Graduate Student Handbook

Department of Electrical and Computer Engineering
UNIVERSITY OF WISCONSIN–MADISON

M.S. Degree in Electrical Engineering
Ph.D. in Electrical Engineering

For students admitted for Spring 2019 or thereafter

Updated January 2019

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1.0 WELCOME TO THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING (ECE) AT THE UNIVERISTY OF WISCONSIN-MADISON

1.1 Welcome Letter from Department Chair Susan Hagness

Welcome to the ECE graduate program!
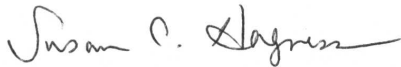
This handbook is intended to supplement the general guidelines provided by the **Graduate School** about graduate programs and services at the University of Wisconsin. Here, you will find department-specific details about academic requirements that need to be satisfied as well as a variety of related information that you may find helpful as you pursue your M.S. and/or Ph.D. graduate degree in ECE. This handbook should also answer most of your day-to-day questions concerning routine operations in the ECE Department.

The requirements listed in this version of handbook are applicable to ECE graduate students who have entered our program in January 2019 and thereafter. Graduate students who entered prior to January 2019 may petition to the ECE Graduate Committee to have specific department requirements applied to their record should the requirements differ from those listed in previous versions of this handbook.

We have attempted to make degree requirements flexible enough to accommodate a wide range of academic and research objectives. If you find that your particular situation is not adequately covered in this handbook, or if for any reason you feel your case warrants consideration of an exception to a particular policy, the ECE graduate program staff at the Student Services Center (see Chapter 2 of this handbook) can provide you with more details and point you to the appropriate faculty or staff in ECE who can help with your situation.

We hope you find your UW-Madison studies to be both challenging and rewarding. On Wisconsin!

Sincerely,

Susan C. Hagness

Philip D. Reed Professor and Chair

1.2   INTENTION / ROLE OF THE HANDBOOK

This handbook is intended for graduate students who are pursuing master's and doctoral degrees. It may also serve as a tool and resource for Electrical and Computer Engineering (ECE) Department faculty and staff. The UW-Madison Graduate School is the ultimate authority for granting graduate degrees at the University. The ECE Department administers these graduate programs under the authority of the Graduate School. The Graduate School's Academic Policies and Procedures provide essential information regarding general University requirements. Program authority to set degree requirements beyond the minimum required by the Graduate School lies with the ECE program faculty. The policies described in this handbook have been approved by the program faculty and encompass ECE and Graduate School policies. Degrees and course requirements may change over time. Students must meet the degree and course requirements in effect when they entered the program or what is in effect when graduating from the program. In addition, administrative procedures and processes can change over time. Students are required to follow the procedures and processes listed in the current handbook, but may petition the ECE Graduate Committee to have specific department requirements applied to their record should the requirements differ from those listed in previous versions of this handbook. The information in this handbook should also be supplemented by individual consultation with students' advisors so that individual needs/interests and all degree requirements are met. Additional information is available via the **ECE Department's web page**. Students may also wish to consult the **Graduate School GUIDE** or **Graduate School web page**.

2.0   ECE DEPARTMENT INFORMATION

2.1   Introduction to the College of Engineering and ECE Department

Graduate students in the College of Engineering are an elite group of people who have chosen to advance their education at one of the premiere engineering colleges in the country. UW-Madison's College of Engineering is among the nation's best; our graduate academic programs are highly ranked and our faculty are widely recognized as leaders in their fields. Here you will find a community in which you will excel. You will find faculty, staff, and peer students who are supportive and committed to your success. You will find rigorous coursework that will prepare you to achieve your goals. You will experience an environment highly conducive to collaboration–and you will meet faculty with a broad range of research interests and connections both on campus and around the world.

2.2   Mission Statement

In partnership with our students, it is the mission of the ECE Department to:
- Educate and inspire future leaders who contribute to society through the creation, application, and transfer of electrical and computer engineering knowledge.
- Expand knowledge through research into new technologies, design methods, and analysis techniques.
- Serve the state of Wisconsin, our nation, and the world with electrical and computer engineering expertise.

2.3   Statistics

Fall 2018 Enrollment (new and continuing students)

- M.S. = 117
- Ph.D. = 206

2017-2018 Degrees Awarded

- M.S. = 47
- Ph.D. = 38

2.4 Key Individuals and Roles

2.4.1 Department Administration

Susan Hagness
Department Chair
2420 Engineering Hall (EH) | 608-265-5739 | **susan.hagness@wisc.edu**

Barry Van Veen
Associate Chair for Graduate and Online Studies
3546A EH | 608-265-2488 | **vanveen@engr.wisc.edu**

Nader Behdad
Graduate Committee Chair
3438 EH | 608-262-8804 | **behdad@wisc.edu**

John Gubner
Associate Chair for Operations
TA Coordinator
2554 EH | 608-263-1471 | **john.gubner@wisc.edu**

Bernard Lesieutre
Associate Chair for Undergraduate Studies
2557A EH | 608-890-1883 | **lesieutre@engr.wisc.edu**

Lori Burrow
Academic Department Manager
2422 EH | 608-262-8272 | **lori.burrow@wisc.edu**

Katrina Olson
Assistant Department Administrator
2413 EH | 608-263-3468 | **katrina.olson@wisc.edu**

Courtney Summars
Office Manager
2416 EH | 608-890-2182 | **courtney.summars@wisc.edu**

Rita Purtell
Communications Specialist Senior
2436 EH | 608-262-1073 | **rita.purtell@wisc.edu**

2.4.2 Payroll and Financial Services

Amy Terpening
Payroll and Benefits Specialist Advanced
2438 EH | 608-236-4279 | **amy.terpening@wisc.edu**

Dwight Redders
Financial Specialist Senior
2440 EH | 608-262-3841 | **dwight.redders@wisc.edu**

Kathy Hall
Financial Specialist Senior
2442 EH | 608-265-5738 | **kathy.hall@wisc.edu**

Renee Starks
Research Administrator
2440 EH | 608-262-3842 | **starks@engr.wisc.edu**

Jean Touchett
Research Administrator
2440 EH | 608-262-8231 | **jtouchett@wisc.edu**

2.4.3 Graduate Student Services

For more information on Graduate Student Services, see *Section 3.0*.

Hannah Roberg
Graduate Student Services Coordinator (On-Campus Programs)
3186 Mechanical Engineering | 608-890-2204 | **hroberg@wisc.edu**

Daryl Harrison
Graduate Student Services Coordinator in Engineering Professional Development (M.S. Power at a Distance/Online)
701 Extension Building | 608-262-8819 | **daryl.harrison@wisc.edu**

2.5 Other Important Information and Resources

Information about other specific department services and resources is provided below in alphabetized categories.

