

# ECSE Graduate Program Handbook

# 2018

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The Graduate Program Handbook contains the rules, policies, and guidelines applicable to the graduate community within the Electrical, Computer, and Systems Engineering Department at Rensselaer Polytechnic Institute.

Department  
of Electrical,  
Computer &  
Systems  
Engineering

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## Welcome

I'm pleased to welcome you to our ECSE department, one of the top electrical and computer engineering departments in the country. You are joining a department with a heritage that stretches back more than 100 years.

Our graduates have been technical leaders for generations: such as Marcian Hoff, one of the inventors of the microprocessor; Steven Sasson, who invented the digital camera; and the IEEE Medal of Honor winner, B. Jayant Baliga, "For the invention , implementation, and commercialization of power semiconductor devices with widespread benefits to society."

Our faculty are leading experts in microelectronics, optoelectronics, the design of high performance electronic devices, image science, control systems, communication systems, electrical energy systems, signal processing, and networks. In addition to individual faculty research contracts, we have a number of large research centers that support cross-disciplinary research, such as the NSF Engineering Research Center in Lighting Enabled Systems and Applications (LESA), the NSF/DoE Engineering Research Center for Ultra-Wide-Area Resilient Electrical Energy Transmission Networks (CURENT) and the New York State supported Center on Future Energy Systems (CFES).

Our departmental Office of Student Services is your resource to help you coordinate graduate student requirements. The staff is very experienced and will help you resolve any problems as you settle down in your new environment at Rensselaer.

Take advantage of your time at Rensselaer to learn as much as you can about your chosen field. We are here to help you succeed. And when you graduate, you will be sufficiently prepared to contribute meaningfully to your chosen field and ultimately take your place among the past ECSE technical giants listed above.

I wish you success in your graduate studies.

Sincerely,

Michael J. Wozny  
Acting Department Head

## **Introduction**

Welcome to graduate study within the Electrical, Computer, and Systems Engineering (ECSE) Department at Rensselaer Polytechnic Institute! We are delighted that you are considering or have chosen to pursue graduate studies within our department.

The purpose of this handbook is to acquaint new and continuing ECSE graduate students with Departmental expectations and the requirements that a student must satisfy in order to complete a graduate degree. This manual contains specific Departmental requirements in addition to pertinent Institute rules and regulations. Additional information can be found on our website at <http://ecse.rpi.edu/> in addition to the [RPI Catalog](#).

For additional information or explanation of any of the requirements, please contact the ECSE Graduate Student Services Office by calling (518) 518-276-6225 or emailing [gradinfo@ecse.rpi.edu](mailto:gradinfo@ecse.rpi.edu).

### **Contact List**

Prof. Alhussein Abouzeid, Graduate Program Director – 518-276-6534;  
[abouzeid@ecse.rpi.edu](mailto:abouzeid@ecse.rpi.edu)

Ms. Leslie D. Davis, Graduate Program Administrator – 518-276-2554; [davisl4@rpi.edu](mailto:davisl4@rpi.edu)

Ms. Priscilla Magilligan, Graduate Program Secretary – 518-276-6225; [pris@ecse.rpi.edu](mailto:pris@ecse.rpi.edu)

## **Degree Programs**

The ECSE Department offers a Master of Engineering (MEng), Master of Science (MS), and a Doctor of Philosophy (PhD) in Electrical Engineering (ELEC) and in Computer and Systems Engineering (CSYS). There isn't a difference in the requirements between the ELEC and CSYS majors. The student should simply choose the major that best matches his or her area of interest.

### **Master of Engineering in ECSE (MEng Degree)**

The MEng is intended to be a terminal degree for those who wish to enter professional practice upon completion. Students entering the program typically hold an accredited bachelor's degree in an appropriate branch of engineering. A master's thesis or project is not required.

Students pursuing the MEng in ELEC or CSYS need to complete the following:

- Minimum of 30 credits.
- A Technical Concentration consisting of 3 courses in the same area. Having one as a pre-requisite for one of the others is preferable, but not required (and not possible in some areas).
- At least 18 credits must be taken at the 6000 level.
- At least 15 credits must be taken within the ECSE Department.
- At least one Math elective.
- Six (6) credits must be taken outside of the ECSE Department that are not technically related (e.g. courses in Economics or Management).
- **No more than 3 credits can be taken as an Independent Study (e.g. ECSE-6940)**

Students who do not have adequate preparation for their chosen area of specialization may need to take background courses in addition to the 30-credit-hour requirement. In particular, no 1000- or 2000- level courses may be applied to a graduate degree at RPI.

Although students may elect to pursue the PhD after completing the MEng, it is strongly recommended that any student considering the PhD should choose the MS degree program (preferably with a thesis) in order to get a feel for doing research.

# Master of Engineering in ECSE - Program Planner

Name \_\_\_\_\_

Entry Term \_\_\_\_\_

**Graduation Requirements:** 30 credits minimum.

- At least 18 credits must be taken at the 6000 level.
- At least 15 credits must be taken within the ECSE Department (ECSE XXXX).
- Nine (9) credit Technical Concentration
- Six (6) credits must be taken outside of the ECSE Department, not technically related to ECSE (e.g. Management, ECON, HASS).
- At least one Math course (3-4 credits)
- No more than 3 credits can be taken as an Independent Study (e.g. ECSE-6940)

<u>Course #</u>	<u>Course Title</u>	<u>Credits</u>	<u>Term/Year</u>
<b>I. Required - Technical Concentration (9 credits)</b>			
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
<b>II. Math Course (3-4 credits)</b>			
MATH- _____	_____	_____	_____/____
<b>III. Required - Non-Technically Related, Outside-ECSE Courses (6 cr.)</b>			
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
<b>IV. Free Electives (11-12 credits)</b>			
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
<b>Total Credits:</b>		_____	

## **The Master of Science (MS) without Thesis Degree**

The MS without thesis is also intended to be a terminal degree for those who wish to enter professional practice upon completion. Students entering the program typically hold an accredited bachelor's degree in an appropriate branch of engineering. A master's project is an option.

