td>
<td>Physics</td>
</tr>
<tr>
<td>SETM</td>
<td>Systems Engineering &amp; Technology Mgmt</td>
</tr>
<tr>
<td>SSST</td>
<td>Science &amp; Technology Studies</td>
</tr>
<tr>
<td>TCOM</td>
<td>Technical Communication</td>
</tr>
<tr>
<td>TCE</td>
<td>Technol. Commercialization &amp; Entrep</td>
</tr>
<tr>
<td>TRAN</td>
<td>Transportation Engineering</td>
</tr>
</tbody>
</table>
Appendix 2H: Graduate student exit survey.

RENSSLEAER POLYTECHNIC INSTITUTE
GRADUATE STUDENT SURVEY

Your opinions are very valuable to us and could form the basis of significant improvements to the content and delivery of graduate education at Rensselaer. The Office of Graduate Education assures complete confidentiality of your individual survey responses. We will share them without identifying respondents, and only to the extent that the exchange of information may serve to advance any needed academic or social change in your Department, your School, or the Institute as a whole. Your cooperation is appreciated, thank you for once again helping Rensselaer change the world to a better place.

Stanley Dunn
Vice Provost and Dean of Graduate Education

1. Name (optional): ____________________________
2. Gender: M F
3. Visa Type: ____________________________
5. U.S. Citizen: Yes No Permanent Resident
6. Ethnicity: Black White Hispanic/Latino Asian
   Native American Other: ____________________________
7. Department: ____________________________
8. Graduate Degree(s) earned: ____________________________

Please use the scale that follows to respond to each set of questions. After each set you have an opportunity to provide comments.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>Don't Know</td>
</tr>
</tbody>
</table>

A. Information for Prospective Students — My graduate program provided me with the following information during my application and admissions process:

1. ___ Accurate information about the costs (total of tuition, fees, and living expenses) of the program.
2. ___ Realistic assessment of financial support (prospects for and levels of) while in graduate school.
3. ___ Clear information about the requirements and expectations of my program.
4. ___ Information about career prospects for graduate students in my field.
5. ___ A list of places where recent program graduates were employed after graduation.
6. ___ The percentage of students in the program who complete the program.
7. ___ The average time to degree for recent program graduates.
8. ___ Overall, my program provided enough information during the application and admissions process for me to make an informed decision about choosing to pursue my degree program.

Additional comments on Information for Prospective Students:
B. Curricular Breadth & Flexibility
1. ____ My program's curriculum is broad enough to meet my needs and prepare me for my career of choice.
2. ____ My program actively encourages students to explore a broad range of career options.
3. ____ My program encourages students to broaden their education through non-required activities such as coursework outside of the department, internships, and workshops.
4. ____ My program does a good job of preparing students for academic careers.
5. ____ My program does a good job of preparing students for careers outside of academia.

Additional comments on Curricular Breadth & Flexibility:

C. Teaching
1. ____ Teaching assistants in my program are appropriately prepared and trained before entering the classroom.
2. ____ Teaching assistants in my program are appropriately supervised to help improve their teaching skills.
3. ____ Graduate student needs and interests are given appropriate consideration for determining which courses students in my program teach.
4. ____ The teaching experience available through my program is adequate preparation for an academic/teaching career.

Additional comments on Teaching:

D. Professional Development
1. ____ Graduate students in my program receive training in professional ethics and professorial responsibilities via coursework or seminars.
2. ____ Graduate students in my program receive training in professional skills such as public speaking, grant writing, and working in teams.
3. ____ Graduate students in my program receive sufficient resources such as office space, computer access, office equipment, and supplies.

Additional comments on Professional Development:
F. Career Guidance & Placement Services
1. _____ Graduate students in my program receive effective career guidance and planning services for careers in academia.
2. _____ Graduate students in my program receive effective career guidance and planning services for careers outside of academia.
3. _____ Graduate students in my program receive effective placement assistance and job search support for positions in academia.
4. _____ Graduate students in my program receive effective placement assistance and job search support for positions outside of academia.

Additional comments on Career Guidance & Placement Services:

F. Time to Degree Completion
1. _____ My program gives me a clear, annual assessment of my progress towards my graduate degree.
2. _____ A faculty member or group of faculty members (in addition to my advisor) is keeping track of my research progress and will help to determine when I have accomplished enough work for my Ph.D. (or research based master’s).
3. _____ Insufficient funding slows my progress towards a degree.

Additional comments on Time to Degree Completion:

G. Mentoring
1. _____ I am learning good research practice(s).
2. _____ I receive ongoing, constructive feedback on my progress towards degree from my advisor.
3. _____ I am satisfied with the amount of time I spend with my advisor.
4. _____ I am satisfied with the quality of the time I spend with my advisor.
5. _____ I would feel comfortable talking to my advisor about a career in academia.
6. _____ I would feel comfortable talking to my advisor about a career outside of academia.
7. _____ My own goals and research interests are incorporated into my doctoral dissertation.
8. _____ There is a person or office I would turn to if I perceived abuse or misconduct in my program, by my advisor, or by a committee member.

Additional comments on Mentoring:
H. Program Climate
1. ____ There is a supportive student community in my program.
2. ____ Graduate students in my program are treated with respect.
3. ____ Graduate students in my program are involved in decisions relevant to their education.
4. ____ Faculty in my program believe students are here primarily to help faculty fulfill their research and teaching obligations.
5. ____ My program actively recruits talented students from underrepresented groups.
6. ____ My program provides an environment in which members of underrepresented groups feel comfortable and supported.
7. ____ I have enough time and freedom to pursue interests and activities outside of my academic program.

Additional comments on Program Climate:

I. Overall Satisfaction
1. ____ I receive sufficient financial support to maintain an acceptable standard of living.
2. ____ Overall, I am satisfied with the courses in my program.
3. ____ Overall, I am satisfied with my advisor.
4. ____ Overall, I am satisfied with my program.
5. ____ Overall, students in my program seem satisfied with the program.
6. ____ Overall, I would recommend my program to prospective students.
7. ____ Overall, I am satisfied with my Rensselaer experience.

Additional comments on Overall Satisfaction:

Thank You Very Much For Your Assistance.

Please submit your survey to the Office of Graduate Education with your thesis.

Rensselaer Polytechnic Institute
1516 Peoples Ave.
110 Eighth Street
Troy, NY 12180-3590