Address Changes

It is extremely important to keep your contact information up-to-date. Address changes should be made in your MyUW account. International students must check with the International Student Services for any additional address (or change of address) reporting requirements that the U.S. Department of Homeland Security may require from them.

Building Access and Keys

Building keys for outside doors and offices are issued to graduate students who have been assigned desk or lab space. Other students may receive keys if they obtain written permission from a supervising faculty member. A deposit of $5 is required for each key; all keys must be returned or renewed each semester. Students needing keys should see staff in 2416 Engineering Hall. EH is open from 7:00 a.m. to 10:00 p.m. Monday through Friday, and 7:00 a.m. to noon on Saturday. EH is closed on Sundays and football Saturdays.

Building Manager

Report any maintenance problems in Engineering Hall to **Matt Wornson** . In case of an emergency, dial **911**.

Desk Space

Students should contact their faculty advisor for information on desk space.

ECE Copy Center

ECE operates copy machines in 2415 Engineering Hall. This facility and service is managed by the ECE Office Manager. The ECE Copy Center is used exclusively for department administration, instruction, and research.

Copy machines are not for personal use! Usually, only students who have research assistantships or teaching assistantships are given a key and required code numbers. Other students must use local photocopy shops or copiers in the libraries.

ECE Directory

Students who have appointments in ECE or anywhere else on campus will be included in the department directory for that semester. If you do not want your name shared in the directory, please contact the ECE Office Manager, Courtney Summars.

Email

All ECE communication will be sent to students' WiscMail accounts. Students are responsible for keeping and maintaining their email account.

Mailboxes

All graduate students are assigned mailboxes in the back corner of the ECE Copy Center, 2415 Engineering Hall. All students should confirm that their name is listed. Students should report missing names to the ECE Office Manager. It is the students' responsibility to check their mailboxes daily for university and department information. Personal mail should be sent to home addresses. Student mailboxes will be emptied of any remaining materials after each semester.

Parking and Transportation Services

For parking information, visit **Transportation Services** website. Transportation Services' website also has information about commuting, using the bus, biking, SAFEwalk, accessible options, as well as an interactive campus map.

Public Transportation

Some campus bus routes are free (80, 81, 82, and 84). Additionally, all UW-Madison graduate students qualify for a free **Madison Metro Bus Pass**.

3.0   STUDENT SERVICES AND ADVISING

3.1   Graduate Student Services

3.1.1   Mission

The Student Services Center within the College of Engineering at the University of Wisconsin-Madison provides support to both undergraduate and graduate students. In our 3182 Mechanical Engineering office, we support graduate students in the College of Engineering through the various policies and procedures that are required from the time of admissions through graduation.

3.1.2   Vision

The vision of the Student Services Center within the College of Engineering at the University of Wisconsin-Madison is to: (1) be, and be recognized as, an effective and efficient student services center for both the students and the academic programs that we serve; (2) provide quality academic advising in partnership with the student's faculty advisor; and (3) continually ask ourselves "is this good for our students?"

3.1.3   Objectives

The Student Services Center within the College of Engineering at the University of Wisconsin-Madison will strive to attain its vision by:
- creating a welcoming, inclusive, and supportive learning environment for students

- providing services of the highest quality that help students to develop and enrich their academic abilities, personal aspirations, and professional goals
- facilitating students' entry into and success within graduate programs
- continually improving the recruitment and retention of engineering students by enhancing the COE's interaction with: (1) UW-Madison students, programs, and student service organizations and (2) prospective students.
- supporting and collaborating with the student organizations that serve students
- recruiting, supporting, and retaining the best undergraduate and graduate students, especially women and underrepresented groups
- collaborating with faculty and the appropriate advising and curriculum committees within each program to help students achieve their academic goals
- providing student feedback to the faculty and appropriate committees within each program
- streamlining administrative processes amongst the Civil and Environmental Engineering, Electrical and Computer Engineering, and Geological Engineering programs

3.1.4 Staff

Graduate Student Service Center Main Office
3182 Mechanical Engineering | 608-263-1795

Hannah Roberg
Graduate Student Services Coordinator (On-Campus Programs)
3186 Mechanical Engineering | 608-890-2204 | **hroberg@wisc.edu**

Daryl Harrison
Graduate Student Services Coordinator in Engineering Professional Development
(M.S. Power at a Distance/Online)
701 Extension Building | 608-262-8819 | **daryl.harrison@wisc.edu**

ECE Graduate Admissions (On-Campus Programs)
ecegradadmission@engr.wisc.edu

3.2 Faculty Advisor

A student's faculty advisor serves a dual role: first, to assist the student in acquiring the highest level of knowledge and competence in the field that is possible; and second, to chair the committee that will determine whether the student has performed acceptably at each of their degree milestones. Faculty advisors play a role in tracking the student's progress toward degree completion, assisting with course selection and academic planning, and helping students identify possible research mentors, committee members, and opportunities. Whereas the Graduate Coordinator helps students navigate policies and procedures, connect with resources on campus, and serve as a first point of contact for questions, the faculty advisor is more focused on course content and research opportunities for the student.

The advisor/student relationship is one of mutual agreement, which may be terminated by either party at any time (see Section 3.5 below about changing your advisor). Students should discuss roles and expectations with their advisor or prospective advisors. Both the student and the advisor have a responsibility to make their expectations clear to each other. Communication is critical to a successful advisor/student relationship.

All ECE graduate students must have a faculty advisor at all times! If students do not have an advisor, the Graduate School may suspend them from further graduate study at UW–Madison. Students may have temporary faculty advisors while in transition.

All ECE students must have a faculty advisor who is a current ECE faculty member or current ECE affiliate. If a student's advisor leaves UW-Madison, retires, or becomes emeritus, that faculty member can serve as the student's faculty advisor for up to one year after leaving the University. After one year, the faculty member can continue to serve as an unofficial advisor, but the student must also obtain a current ECE faculty member as their official advisor.

Students are also allowed to have more than one faculty advisor. Advisor roles can be equal or set up as primary and secondary. A student may have more than one current ECE faculty advisor, but at least one is required. As long as a student has one current ECE faculty member as an advisor, any additional advisor(s) can be from outside of the ECE Department, faculty from a department without a graduate program, academic staff, emeritus faculty, visiting faculty, faculty from another institution, scientists, research associates, or other individuals deemed qualified by the ECE Graduate Committee.