Students pursuing the MS in ELEC or CSYS need to complete the following:

- Minimum of 30 credits
- At least 18 credits must be taken at the 6000 level
- At least 18 credits must be taken within the ECSE Department
- No more than 3 credits of Independent Study (ECSE-6940)
- No more than 6 transfer credits
- At least one Math course.

Students who do not have adequate preparation for their chosen area of specialization may need to take background courses in addition to the 30-credit-hour requirement.

# Master of Science without Thesis - Program Planner

Name \_\_\_\_\_

Entry Term \_\_\_\_\_

**Graduation Requirements:** 30 credits minimum.

- At least 18 credits must be taken at the 6000 level.
- At least 18 credits must be taken within the ECSE Department (ECSE XXXX).
- At least one Math course (3-4 credits)
- No more than 3 credits can be taken as an Independent Study (e.g. ECSE-6940)

Course #	Course Title	Credits	Term/Year
----------	--------------	---------	-----------

**I. Required – ECSE Coursework (18 credits)**

ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____

**II. Math Course (3-4 credits)**

MATH- _____	_____	_____	_____/____
-------------	-------	-------	------------

**III. Free Electives (9 credits)**

_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____

<b>Total Credits</b>	_____
----------------------	-------



## **The Master of Science (MS) with Thesis Degree**

The MS program is designed to prepare students for research-oriented careers and/or eventual pursuit of a doctoral degree. Students entering the program typically hold an accredited bachelor's degree in an appropriate branch of engineering. A master's thesis is required for the MS degree.

Students pursuing the MS in ELEC or CSYS need to complete the following:

- Minimum of 30 credits.
- At least 15 non-thesis credits must be taken at the 6000 level.
- At least 12 credits must be taken within the ECSE Department.
- At least one Math course.
- Six (6) OR nine (9) MS thesis credits. Six is typical. Nine is for cases requiring an exceptional amount of work and must be justified by the student's research advisor.

Students who do not have adequate preparation for their chosen area of specialization may need to take background courses in addition to the 30-credit-hour requirement.

## Master of Science with Thesis - Program Planner

Name \_\_\_\_\_

Entry Term \_\_\_\_\_

**Graduation Requirements:** 30 credits minimum.

- At least 15 (non-thesis) credits must be taken at the 6000 level.
- At least 12 credits must be taken within the ECSE Department (ECSE XXXX).
- Six (6) OR Nine (9) MS thesis credits
- At least one Math course (3-4 credits)
- No more than 6 credits can be transferred
- No more than 6 credits can be taken as an Independent Study (e.g. ECSE-6940)

Course #	Course Title	Credits	Term/Year
<b>I. Required – ECSE Coursework (12 credits)</b>			
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
ECSE - _____	_____	_____	_____/____
<b>II. Math Course (3-4 credits)</b>			
MATH- _____	_____	_____	_____/____
<b>III. Master’s Thesis (6 <u>OR</u> 9 cr.)</b>			
ECSE-6990	_____	_____	_____/____
ECSE-6990	_____	_____	_____/____
ECSE-6990	_____	_____	_____/____
<b>IV. Free Electives (5-9 credits)</b>			
ECSE - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
_____ - _____	_____	_____	_____/____
<b>Total Credits</b>		_____	

## **Forming an MS Committee**

MS (thesis) students are expected to formulate a thesis problem in consultation with their research advisor. The supervision of the research for the thesis is entrusted to a committee, whose members are selected by the student and advisor and must be approved by the Graduate Program Director (GPD) and the Office of Graduate Education (OGE). The committee consists of three members, with the advisor serving as chairperson. Typically, the committee includes three ECSE tenure-track faculty, but exceptions can be made when appropriate. If a student wishes to nominate someone from outside the Department to serve on the committee, the student's advisor will need to submit a brief justification to the GPD, detailing how this external member is particularly knowledgeable in the student's research area.

Once the committee is determined, the student is expected to file a [Nomination of Master's Thesis Committee](#) form with the Graduate Program Secretary, who will forward the original document to the Graduate School for final approval. This document is due to the Graduate School at the beginning of the semester the student intends to graduate. Please refer to the [Academic Calendar](#) for the exact deadline that applies to your graduation semester.

## **Master's Thesis & Oral Presentation**

All MS students are expected to orally present their research. This is typically done the semester in which the student intends to graduate. The required oral presentation, which must be approved by your advisor, can be one of the following:

1. Program or Institute Seminar  
NOTE: A presentation announcement must be posted publically within the department (electronic or paper copy) at least two weeks prior to the date of the presentation. Faculty representation is required. Contact the Graduate Program Secretary for electronic posting.
2. Presentation at a conference or symposium.
3. Traditional thesis defense.

[The Record of Master's Thesis & Oral Presentation](#) is to be completed and signed by the student's Committee once the student has met the requirement for the oral presentation and the thesis meets the approval of the Committee.