Incoming students who have not already agreed to work with a particular faculty member or those who are in one of the professional programs, will be assigned a faculty advisor in their area after admittance and before course enrollment. Students in a research-based degree program must seek out a permanent research advisor by the end of the first year of graduate study.

3.3   Research Advisor

Research advisors are specifically responsible for monitoring and advising students on their research. Research credits are taken in the research advisor's Section number.

A student's research advisor is usually the same person as their faculty advisor, but this is not required. Although most often a student's research advisor is an ECE current faculty member or affiliate, research advisors can also be faculty members in other departments or can be emeritus faculty members. If a student's research advisor is different than their faculty advisor, their faculty advisor must agree with the choice of research advisor.

The research advisor should be a faculty member whose expertise and project/research interests match closely with those that the student intends to acquire. Students are encouraged to gather information from courses, faculty and student seminars, the program website, and publications to help identify faculty with matching interests.

It is the responsibility of the student to seek out a research advisor, whether it be during the admissions process or within the first year of graduate study, if pursuing a research-based degree program.

3.4   Choosing an Advisor

In choosing an advisor, especially for research, it is important for students to seek out faculty members with expertise and research in the student's area of interest. Likewise, in order to receive the most appropriate academic planning advice, students should connect with a faculty member who is experienced and knowledgeable in regards to the industry and research related to the student's area of interest. Please see Section 3.2 regarding the faculty advisor, Section 3.3 regarding the research advisor, and Section 3.5 on how to change one's advisor.

3.4.1   Sample Questions to Ask of Prospective Advisors

In order to support students in selecting an appropriate advisor, below is a list of questions that may be asked of a prospective advisor. This list is by no means complete; students should spend time thinking about what is most important to them in their graduate training. Many of these questions are complex and may not elicit a quick answer. However, any advisor should be willing to discuss these important issues with students. Students may also want to discuss these issues with any students that are currently in the prospective advisor's group/lab.

- What thesis projects would be available to me if I were to join your group?
- Would these projects expose me to a variety of different approaches?
- In general, how available will you be to answer questions I might have?
- What is your philosophy regarding the amount of guidance the advisor should provide to a student during preparation of the thesis proposal, literature, presentations, thesis, etc.?
- What are your expectations for the amount of time I should spend each day/week in your group/lab?
- What regularly scheduled activities (e.g., group meetings, joint group meetings, and research clubs) does your group participate in that provide an opportunity to get outside input on my (research) project and to hear about the work of other students and postdocs?
- Do you encourage your students to attend seminars and journal clubs, including those that may be outside of their narrow field of interest/research?
- Do students in your group/lab have the opportunity to attend professional meetings where they can interact with colleagues/researchers from other institutions?
- Do you include your graduate students in professional activities that will familiarize them with their field of interest/research, such as reviewing manuscripts and meeting with visiting speakers?
- How long do you think it should take me to get my degree?
- What are your former graduate students (if any) doing now?
- What is your general philosophy of graduate training and what goals do you have for your graduate students?

3.5   Changing Your Advisor

Before selecting or changing advisors, it is suggested that students discuss such change with their current faculty advisor. After discussions with both the current and new advisors, students need to notify the ECE Graduate Coordinator. Students may email the ECE Graduate Coordinator about the change, for which email confirmations from both the current and new advisors will be requested. Once the ECE Graduate Coordinator receives the necessary email confirmations, the change will be made official in the system.

4.0   ADMISSIONS AND INFORMATION FOR PROSPECTIVE STUDENTS

4.1   Graduate Studies in ECE at UW-Madison

ECE Department graduate programs are designed to cater to changing industry needs and research developments. ECE students are able to fast-track their professional knowledge and skills, participate in cutting-edge research, and collaborate with exceptional students and faculty who are leaders in their field.

The ECE Department offers four different **M.S. degrees and the Ph.D. degree**.

4.2   Admission Requirements and Procedures

ECE M.S. Degree.
ECE Ph.D. Degree.

If you have any admissions questions, please contact the ECE Graduate Admissions team at **ecegradadmission@engr.wisc.edu**.

4.3   Re-entry Students

Per Graduate School policy, if graduate students do not continuously enroll during a fall or spring semester, they are required to apply for readmission to the Graduate School through the **online application**. The readmission

process accomplishes two goals: (1) assures the Graduate School that graduate students are in good standing with their academic program; and (2) activates their enrollment eligibility.

Graduate degrees are awarded, in part, for completion of current coursework. Students who break enrollment from their graduate program may risk losing all credits earned prior to their absence. Master's or doctoral students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Although ECE may consider crediting the coursework students completed prior to their absence for satisfying program requirements, the coursework will not count toward Graduate School requirements.

A returning student who is completing another same level degree within five years must comply with double **degree requirements**, including the 25% overlap rule.

Re-entry applicants should contact **ECE Graduate Admissions** with any questions.

4.4   Special Students from UW-Madison

Students enrolled as University Special students are considered non-degree candidates and pay tuition and fees at the designated special student rate. Students may not be simultaneously enrolled as a graduate student and as a University Special student.

After admission to a graduate program, on a case-by-case basis, the student's program may decide to accept up to fifteen University Special student credits as fulfillment of the minimum graduate residence, graduate degree, or minor credit requirements. In all these cases, the student would have to pay the difference in tuition for the terms in question. Those credits earned in a University Special student semester still appear in the transcript history as "University Special" student, but the Registrar's Office will add a statement in the beginning of the transcript "All credits taken in [term] as a University Special student have been accepted by the Graduate School toward a degree program" after the student has paid the difference in tuition. This work will not appear on the graduate career portion of the UW–Madison transcript nor count toward the graduate career GPA.

Special Students of UW-Madison wishing to apply to a graduate program in ECE must apply online as a new student through the **Graduate School application system**. Special students should contact **ECE Graduate Admissions** with any questions.

5.0   GETTING STARTED INFORMATION FOR NEW STUDENTS

Newly admitted students, who have received official acceptance letters from the Graduate School, should follow the checklists below in preparation for arriving to campus and successfully transitioning once on campus.

5.1   Before Arriving on Campus

❑ Activate your **NetID**. **Additional instructions** available.

❑ Read the current ECE Graduate Student Handbook.

❑ Communicate with your faculty advisor to discuss your degree requirements, course selection, and funding opportunities (if applicable/desired).

❑ Receive an "Invitation to Enroll" email message from the Office of the Registrar containing important information about your enrollment appointment time for the upcoming semester. Your enrollment appointment time should also be listed in your Student Center.

❑ Enroll in courses after consulting with your faculty advisor. See Section 14.0 for more information on course enrollment.

❑ Activate your **WiscMail Email Account**. You must be enrolled.

❑ Activate your **Computer-Aided Engineering (CAE) Account**. You must have a UW Campus ID Number and be enrolled in an engineering course to do so.
   - Additional help available. Contact the **Help Desk** at 608-262-5349
     Room 170 Computer Aided Engineering, 1410 Engineering Drive, Madison, Wisconsin

❑ Check your MyUW Application Portal for any messages from the Graduate School.
   - If your official transcripts submitted during the application process did not include your final semester grades and degree verification, you will need to submit final official transcripts to the Graduate School by the third week of classes. Transcripts can be mailed to the Graduate School (UW-Madison Graduate Admissions, 232 Bascom Hall, 500 Lincoln Drive, Madison, WI 53706), emailed securely (if your previous institution allows for such process), or brought in person.

❑ Get familiar with your **MyUW** and organize your widgets.

❑ Get familiar with your Student Center (accessed through your MyUW).

❑ Get used to using your WiscMail account and get in the habit of checking it daily. All UW-Madison communication will be via your WiscMail account.

❑ If you have a need related to a disability, contact the **McBurney Disability Resource Center**.

❑ Research and plan necessary vaccinations and health insurance coverage:
   - **University Health Services** recommends some immunizations and describes the process of getting them before and after arriving on campus.
   - Flu shots will be available for students throughout the fall semester.
   - **Health insurance information and SHIP information** for domestic students.
   - **Health and safety information for international students** provided by ISS.
   - All F-1 and J-1 visa students must have health insurance.
   - One option is **SHIP for International Students**.
   - Funded students may be eligible for health insurance through their appointment. Students should confirm with the ECE Payroll Specialist. Students with this option may want to waive SHIP, which has a deadline usually in the first week of the semester.

❑ Pay your tuition and fees (please note that specific due dates may be after arriving on campus, but students should familiarize themselves with the details sooner rather than later).
   - Additional Registrar's Office **Tuition Information**.
   - **Tuition Rates** (choose "Graduate or most Capstone Certificates" from drop-down menu).
   - **Tuition Due Dates**.

❑ Pay your segregated fees even if you have an appointment and are receiving tuition remission.

5.2   Upon Arrival to Campus

   - International students must check in with ISS within 1-2 days of arrival!
   - Get your **UW-Madison Photo ID (WisCard)**. You must be enrolled in order to receive your WisCard.
   - You must bring photo identification, such as a valid driver's license or passport, with you when you go to the WisCard Office.
   - Pick up your free **Madison Metro Bus** pass. You must have a WisCard and be enrolled!
   - Verify/update your mailing and email addresses in your Student Center (accessible through your MyUW).
   - Attend all necessary orientations!
   - Details and information about orientations will be emailed to students.
   - All students are required to attend the Graduate School's New Student Welcome Event.
   - All ECE students are required to attend the ECE Graduate Student Orientation.
   - International students are required to attend the International Student Orientation.
   - Students with Teaching Assistantships must attend COE's New Educator's Orientation (NEO).

- All international students who are non-native speakers of English must take the ESLAT before the start of the semester, unless they qualify for an exemption. See Section 13.5 for more details about the ESLAT requirement.
- Funded students should check in with the ECE Payroll Specialist.
- Students are encouraged to check in with the ECE Graduate Coordinator.
- All students must check in with their faculty advisor.
- Complete the required **Online Sexual Violence Prevention Program**. The deadline for completion is usually mid-September (or mid-February or late-June respectively). You will not be able to enroll in future terms until this is completed.

5.3 Further Suggestions

The following are optional suggestions for students to explore if desired.
- Read the **Graduate Student Life** at UW-Madison guide written by several graduate students and published by the Graduate School. It covers information about the city of Madison, student services, finances, employment, housing, transportation, shopping, local services, recreation, and healthy living.
- Or get the **app**.
- Get involved in the **ECE Graduate Student Association**.
- Download the **Wisconsin App** (the logo is the crest of UW-Madison) on your phone for all sorts of campus information.
- Connect with ECE on Social Media: **COE Facebook** - **ECE Facebook** - **ECE Twitter** - **ECE Instagram**

6.0 MASTER OF SCIENCE IN ELECTRICAL ENGINEERING, SIGNAL PROCESSING AND MACHINE LEARNING OPTION

6.1 Introduction to the Signal Processing and Machine Learning Option

The Signal Processing and Machine Learning M.S. degree program leads to a Master's degree in Electrical Engineering specializing in Signal Processing and Machine Learning (SPML). It is an accelerated/condensed, course-based program designed to prepare students to be successful in the workforce. It is designed to be a terminal degree and not meant for students intending to continue to a Ph.D. or further research. SPML students cannot be simultaneously enrolled in another graduate program at UW-Madison while completing this program.

After completing this program, students will receive a diploma stating "Master of Science-Electrical Engineering." Students' transcripts will state "Master of Science-Electrical Engineering, Major: Electrical Engineering, Option: Signal Processing and Machine Learning."

Guide information on the **Signal Processing and Machine Learning degree plan**.

6.2 Expectations and Policies

Graduate students in the SPML program are expected to understand and follow a specific set of policies:
- This is a 30 credit, accelerated (12-16 months) course-based, terminal M.S. degree option.
- Students will be required to enroll in at least nine credits per semester from a specific list of courses offered by the department.
- Enrollment in the summer term is required.
- Students enrolled in the SPML program may not change their degree goal to another M.S. program or a Ph.D. without formally applying to and being accepted into the program.
- Students enrolling in the SPML program cannot simultaneously enroll in another graduate program at UW-Madison.

- Due to the accelerated, course-based nature of the SPML program, applicants to and students in this program will neither be considered for nor will receive department funding (department RA, TA, or PA positions or fellowships). Applicants may apply on their own for external fellowships and/or scholarships.

6.3 Degree Credit Requirement

The accelerated M.S. degree in Signal Processing and Machine Learning requires a minimum of 30 credits subject to the following constraints:
- ECE courses must be 400-level or above.
- A maximum of nine credits at the 300-level or above in other departments, provided these courses are approved in writing (including email) by a faculty advisor.
- A maximum of one credit ECE 610.
- A maximum of three credits of independent study (ECE 699 and ECE 999) with written faculty advisor approval.
- A maximum of three credits of ESL courses 300-level or above.
- A maximum of three credits of ECE 702 CPT/internship.
- A maximum of three credits of ECE 601 and ECE 901 (special topics courses) with written faculty advisor approval.
- Students are expected to follow the curriculum listed below (Section 6.6).
- Some credits taken as an UW-Madison undergraduate may be eligible. See "Prior Coursework" Section 6.9 below for specifics.
- Some credits taken as an undergraduate or graduate student at a previous institution may be eligible. See "Prior Coursework" Section 6.9 below for specifics.