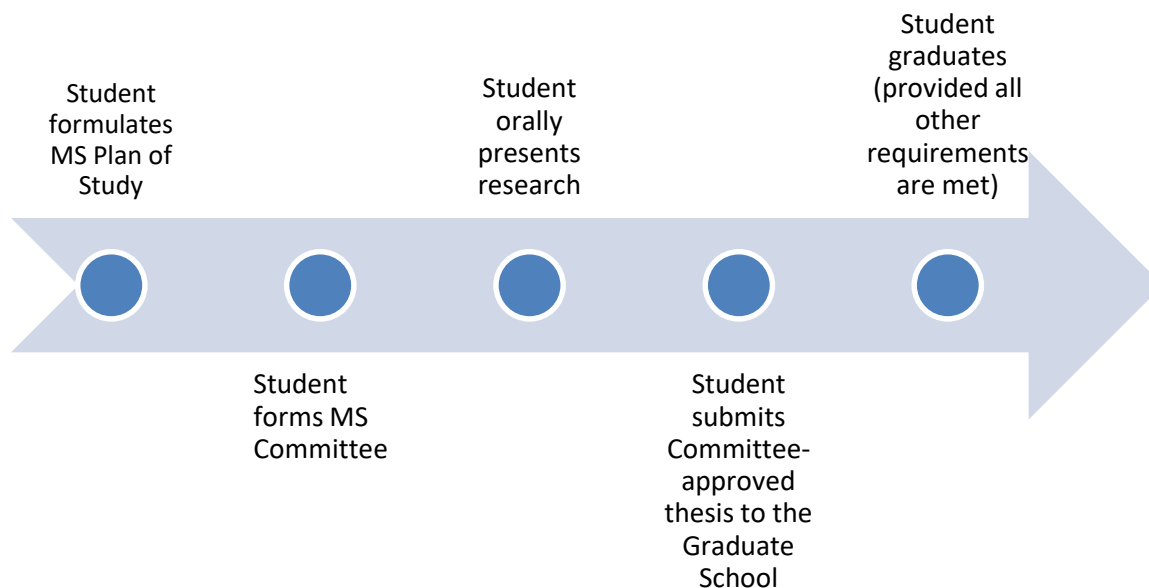
## Thesis Submission

All MS candidates are required to submit a thesis to the Office of Graduate Education (OGE) for final approval after meeting the oral presentation requirement. OGE has stringent formatting specifications and requirements for all submissions. It is imperative that you review the [Thesis Writing Manual](#) prior to the submission of your document. We highly encourage you to make an appointment for a preliminary review of your thesis with the Graduate School at [gradschool@rpi.edu](mailto:gradschool@rpi.edu) before your formal submission. The manual can be accessed directly from the Graduate School's website.

Please refer to the Institute's [Submit Your Thesis](#) page to access the [Master's Thesis Checklist](#), [Submission Tips and Techniques](#), and the [Submission site](#) to upload one's thesis, etc. Please note that your thesis will be subject to an academic integrity review. All figures and text that have been previously published must be referenced. This includes your own work previously published elsewhere! Please refer to the thesis manual for an example of how to cite previously published work.

## Degree Clearance

To receive a degree at the end of any semester, the student must be registered that particular semester, have an up-to-date Plan of Study on file, successfully completed all of the credits listed on his or her Plan of Study (min. 3.0 GPA), submit a degree application, and receive approval of the thesis by the Graduate School. The thesis must be submitted to the Graduate School Office by the date specified in the Institute calendar.



**Figure 1. Steps in MS ECSE program**

## **Co-Terminal Degree (BS/MEng or BS/MS Degree)**

ECSE's Co-Terminal program is open to current ECSE undergraduates. The purpose is to provide top undergraduates an opportunity to pursue a Bachelor's and Master's degree while maintaining their undergraduate Rensselaer funding. Co-Term students are required to graduate with their bachelor's degree in up to eight semesters, with a minimum GPA of 3.0. After graduating with their BS degree, they have up to two semesters to complete their master's degree. The GRE exam is not required.

### **Application Requirements**

- Minimum 90 credits completed to apply (typically second semester junior year).
- Minimum 3.5 GPA to be considered.
- Submit the Co-Terminal Application with all sections completed.
- Submit two (2) letters of recommendation (at least one must be from faculty).
- Submit a resume.
- Submit a copy of your CAPP report.
- Submit a well-written Statement of Background and Goals.
- Submit a completed Master's Plan of Study.

**Deadline to apply:** October 1st if your normal BS graduation is in the spring; April 1st if your normal BS graduation is in the fall (late applications will not be accepted).

Co-terminal students can pursue either the MEng or MS degree, but the MS non-thesis is more appropriate for most students. If you wish to apply for the MS with thesis program, you will need to identify a research advisor before your application will be considered. BS/MEng students will continue to be advised by their undergraduate advisor unless they are pursuing a MEng/MS with project. In this case, the student's research advisor serves as the academic advisor.

### **Co-Terminal FAQ's**

#### **1. Can I receive both undergraduate financial aid and graduate TA/RA aid?**

No. Co-terminal students cannot receive graduate financial aid. You should speak with the Graduate Program Administrator about applying for the traditional Master's program if you receive a verbal graduate financial aid offer and are uncertain about how to proceed.

**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. When do I receive my B.S. degree?**

You will receive B.S. and MEng/MS degrees once you have satisfied the requirements of each degree program. You should file a degree application with the Office of the Registrar for the B.S. degree at the beginning of the semester in which you will actually graduate. See the [academic calendar](#) for deadline information.

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

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

**5. I finished my 8th semester but decided not to continue in the Co-Term program. How do I receive my B.S. degree?**

You must formally withdraw from the co-terminal program via 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 the end of May.

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

Co-terminal students are subject to graduate degree program guidelines after they have earned the minimum number of credits required for their bachelor's degree. Any courses taken after a student has reached the minimum will be subject to graduate level policies, and graduate policies prohibit designating a graduate course as Pass/No Credit.

**7. 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.

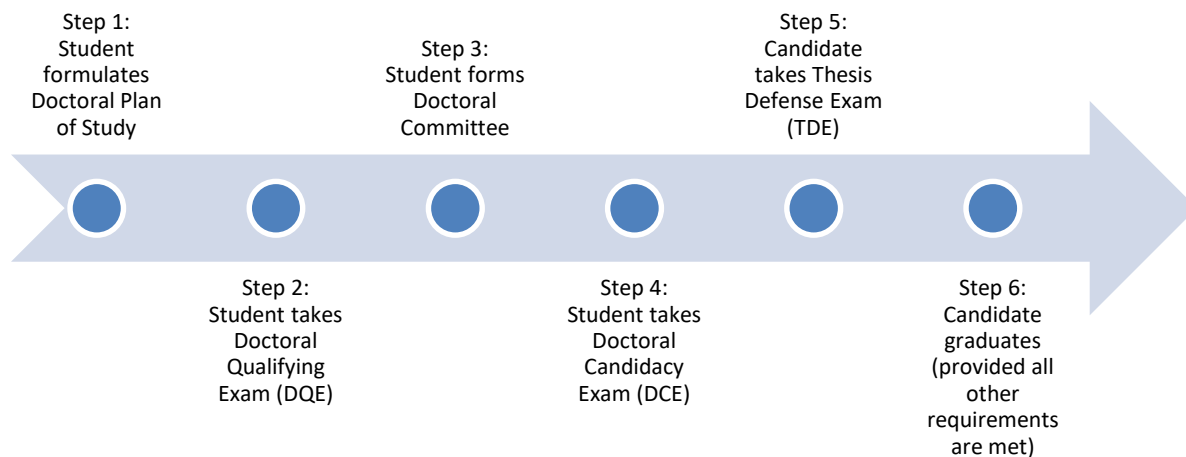
## The Doctoral (PhD) Degree

The Doctor of Philosophy degree is awarded in Electrical Engineering or Computer and Systems Engineering. There is no difference in the requirements between these two. The student should choose the major that best matches his or her area of research. The most important distinction is that a doctoral degree requires a substantial, original contribution to knowledge in some area of ECSE.

Students entering the program should hold an accredited bachelor's degree in an appropriate branch of engineering. Prospective students interested in earning both the MS and PhD should apply directly to the PhD program, as they will have the opportunity to add the Master's degree once enrolled in the program. The doctoral degree requires a total of seventy-two (72) credits beyond a Bachelor's degree or forty-eight (48) credits beyond a Master's degree.

In satisfying the 72 credit hour requirement, at least two thirds of the total credit hours (excluding thesis credits) must be at the 6000-level or higher; no more than fifteen 4000-level credits are allowed. A minimum of twelve and a maximum of thirty-six dissertation credits are allowed. One Math course is also required.

For students entering with a Master's degree, the Master's would be reflected in the 72-credit doctoral plan of study as a 24-credit block. This satisfies the residency requirement that 48 credits be completed at Rensselaer.



**Figure 2. Steps in ECSE Doctoral program**

## Doctoral Qualifying Examination

The purpose of the DQE is to determine the potential or likelihood that the student will be able to satisfactorily complete the doctoral requirements, including the ability to produce quality, independent research. The exam evaluates not only the student's knowledge, but also his or her ability to apply that knowledge to analyze and synthesize ideas at an advanced level in the areas being examined.

All students have two opportunities to pass the DQE. The DQE is given twice each academic year – usually during a two-week period in September and again in February.

It should be noted that in the awarding of financial aid (including research and teaching assistantships), preference is given to those students who have passed the DQE. It is also important to make progress on research before taking the DQE.



The decision as to whether or not a student passes the DQE is made by the entire ECSE faculty after reviewing the student's performance on the four (4) oral exams, the student's academic record, and the recommendation of the student's research or project adviser(s) concerning the student's ability to conduct independent research of high quality.

The DQE consists of three parts:

1. **Four oral exams:** 1 Basic area exam, 2 Major area exams, and 1 Minor area exam. This is discussed in more detail below.
2. **Course grades:** Your grades in the courses you have taken at Rensselaer. This serves as the “written” part of the DQE.
3. **Research Advisor's Recommendation:** Your thesis advisor will evaluate your research to date. This part should not be underestimated nor should the importance of getting started on research as soon as possible after starting your graduate program.

### The Oral Exam Component of the DQE

The oral portion of the ECSE Doctoral Qualifying exam is individually structured for each student and consists of four (4) oral exams. Each oral exam is approximately one hour in length and conducted by an ECSE faculty member in one of the subject areas selected by the student. Specifically, one oral exam is given in the selected Basic Area (i.e., an area selected from the "Basic Group": Physics, Mathematics, and Computer Science). Two oral exams are given in the selected Major Area (i.e., an area selected from the "Elective Group": Circuits and



Electronics, Control, Communications, Plasma and Electromagnetics, Microelectronics Technology and Design, Computer Systems, Computer Design, Image Analysis and Computer Vision, and Electric Power Engineering). One oral exam is given in the selected Minor Area (i.e., an area selected from either the "Basic Group" or the "Elective Group" but not duplicating a Basic Area or Major Area selection).



The Oral portion of the DQE consists of four exams in areas that the student selects: One in the Basic Area, Two in the Major Area, and one in the Minor Area.

Two important points should be noted regarding the DQE. First, the student should not select an exam area unless he/she is familiar with the material in the three courses listed under that area (listed below), as well as the material contained in the prerequisite courses. Second, the three courses listed per subject area are provided only to guide the student in his/her DQE preparation; the courses serve only as a focus for examination, which might also touch upon other related material in the subject area. It should be noted that the oral examiner's primary objective is not to determine how much material a student knows in a given subject area, but how well the student is able to use and apply that knowledge.



Select exam areas that you are familiar with. You are expected to know the material in the courses listed within that area as well as their pre-requisite courses.