The following categories of courses may **not** be used to satisfy the 30-credit requirement.
- Audited courses.
- Courses taken Pass-Fail.
- ECE 611.
- Research credits (ECE 790 or similar courses).

6.4 Credit Loads

The SPML program has an accelerated curriculum and students are expected to complete the required 30 credits within 16 months. During fall and spring semesters, the maximum credit load for a graduate student is 15 credits. Exceeding this limit is not advisable and cannot be made without department approval. A sample credit load is provided below:

Semester	Credits	Notes
First Fall Semester	10-13	Including 1 credit ECE 610
Spring Semester	9-12	
Summer	2-5	ECE 702 CPT/Internship or ECE 697
Second Fall semester	0-9	

6.5 Curriculum

Students in the SPML program are expected to adhere to the following curriculum:
- Required in fall semester – ECE 610 (1 credit)
- A minimum of 9 credits each semester chosen from the following courses:
- ECE 431 (3 credits): Digital Signal Processing
- ECE 436 (3 credits): Communication Systems I
- ECE 437 (3 credits): Communication Systems II

- ECE 524 (3 credits): Introduction to Optimization
- ECE 532 (3 credits): Matrix Methods in Machine Learning
- ECE 533 (3 credits): Image Processing
- ECE 539 (3 credits): Introduction to Artificial Neural Network and Fuzzy Systems
- ECE 717 (3 credits): Linear Systems
- ECE 719 (3 credits): Optimal Systems
- ECE 729 (3 credits): Theory of Information Processing and Transmission
- ECE 730 (3 credits): Modern Probability Theory and Stochastic Processes
- ECE 735 (3 credits): Signal Synthesis and Recovery Techniques
- ECE 736 (3 credits): Wireless Communications
- ECE 738 (3 credits): Advanced Digital Image Processing
- ECE 761 (3 credits): Mathematical Foundations of Machine Learning
- ECE 830 (3 credits): Estimation and Decision Theory
- ECE 901 (3 credits): Special Topics in ECE (as approved by faculty advisor)
  - Please keep written communication of approvals from your faculty advisor.
- Up to 9 credits 300-level or above in other departments with approval from faculty advisor. Please keep written communication of approvals from your faculty advisor. Examples of courses that may be applicable include:
  - EPD 611 (3 credits): Engineering Economics and Management
  - EPD 612 (3 credits): Technical Project Management
  - EPD 617 (3 credits): Communicating Technical Information
  - Computer Science, Math, or Statistics courses
- 2 or 5 credits in summer chosen from one of the following options:
  - ECE 697 (5 credits): Capstone Project in Signal Processing and Machine Learning
  - ECE 702 (2 credits): Graduate Cooperative Education Program (CPT/internship credits)

6.6 ECE 610 Requirement

All SPML graduate students must enroll in ECE 610 (1 credit) during their first semester of graduate studies. Students with a course conflict with ECE 610 should discuss with their faculty advisor as to how to resolve the problem.

The purpose of ECE 610 is to prepare students for success in graduate school and to expose them to various areas within ECE and to areas outside of ECE to which ECE has or could have connections, for example, biotechnology, physics, mathematics, business, or software. Electrical and Computer Engineering is very interdisciplinary in nature, and so it is important for students to be aware of advanced research and development in areas other than their own.

6.7 Cooperative Education (CPT) and Internships

Through the **Engineering and Career Services** Co-op and Summer Internship programs students gain valuable "real world" engineering experiences working with a variety of industries and governmental agencies.

All students in these programs have the opportunities to work full-time, be competitively paid, complete engineering assignments, and work under the supervision of an engineer.

Students participating in a co-op or internship will enroll in ECE 702. ECE 702 can be used toward the SPML curriculum and graduation requirements (see Sections 6.3 and 6.5 for more information).

Obtaining work experience prior to completing your degree requirements typically increases employment opportunities and starting salaries after graduation.

Any questions regarding Cooperative Education and Internships should be directed to Engineering Career Services. Make sure to mention that you are a graduate student.

6.7.1 Cooperative Education

Co-op students work full-time in an engineering position from January-August or May-December. The co-op provides 26-28 weeks of full-time, paid engineering work experience. Alternating assignments are also an option.

Cooperative education is an academic option as part of your engineering education. Students who participate in co-op complete assignments and receive academic credit toward graduation. For SPML students, CPT is an option after completing the second semester of coursework. While on co-op, students are considered full-time students and are eligible to maintain family or UW health insurance.

The advantage of a co-op over an internship is the increased level of responsibility received due to the longer duration of the work term. Co-ops are able to work on larger and complex projects that require more time to complete.

International students please see instructions on the **CPT Process**.

6.7.2 Internships

The Summer Internship is for students seeking engineering employment during the summer months. For SPML student, a summer internship is possible after completing the second semester of coursework in the program. These 12-14 week, full-time assignments provide students exposure to engineering while enabling the employer to fill short-term project needs.

6.8 ECE Course Requirement

A least 21 of the 30 credits used to satisfy the degree requirement must be taken in the ECE Department. Please keep in mind that only ECE courses 400-level and above can count toward this accelerated master's degree.

6.9 Graduate Coursework (50%) Requirement

The Graduate School minimum graduate coursework (50%) requirement states that at least 50% of credits applied toward the program's graduate degree credit requirement (15 of 30 credits) must be courses designed for graduate work as designated in **Guide**.

6.10 Prior Coursework

Students may count prior coursework toward their SPML option M.S.E.E. degree under the following circumstances:

· **Graduate Work from Other Institutions:** With program approval, students may count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions may be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.

· **UW–Madison Undergraduate:** With program approval, up to seven credits from UW–Madison numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to seven credits of ECE courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework, please contact the Graduate Student Services Coordinator.

· **ABET-Accredited Institution Undergraduate:** With program approval, students may count up to 7 credits of undergraduate coursework from a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Electrical and Computer Engineering, Electrical Engineering and Computer Science, or

Computer Science from an ABET-accredited program at other institutions (not UW–Madison) toward fulfillment of minimum degree requirements. Courses numbered 300 or above may be counted towards the minimum graduate degree credit requirement and courses numbered 700 or above may be counted towards the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.