## **DQE Subject Areas**

### **Basic Group**

#### **1. Physics**

PHYS-4100 Introductory Quantum Mechanics  
PHYS-4210 Electromagnetic Theory  
PHYS-4720 Solid-State Physics

#### **2. Mathematics**

MATH-4100 Linear Algebra  
MATH-4300 Introduction to Complex Variables  
MATH-4600 Advanced Calculus

#### **3. Computer Science**

CSCI-2300 Data Structures and Algorithms  
CSCI-4050 Computability, Compilers, and Complexity  
CSCI-4430 Programming Languages

## **Elective Group**

### **4. Circuits and Electronics**

ECSE-2010 Electric Circuits  
ECSE-2050 Intro to Electronics  
ECSE-4040 Digital Electronics

### **5. Control**

ECSE-4440 Control Systems Engineering  
ECSE-4510 Discrete-Time Systems  
ECSE-2410 Signals and Systems

### **6. Communications**

ECSE-4500 Probability for Engineering Applications  
ECSE-4520 Communication Systems  
ECSE-2410 Signals and Systems

### **7. Plasmas and Electromagnetics**

ECSE-4320 Plasma Engineering  
PHYS-4210 Electromagnetic Theory  
PHYS-6590 Statistical Mechanics

### **8. Microelectronics Technology and Design**

ECSE-2210 Microelectronics Technology  
ECSE-4240 Solid State Electronics (or PHYS-4720 Solid State Physics)  
ECSE-4250 Integrated Circuit Processes and Design

### **9. Computer Systems**

CSCI-4210 Operating Systems  
ECSE-2660 Computer Architecture, Networks, and Operating Systems  
ECSE-4670 Computer Communication Networks

### **10. Computer Design**

ECSE-2610 Computer Components and Operations  
ECSE-4770 Computer Hardware Design  
ECSE-4220 VLSI Design

## **11. Image Analysis and Computer Vision**

ECSE-6610 Pattern Recognition  
ECSE-4530 Digital Signal Processing  
ECSE-4540 Introduction to Image Processing

## **12. Electric Power Engineering**

ECSE-4110 Power Engineering Analysis  
ECSE-4080 Semiconductor Power Electronics  
ECSE-2100 Fields and Waves I

### **When is the DQE given?**

The DQE is given twice each academic year – usually during a two-week period in September and again in February.

### **When should a student take the DQE?**

ECSE graduate students should take the DQE prior to completing 15 credits beyond the Master's degree. Full-time students admitted without a Master's degree are expected to take the DQE in their third semester after entering the ECSE graduate program. Students who enter with a Master's degree are expected to take the DQE in their second semester in the PhD program. In the awarding of financial aid (including research and teaching assistantships), preference is given to students who have passed the DQE. However, this should not encourage student to take the DQE before they are ready. It is also important to make progress on research before taking the DQE. Questions about how the DQE affects graduate financial aid should be directed to Leslie Davis, Graduate Program Administrator, at [davisl4@rpi.edu](mailto:davisl4@rpi.edu).

### **How does a student apply to take the DQE?**

Students planning to take the DQE, must complete the "Application for Doctoral Qualifying Examination" form (available in JEC 6012) and submit it to the Doctoral Program Secretary. Students will be notified when the application is available and due for submission prior to the commencement of the applicable semester. The student will receive a letter listing their four examiners and the exact timeframe of the two week examination period. It is the student's responsibility to coordinate the specific date and times of each exam with each examiner. If a student applies to take the DQE and fails to show up, the examination is counted as having been taken and the student has failed the exam.

## **How many times is a student allowed to take the DQE?**

A student may take the DQE at most twice.

## **What is the decision process for passing the DQE?**

The decision as to whether a student passes the DQE is made by the entire ECSE faculty after reviewing **i)** the student's performance on the 4 oral exams, **ii)** the student's academic record, and **iii)** the recommendation of the student's research or project advisor(s) concerning the student's ability to conduct independent research of high quality. (Since research is an important aspect of the doctoral program, the student is strongly encouraged to engage in research activities with a faculty advisor, either at the master's or doctoral level, prior to taking the DQE.)

## **Forming a Doctoral Committee**

As soon as the student has chosen a research area, the student should arrange to conduct thesis research with a thesis adviser. If the thesis adviser is not a full-time tenure-track ECSE faculty member, then there must be a separate academic co-advisor who is. If the student's thesis advisor is not a full-time Rensselaer faculty member, then a full-time ECSE faculty member must be Co-chair of the doctoral committee with him/her.

The student and his/her thesis adviser choose an appropriate doctoral committee. Then, the student completes a "[Nomination of Doctoral Committee](#)" form and submits it to the Doctoral Program Secretary, at least one month prior to taking the DCE. The form can be accessed from the Graduate School's website at <https://info.rpi.edu/graduate-academics/submit-your-thesis-dissertation/#Forms> under the "Submit Your Thesis" tab and a hardcopy can be found in JEC 6012. This form must be complete and contain the original signatures of the Committee members. The Office of Graduate Education (OGE) will not accept scanned or faxed versions of this form. After departmental approval, it is forwarded to the Graduate School which officially appoints the student's doctoral committee.

The committee should include at least four (4) members and represent the principal areas included in the student's Plan of Study. Three members must have an appointment within the ECSE Department (with the rank of assistant professor or higher) and one member must be from outside the ECSE Department. If a Committee member is from outside Rensselaer, a curriculum vitae for this person must accompany the Nomination of Doctoral Committee form. In addition, the student's advisor (typically designated the Committee chair) should

provide a letter of support that includes how the outside member will contribute to the student's research. The committee will conduct the student's Doctoral Candidacy Exam (DCE) and the student's final Thesis Defense Examination. If any members of the doctoral committee change, the student will need to submit a new Nomination of Doctoral Committee form and a strong justification will be required.

### **Doctoral Candidacy Examination (DCE)**

A student may apply for the candidacy examination, given by the doctoral committee, when his/her course work nears completion and he/she has the approval of the doctoral committee. The request should be coordinated with the student's thesis adviser.

The DCE is an oral examination, conducted by the student's appointed doctoral committee, following submission of a written Thesis Proposal. The exact content and nature of the DCE is determined by the student's doctoral committee. Typically, it is a concise presentation of the work so far and the work proposed, followed by questions from the committee. The purpose of the DCE is to determine whether the student has made satisfactory progress in his/her doctoral program, including progress in the chosen doctoral dissertation area, and whether he/she demonstrates the ability and has a viable plan to complete the doctoral dissertation with distinction.

After the student's Thesis Proposal has been approved by the thesis adviser, copies of the proposal should be given to the student's doctoral committee, at least one (1) week prior to the scheduled DCE. The thesis proposal should include i) a concise discussion of the proposed thesis effort; ii) an in-depth review of the pertinent literature (together with how the proposed effort would build on and extend existing knowledge, either theoretically and/or practically); and iii) a concise presentation of some preliminary results which would suggest that the effort can be successfully undertaken. The scope of the DCE is not limited to the thesis proposal, however.

### **Record of Candidacy Examination**

This form must be completed and brought to the DCE for the committee members' signatures and recommendations (pass or fail). This form can be found on the Graduate School's website at [under the "Submit Your Thesis" tab](#) and in JEC 6012. It should be noted that after passing the DCE, the student is formally identified as a doctoral candidate.

Once the record of candidacy form is complete and has the original signatures of all committee members, it should be submitted to the Graduate Program Secretary for processing. The Graduate School will not accept scanned or fax versions of this form.

## Responsible Conduct of Research (RCR) training

The Graduate School requires the completion of Responsible Conduct of Research (RCR) training through CITI as well. A copy of the CITI Program completion report (certificate) must accompany the Record of Candidacy Examination form that is submitted to the Graduate School. Instructions for CITI registration and training can be found on the second page of the Record of Candidacy Examination Form.

## Thesis Defense Examination (TDE)

The thesis defense is one of the final steps in the doctoral program. The purpose of the TDE is for the student to present and defend his/her doctoral thesis. The defense is conducted by the student's doctoral committee and is required to be open to the public. The ensuing committee deliberation is not open to the public, but there is a period where the candidate will field questions from the audience.


The TDE is given whenever i) the candidate has registered for all the credits shown on the Plan of Study, and ii) the candidate's doctoral committee approves the student's request for a TDE. The request should be coordinated with the student's thesis adviser. The TDE should be held by the date listed in the academic calendar for the semester of graduation. Furthermore, the completed thesis must be presented to the candidate's thesis adviser at least one month before the TDE. ii) Each member of the doctoral committee must be given an unbound copy of the thesis at least two weeks before the scheduled TDE. An announcement – INCLUDING AN ABSTRACT – of the TDE must be prominently posted and an electronic copy sent to the Graduate Program Secretary at least one week prior to the TDE for distribution to all the ECSE faculty members and current graduate students. If possible, a copy of your thesis should also be posted on your website (students are encouraged to create one) with a link indicated on the announcement.



An announcement of your defense (including an abstract) should be distributed to all ECSE Faculty and prominently posted, and an electronic copy must be forwarded to the Graduate Program Secretary.

After passing the TDE, the student will need to submit a completed [Record of Dissertation Exam](#) form to the Graduate Program Secretary. This form must be complete and contain the original signatures of the Committee members. The dissertation must be approved by a minimum of three members of a faculty committee of four members. By signing this form, your Committee members are indicating that both your defense and dissertation have met

their approval. The Office of Graduate Education (OGE) will not accept scanned or fax versions of this form.

	OGE requires a complete, signed Record of Dissertation Exam Form and supporting documents by the published dissertation submission deadline that can be found in the Academic Calendar. For a list of the forms that need to be submitted to OGE after the TDE, please refer to <a href="#">the Doctoral dissertation checklist</a> .
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### **Thesis/Dissertation Submission**

All doctoral candidates are required to submit a doctoral dissertation to the Office of Graduate Education (OGE) for final approval after passing the thesis defense. OGE has stringent formatting specifications and requirements for all submissions. It is therefore imperative that you review the [Thesis Writing Manual](#) prior to the submission of your document. We highly encourage you to make an appointment for a preliminary review of your dissertation with OGE at [gradschool@rpi.edu](mailto:gradschool@rpi.edu) before your formal submission. The manual can be accessed directly from OGE's website.

Please refer to the Institute's [Submit Your Thesis](#) page to access the Dissertation Checklist, Submission Tips and Techniques, and the Submission site to upload one's dissertation, etc. Please note that your thesis will be subject to an academic integrity review. All figures and text that have been previously published must be referenced. This includes your own work previously published elsewhere! Please refer to the [thesis manual](#) for an example of how to cite previously published work.

### **Degree Clearance**

To receive a degree at the end of any semester, the student must be registered that particular semester, have an up-to-date Plan of Study on file, successfully completed all of the credits listed on his or her Plan of Study (min. 3.0 GPA), submit a degree application, and receive approval of the thesis by the Graduate School. The thesis must be submitted to the Graduate School Office by the date specified in the Institute calendar.

### **General Departmental Requirements**

#### **Academic Integrity**

As a member of an academic community, a high standard of academic conduct and integrity is expected of you. All graduate students must have a clear understanding of Rensselaer's Academic Integrity Policy and follow it at all times. Please access the [Academic Integrity](#)

[Brochure](#) for more information. As a researcher, your research should be accurate and the contributions of others must be clearly documented according to well-established practices. It is dishonest and unacceptable for you to represent another scholar's ideas or words as your own. Academic dishonesty is taken seriously by the Rensselaer community and failure to comply with the academic code of conduct will result in disciplinary action, including the possible denial of your degree.