- **UW–Madison University Special:** With program approval, students are allowed to count up to nine credits of coursework numbered 400 or above taken as a UW–Madison University Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. Courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.
- All prior coursework must have been earned with a grade of B or better.
- Coursework earned five or more years prior to matriculation into a UW-Madison Master's degree program is not allowed to satisfy requirements.
- Prior coursework from other institutions or from a UW-Madison undergraduate career will not appear on a student's UW-Madison graduate transcript. It will not count toward the student's graduate GPA.

6.11   Grades and GPA

The Graduate School requires that students maintain a graduate grade point average (GPA) of 3.00 (on a 4.00 scale) for all graduate courses (excluding research) to receive a degree.

Courses taken for audit (S/NR), credit/no credit (CR/N), or pass/fail do not affect the GPA. Research courses graded on a Satisfactory/Unsatisfactory (S/U) basis do not impact GPA and do not count toward SPML program requirements. However, U grades are monitored by the Graduate School for satisfactory progress. A Permanent Incomplete (PI) grade does not impact the GPA. A No Report (NR) or Incomplete (I) grade does not impact the GPA, but in a graded course this is a temporary grade, indicating the instructor has not yet submitted a final grade.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **ECE Courses:**
- Grades of B or better are always acceptable.
- BC grades are acceptable if the cumulative GPA for graduate ECE classroom courses is equal to or greater than 3.0.
- Grades of C or lower are not acceptable.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **Non ECE Courses:**
- Grades of B or better are always acceptable.
- BC and C grades are acceptable if approved by the ECE Graduate Committee.
- Any grade lower than a C is not acceptable.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **Independent Study Courses:**
- S grades are acceptable, while U grades are not.
- If ECE 699 or 999 was letter-graded, only grades of B or better are acceptable.

Incomplete Grades
- If a student is unable to complete coursework by the end of the term, an instructor may enter a temporary grade of "I" for "incomplete" for that term. The student must resolve the incomplete grade by the end of the following term in which they are enrolled. Please note that instructors may impose an earlier deadline. If the incomplete grade is not resolved by the respective deadline, the student is considered in "bad academic

standing" by the Graduate School. Students may be placed on probation or suspended from the Graduate School for failing to complete the work and receive a final grade in a timely fashion. Outstanding incompletes must be resolved before a degree is granted. An unresolved I grade lapses to a grade of PI ("Permanent Incomplete") after five years. Please see the **Graduate School Policy on Incomplete Grades**.

6.12 Exceptions

Exceptions to the policies indicated above for this M.S. degree program may be made under unique circumstances. In such unusual cases, a student must first consult their faculty advisor and contact the ECE Graduate Student Coordinator with written request including the rationale for granting an exception. The exception request will be forwarded to the appropriate program coordinator and graduate committee for adjudication. Please notice that appeals for receiving exceptions from clearly-defined program rules are rarely approved by the graduate committee.

6.13 Graduation Procedures and Checklist

The ECE Graduate Coordinator (Graduate Student Services) will send out an e-mail at the beginning of each term requesting the names of students who plan to graduate as well as with instructions and deadlines for submitting final degree forms and warrant requests. Students must also indicate their plans for graduation during their final semester in their MyUW Student Center.

During the final semester prior to graduation (graduation term), the following must be completed:
- Must be enrolled in at least two credits during graduation term (Note: must also satisfy any other enrollment requirements, for example as required by international student status).
- **Apply to Graduate** in Student Center.
- Notify the ECE Graduate Coordinator (Graduate Student Services) of plans to graduate via email (include name, campus ID, degree, and faculty advisor's name).
- Thoroughly read the Graduate School's webpage **Completing Your Master's Degree** and complete all the respective tasks.
- Confirm all final grades entered, with exception to the current semester (no incomplete, unreported, or P[rogress] grades.
- Complete the **Master's Degree Survey**.
- Ask their faculty advisor to complete the Graduate Learning Outcome Report. This report must be submitted online prior to turning in the M.S. Degree Requirement Approval Form.
- Turn in the **M.S. Degree Requirements Approval Form** with faculty advisor's signature to the ECE Graduate Coordinator (ECE Graduate Student Services) immediately after the add/drop deadlines.
- Turn in the **M.S. Degree Warrant Request Form** to the ECE Graduate Coordinator (ECE Graduate Student Services) at least three weeks prior to the end of the semester or thesis defense date, whichever is sooner.
- After receiving the warrant from the Graduate School, obtain the necessary signatures, and return it to the ECE Graduate Coordinator (ECE Graduate Student Services) by the degree deadline.
- Make sure "diploma"/"mailing" address is up to date in Student Center in order to receive diploma
- Review **Diploma and Degree Posting** information.
- As soon as the degree conferral date has passed, students may request a **Degree Completion Letter** in order to prove their degree prior to receiving their diploma.
- Review **UW-Madison** and the **College of Engineering** commencement information.

6.14 Transfers to Other ECE M.S. Degree Programs

Students desiring to transfer from one ECE M.S. degree program, e.g., Professional, to another, e.g., Research, must formally apply for a transfer. Requests must be received by the Graduate Student Services Coordinator no later than October 15 for transfers effective the following spring semester and March 15 for transfers effective the following summer or fall semester. Transfer requests are not accepted in summer. The request should

include: a current transcript, brief reason for the change, and (optionally) an updated statement of purpose. Requests for transfers into the Research program require a letter from a faculty member indicating their willingness to supervise your research project.

7.0   MASTER OF SCIENCE IN ELECTRICAL ENGINEERING: POWER ENGINEERING ONLINE OPTION

7.1   Introduction to the Power Engineering Online Option

The Master of Science Electrical Engineering: Power Engineering program is an online degree designed for electrical engineers to complete part-time while working full-time. It is jointly administered by the Department of Electrical and Computer Engineering and Engineering Professional Development. This specialized degree prepares students for leading-edge positions in industry in the areas of electric power, power electronics, motor drives, and electric machines.

This degree provides students both theoretical and practical knowledge in power electronics, electric machines, and controls, including alternative energy, using a combination of classroom and laboratory-based courses, and, in some cases, research activities. This is directly applicable to a career in industry and is suitable for new or recent graduates, as well as experienced professionals who seek the necessary (re)training to change or advance their careers.

The **Wisconsin Electric Machines and Power Electronics Consortium (WEMPEC)** is a UW–Madison academic-industrial partnership that is sponsored by companies that either use, manufacture, or supply components for electric machines, power electronics, and adjustable-speed drives. With a mission to provide education, research, and professional service, WEMPEC is an internationally-renowned model program demonstrating strong interactions between university and industry.