### **Academic Plan of Study**

The graduate program is flexible and affords each student an opportunity to plan a course of study suited to his or her own objectives. To assure a coherent program in accord with the student's maturing capacities and goals, each student is to maintain, with the adviser's assistance, a Plan of Study (POS) for the degree for which he or she is studying. A POS is a form that lists the courses and thesis credits needed to satisfy the degree requirements. The Department requires all new students to file their first POS prior to the completion of their first semester within the Department.



A Plan of Study lists all of the courses and thesis credits needed to satisfy one's degree requirements. You cannot graduate or receive financial aid without an up-to-date Plan of Study on file. It is therefore important that you update your PoS whenever you deviate from the Plan currently on file.

The form can be accessed from the Graduate School's website [here](#), under "Forms" and in JEC 6012. Once it is completed, it should be signed by the student and the student's academic adviser (who must be a full-time ECSE faculty member). It is then submitted to the ECSE Graduate Program Secretary in JEC 6012 for processing including obtaining the signature of the ECSE Graduate Program Director.

Please note that the student must update his/her Plan of Study whenever changes occur to the previously submitted plan.

### **Masters of Engineering Plan of Study**

A **Master's of Engineering Plan of Study** must list a minimum of 30 credits beyond the Bachelor's degree. In satisfying the 30 credit hour requirement, the student's POS must list a minimum of 18 credits at the 6000- level, a minimum of 15 credits taken within the ECSE Department, six (6) non-technical credits, and at least one (1) math elective.



## Master of Science Plan of Study

A **Master's of Science Plan of Study** must list a minimum of 30 credits beyond the Bachelor's degree. In satisfying the 30 credit hour requirement for the **MS with Thesis** degree, the student's POS must list a minimum of 15 credits at the 6000 level, a minimum of 12 credits taken within the ECSE Department, six (6) or nine (9) thesis credits, and at least one math elective. For the **MS without Thesis** degree, the student's POS must list a minimum of 18 credits at the 6000 level, a minimum of 18 credits within the ECSE Department, at least one math elective and nine (9) credits of electives.

## Doctoral Plan of Study

A Doctoral **Plan of Study** must contain a minimum of 72 credit hours beyond the Bachelor's degree or 48 credit hours beyond a Master's degree. In satisfying the 72 credit hour requirement, the student's program cannot include any more courses from the 4000-4999 range than one-third of the total credit hours in all courses (excluding doctoral dissertation credits), with the further limitation that a maximum of 15 credits at the 4000 level is allowable. At least two-thirds of the total credit hours, excluding thesis, must be at the 6000-level.

## Registration Requirements

Rensselaer Polytechnic Institute requires fellowship holders and graduate assistants to register for a minimum number of credits each semester. The full-time load for a graduate student is 12 to 15 credit hours each term. The only exception to this requirement is for those students serving as teaching assistants (TA). TA's may register for a minimum of nine (9) credits to maintain their full-time status. The Department encourages *all* ECSE students to register for a total of 15 credits. Each student should simply register for the courses approved by his or her advisor and the remaining credits should be thesis or dissertation credits. This will ensure that you maintain a full academic load even if you need to drop a course at some point in the semester. Students who register for less than a full academic load jeopardize their student status, visa status, and financial aid. Please be very mindful of the add deadline (typically two weeks after the semester begins) as the Graduate School does not approve late add requests. You will not be allowed to add any courses beyond the add deadline, not even thesis or dissertation credits. The drop deadline tends to be eight (8) weeks after the start of the semester.



Falling below a full academic load can jeopardize your visa, academic status, and financial aid. To avoid potential issues, the Department encourages you to register for 15 credits every semester that you are a full-time student. Simply register for the courses approved by your Advisor and all remaining credits should be thesis credits.

## Summer Administrative Registration (SAR)

Summer Administrative Registration (SAR) is a no-charge registration requirement for graduate students who will be receiving a stipend over the summer or graduating in the summer semester. Students taking a credit-bearing course or research credits should not register for SAR.

## Transfer Credit

Transfer credits must be approved by the ECSE Department, the Graduate School, and the Registrar's Office before they can be applied toward the degree. No more than six (6) credits may be transferred toward the master's degree as the residence requirement for the master's degree is 24 credit hours; no more than 42 credits may be transferred towards the 90-credit doctoral degree as the residence requirement is 48 credit hours. Additionally, only courses completed with a grade of B or better can be transferred and the credits to be transferred have to meet the requirements for the degree pursued as outlined in this handbook. To initiate the transfer credit approval process, you must take the following steps:

1. Complete the [transfer credit approval form](#).
2. Obtain a course syllabus of the course you wish to take/have taken AND a syllabus for the Rensselaer equivalent course. Have these evaluated by the corresponding Rensselaer department. For example, if you want to transfer a Math course, you will need the approval of the Rensselaer Math Department. If you want to transfer an ECSE course, the course syllabi should be evaluated by an ECSE faculty member.
3. Once departmental approval is obtained and the Rensselaer equivalent is determined, obtain your advisor's approval of the transfer of the course.
4. Update your Plan of Study so that it includes the transfer courses listed. You and your Advisor must sign the POS.
5. Submit the syllabi, the POS, and the transfer credit form to the Department Secretary as it will be presented to the Graduate Program Director for his consideration and approval.
6. The transfer credit approval forms will be forwarded to the Graduate School for the Dean's consideration.

## Advising

New students have up to **six (6) weeks** after the academic semester begins to identify an advisor. In the interim, students will have the opportunity to meet with a faculty member from their area of specialization during a temporary advising session that takes place the

same day as Orientation. Once an advisor is identified, you will be asked to submit an Advisor form to the Graduate Program Secretary. It should be completed and signed by both you and your advisor. We encourage you to meet with multiple faculty members to determine the best match. Please access the [Faculty Profiles](#) on our website.