After completing this program, students will receive a diploma stating "Master of Science-Electrical Engineering." Students' transcripts will state "Master of Science-Electrical Engineering, Major: Electrical Engineering, Option: Power Engineering."

Guide information on the **Power Engineering Online Option**.

7.2   Expectations and Policies

Graduate students in the Power Engineering program are expected to understand and follow a specific set of policies:
- Admittance into the Master of Science: Electrical Engineering program requires completion of the **Capstone Certificate in Power Conversion and Control.**
- This is a 30-credit, part-time, online M.S. degree option.
- There are two degree completion options (more details in section 7.3): course and research. All students start with the course option, which is based on 30 credits of classroom instruction. Students that find a faculty member who agrees to supervise a research project may pursue the research option. It is the student's responsibility to secure an appropriate advisor to supervise a research project. The student then enrolls in 3-9 research or independent study credits in lieu of the same number of classroom credits to complete the degree. The number of research advisors is limited and students should not assume they will be able to pursue the research option.
- Students enrolled in the Power Engineering program may not change their degree goal to another M.S. program or a Ph.D. without formally applying to and being accepted into the program.
- Students enrolling in the Power Engineering program cannot simultaneously enroll in another graduate program at UW-Madison.
- Due to the online nature of the Power Engineering program, applicants to and students in this program will neither be considered for nor will receive department funding (department RA, TA, or PA positions

or fellowships). Applicants may apply on their own for external fellowships and/or scholarships. Many students pursue tuition benefits through their employers.

7.3 Degree Credit Requirement

The Power Engineering program requires a minimum of 30 credits subject to the following constraints:
- Completion of the Capstone Certificate in Power Conversion and Control courses (ECE 411, ECE 412, ME 446).
- Completion of one on-campus, laboratory class (ECE 504 or ECE 512) offered in three-week summer semesters in Madison, Wisconsin.
- ECE courses must be 400-level or above.
- A maximum of nine credits at the 300-level or above in other departments, provided these courses are approved in writing (including email) by a faculty advisor.
- For students completing the research option, a maximum of nine credits of independent study or research (ECE 790 or ECE 999) with written faculty advisor approval.
- For students completing the course option, nine credits of ECE 700+ classes.
- Students are expected to follow the curriculum listed below (Section 6.6).
- Some credits taken as an UW-Madison undergraduate may be eligible. See "Prior Coursework" Section 6.9 below for specifics.
- Some credits taken as an undergraduate or graduate student at a different (non-UW) institution may be eligible. See "Prior Coursework" Section 6.9 below for specifics.

The following categories of courses may **not** be used to satisfy the 30-credit requirement.
- Audited courses.
- Courses taken Pass-Fail.

7.4 Credit Loads

The Power Engineering program is part-time and students typically take one three-credit class per semester.

7.5 Curriculum

Students in the Power Engineering program are expected to adhere to the following curriculum.

Of the 30 graduate a minimum of 15 must be in the ECE department at a level of 400 or above. Also, a minimum of 15 credits must be at or above the 700-level. 700-level and higher ECE courses count towards both requirements. Additional restrictions depend on the chosen Master's Option:

Thesis or Project Option:

Of the 30 credits, a minimum of 3 credits must be in ECE 790 (Master's Research or Thesis). No more than 9 credits from any combination of ECE 699, 790 or 999 may be applied toward the degree.

Course Option:

Of the 30 credits, a minimum of 9 credits must be in ECE at the 700-level and above. A maximum of 3 credits in ECE 699 and a maximum of 3 credits in ECE 999 are allowed towards the 30 credits.
Completed as the Capstone Certificate in Power Conversion and Control curriculum:
- ECE 411 (3 credits): Introduction to Electric Drive Systems
- ECE 412 (3 credits): Power Electronic Circuits
- ME 446 (3 credits): Automatic Controls

Courses available in the Power Engineering M.S. curriculum:

- ECE 427 (3 credits): Electric Power Systems

- ECE 504 (3 credits): Electric Machine and Drive Systems Lab
- ECE 512 (3 credits): Power Electronics Lab
- ECE 711 (3 credits): Dynamics and Control of AC Drives
- ECE 712 (3 credits): Solid State Power Conversion
- ECE 713 (3 credits): Electromagnetic Design of AC Machines
- ECE 714 (3 credits): Utility Application of Power Electronics
- ECE/ME 739 (3 credits): Advanced Automation and Robotics
- ECE/ME 759 (3 credits): High-Performance Computing for Applications in Engineering
- ME 447 (3 credits): Computer Control of Machines and Processes
- ME 746 (3 credits): Dynamics of Controlled Systems
- ME 747 (3 credits): Advanced Computer Control of Machines and Processes
- ECE 699 (variable credits): Independent Study
- ECE 790 (variable credits): Master's Research and Thesis
- ECE 999 (variable credits): Advanced Independent Study

Graduate-level courses from Engineering Professional Development and graduate-level courses from other departments must be approved by your faculty advisor. Please keep written communications as proof of approvals from your faculty advisor.

7.6 ECE 610 Equivalency Requirement

All Power Engineering graduate students must complete the ECE 610 equivalency requirement before their formal coursework is complete.

The purpose of ECE 610 is to prepare students for success in graduate school and to expose them to various areas within ECE and to areas outside of ECE to which ECE has or could have connections. Examples include biotechnology, physics, mathematics, business, or software. Electrical and Computer Engineering is very interdisciplinary in nature, and so it is important for students to be aware of advanced research and development in areas other than their own.

Please review the information on **completing this requirement as an online student**.

7.7 ECE Course Requirement

A least 15 of the 30 credits used to satisfy the degree requirement must be taken in the ECE Department. ECE courses 400-level and above can count toward this master's degree.

7.8 Graduate Coursework (50%) Requirement

The Graduate School minimum graduate coursework (50%) requirement states that at least 50% of credits applied toward the program's graduate degree credit requirement (15 of 30 credits) must be courses designed for graduate work as designated in the course description in **Guide**.

7.9 Prior Coursework

Students may count prior coursework toward their Power Engineering degree under the following circumstances:

- **Graduate Work from Other Institutions:** With program approval, students may count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions may be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **course equivalency request** to the Graduate Student Services Coordinator.