### **Doctoral Student Yearly Review Form (DSYR)**

The Graduate School specifies that PhD students meet with their advisor each spring semester to review academic progress, update the plan of study on file, and complete and file a Doctoral Student Yearly Review (DSYR) form. The form is to be completed by the student and Advisor, noting expectations, academic progress, and dates that milestones will be met.

### **Departmental Seminars (Mercer Lab Series)**

All graduate students are required to attend departmental seminars as a part of their education. Seminars typically fall on Wednesday's from 4-5 pm and are held bi-weekly. Students are excused from seminars if they (1) have a regularly scheduled class that meets during the seminar timeslot or if (2) their TA assignment conflicts with the seminar timeslot.

### **Financial Aid**

Financial aid is available in the form of Teaching Assistantships (TA), Research Assistantships (RA), and Fellowships. The continuation of your award is contingent upon your academic performance and your teaching work, if you have a TA assignment. Graduate students in our department are expected to maintain a grade point average of 3.0 or better.

### **Teaching Assistantships**

A Teaching Assistantship provides a stipend and full tuition. For incoming students, the Graduate Teaching Assistantship is the most common form of aid. The Department deems this role as a very important one as it pertains to one's ability to demonstrate mentorship, is invaluable preparation tool for any career, mastering subject matter, etc.

### **Research Assistantships**

A Research Assistantship provides a stipend and full tuition. It is another form of aid available to many of our graduate students. The availability of research assistantships

depends solely upon individual research professors and is subject to the needs of contracts and interests of students. Research assistantships are normally extended for the academic year, and in many cases, summer support is often also available.

## **Fellowships**

Students are encouraged to seek external fellowship funding as there are a multitude of fellowships that offer a higher stipend, networking opportunities, job training opportunities, prestige, etc. Please feel free to access the Graduate School's fellowship page on [External Fellowships](#)

## **Summer Support**

Most students are supported via research assistantships during the summer. In 2018, the minimum summer stipend was \$7,334.

## **Residency Requirement**

A student working towards a master's degree must complete a minimum of 24 credit hours at Rensselaer. A student working towards a doctoral degree is required to take at least 48 credits of course and/or dissertation work beyond the Bachelor's degree at Rensselaer.

## **Time Limit for students pursuing a Master's degree**

For full-time students pursuing a master's degree, all work must be completed within two and one-half years. Full-time students not fulfilling the master's degree requirements by the end of two and one-half years will be dismissed unless the Graduate School has given advance approval for additional time to complete the degree. Extensions are granted for only the most compelling reasons and are rare.

Part-time students must complete all work for the master's degrees requiring 30 credits within three calendar years of the original admission date. Extensions may only be granted if the student is in good academic standing and has an acceptable Plan of Study. Working professionals must petition and receive approval from the Dean of Graduate Education.

## **Time Limit for students pursuing a Doctoral degree**

For students entering without a master's degree, all work for the doctorate must be completed within seven years. Students entering with a master's degree in their field of study

must finish all degree requirements for the PhD within a five-year time period. Students who have not met their applicable time limit will be dismissed from the program unless the Graduate School has given advance approval for additional time to complete the degree. Extensions are granted for only the most compelling reasons and are extremely rare. Students should contact the Graduate Program Administrator if there is any concern about meeting the deadline.

Individuals who leave Rensselaer without obtaining an authorized leave of absence and who have not requested an extension before the time limit will be dismissed from the program.

## **Housing**

Graduate students arrange housing on their own but you should know that a housing development was recently built and developed exclusively for Rensselaer graduate students and graduate-level affiliates (post-doctoral fellows and visiting scholars). The [Rensselaer Graduate Community at City Station](#) was developed to make locating and entering housing at Rensselaer a hassle-free process and is within walking distance of the campus. Students who choose City Station enjoy Rensselaer services such as the Rensselaer Shuttle and Rensselaer Public Safety even though they reside off-campus in a private community. City Station West and City Station East offer two, three, and four bedroom, furnished suites for single students whereas City Station South houses married couples and families. City Station South suites are unfurnished. At each location, utilities and internet are included in the rent, and each suite includes air conditioning, dishwasher, washer and dryer, and 24-hour video monitoring. All residents are provided off-street parking at no cost and access to an on-site exercise facility. Various retail outlets, including a coffee shop, sandwich shop, full service restaurant, and a hair salon are located on the first floors of West and East. For additional information, you may contact Dennis Gornic, Associate Dean, in the Office of Graduate Education at [dgornic@rpi.edu](mailto:dgornic@rpi.edu).

## **Graduate Center**

The Graduate Center is housed within the Office of Graduate Education and was created as a service to graduate students, including co-terminal students, who would prefer to discuss an academic or personal issue on a confidential basis. This sort of consultation is characteristic of an Ombuds office and is designed to confidentially, impartially, and informally assist students in resolving issues that may arise over an interpersonal dispute or other personal situation affecting their educational progress. The center also helps eligible students identify other campus offices and professionals who may be better equipped to assist them. Please go to <https://info.rpi.edu/graduate-education/graduate-ombudsperson> for additional information or contact Dennis Gornic at 518-276-6567.

## General Links:

ECSE website: <http://www.ecse.rpi.edu/>

Advising & Learning Assistance Center: <https://info.rpi.edu/advising-learning-assistance/>

Career and Professional 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/>

Registrar Forms: <http://srf.s.rpi.edu/update.do?catcenterkey=29>

Student Information System: <http://sis.rpi.edu/>

Office of Graduate Education: <http://gradoffice.rpi.edu/setup.do>

Graduate Forms: <http://gradoffice.rpi.edu/update.do?catcenterkey=20>