- · **UW–Madison Undergraduate:** With program approval, up to seven credits from UW–Madison numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to seven credits of ECE courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework, please contact the Graduate Student Services Coordinator.
- · **ABET-Accredited Institution Undergraduate:** With program approval, students may count up to 7 credits of undergraduate coursework from a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Electrical and Computer Engineering, Electrical Engineering and Computer Science, or Computer Science from an ABET-accredited program at other institutions (not UW–Madison) toward fulfillment of minimum degree requirements. Courses numbered 300 or above may be counted towards the minimum graduate degree credit requirement and courses numbered 700 or above may be counted towards the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **course equivalency request** to the Graduate Student Services Coordinator.
- · **UW–Madison University Special:** With program approval, students are allowed to count up to nine credits of coursework numbered 400 or above taken as a UW–Madison University Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. Courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.

Additional requirements and rules apply to prior coursework credits in all of the categories listed above:
- · All prior coursework credits for any of the categories must have been earned with a grade of B or better.
- · Coursework earned five or more years prior to matriculation into a UW-Madison Master's degree program is not allowed to satisfy requirements.
- · Prior coursework from other institutions or from a UW-Madison undergraduate career will not appear on a student's UW-Madison graduate transcript. It will not count toward the student's graduate GPA.

7.10 Grades and GPA

The Graduate School requires that students maintain a graduate grade point average (GPA) of 3.00 (on a 4.00 scale) for all graduate courses (excluding research) to receive a degree.

Courses taken for audit (S/NR), credit/no credit (CR/N), or pass/fail do not affect the GPA. Research courses graded on a Satisfactory/Unsatisfactory (S/U) basis do not affect the GPA and do not count toward Power Engineering degree requirements. However, U grades are monitored by the Graduate School for satisfactory progress. A Permanent Incomplete (PI) grade does not affect the GPA. A No Report (NR) or Incomplete (I) grade does not affect the GPA, but in a graded course this is a temporary grade, indicating the instructor has not yet submitted a final grade.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **ECE Courses:**
- · Grades of B or better are always acceptable.
- · BC grades are acceptable if the cumulative GPA for graduate ECE classroom courses is equal to or greater than 3.0.
- · Grades of C or lower are not acceptable.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **Non ECE Courses:**
- · Grades of B or better are always acceptable.

- BC and C grades are acceptable if approved by the ECE Graduate Committee.
- Any grade lower than a C is not acceptable.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements for **Independent Study Courses:**
- S grades are acceptable, while U grades are not.
- If ECE 699 or 999 was letter-graded, only grades of B or better are acceptable.

Incomplete Grades
- If a student is unable to complete coursework by the end of the term, an instructor may enter a temporary grade of "I" for "incomplete" for that term. The student must resolve the incomplete grade by the end of the following term in which they are enrolled. Please note that instructors may impose an earlier deadline. If the incomplete grade is not resolved by the respective deadline, the student is considered in "bad academic standing" by the Graduate School. Students may be placed on probation or suspended from the Graduate School for failing to complete the work and receive a final grade in a timely fashion. Outstanding incompletes must be resolved before a degree is granted. An unresolved I grade lapses to a grade of PI ("Permanent Incomplete") after five years. Please see the **Graduate School Policy on Incomplete Grades**.

7.11 Exceptions

Exceptions to the policies indicated above for this M.S. degree program may be made under unique circumstances. In such unusual cases, a student must first consult their faculty advisor and contact the Director of EPD Student Services with a written request including the rationale for granting an exception. The exception request will be forwarded to the appropriate program coordinator and graduate committee for adjudication. Please note that appeals for receiving exceptions from clearly-defined program rules are rarely approved by the graduate committee.

7.12 Graduation Procedures and Checklist

The Director of EPD Student Services will send out an e-mail at the beginning of each term requesting the names of students who plan to graduate along with instructions and deadlines for submitting final degree forms. Students must also indicate their plans for graduation during their final semester in their MyUW Student Center.

During the final semester prior to graduation (graduation term), the following must be completed:
- Must be enrolled in at least two credits during graduation term
- Complete **Apply to Graduate** in Student Center.
- Notify the Director of EPD Students Services of plans to graduate via email
- Thoroughly read the Graduate School's webpage **Completing Your Master's Degree** and complete all of the stated tasks.
- Confirm all final grades entered, with exception of the current semester grades. Any incomplete, unreported, or Progress grade must be resolved.
- Complete the **Master's Degree Survey**.
- Ask faculty advisor to complete the Graduate Learning Outcome Report. This report must be submitted online prior to turning in the M.S. Degree Requirement Approval Form.
- Turn in the MSEE Course Approval Form to the Director of EPD Student Services at the start of their final semester.
- Make sure "diploma"/"mailing" address is up-to-date in Student Center in order to receive diploma
- Review **Diploma and Degree Posting** information.
- As soon as the degree conferral date has passed, students may request a **Degree Completion Letter** prior to receiving their diploma in order to prove that their degree has been completed.
- Review **UW-Madison** and the **College of Engineering** commencement information.

7.13   Transfers to Other ECE M.S. Degree Programs

Students desiring to transfer from one ECE M.S. degree program, e.g., Professional, to another, e.g., Research, must formally apply for a transfer. Requests must be received by the Graduate Student Services Coordinator no later than October 15 for transfers effective the following spring semester and March 15 for transfers effective the following summer or fall semester. Transfer requests are not accepted in summer. The request should include: a current transcript, brief reason for the change, and (optionally) an updated statement of purpose. Requests for transfers into the Research program require a letter from a faculty member indicating their willingness to supervise your research project.

8.0   MASTER OF SCIENCE IN ELECTRICAL ENGINEERING, PROFESSIONAL OPTION

8.1   Introduction to the Professional Option

The Professional option of the Master of Science degree in Electrical Engineering is a course-only, accelerated curriculum to be completed within a time frame of 16 months or less. It is designed to develop advanced technical capabilities in students that seek to pursue a professional career in industry upon graduation. The PMSEE program affords students the flexibility to customize a technical emphasis, and participate in professional development activities, such as industry-sponsored summer internships.

After completing this program, students will receive a diploma stating "Master of Science-Electrical Engineering." The transcript will state" Master of Science-Electrical Engineering, Major: Electrical Engineering, Option: Professional."

8.2   Expectations and Policies

Graduate students in the Professional program are expected to understand and follow a specific set of policies:
- This is a 30 credit, accelerated (12-16 months) course-based, terminal M.S. degree option.
- Students will be required to enroll at least nine credits each academic-year semester, selected from a specific list of courses offered by the department, with the expectation of completing the degree requirements within 16 months. In the final semester the student only needs to enroll in enough credits to graduate.
- Students enrolled in the Professional program may not change their degree goal to another M.S. program or a Ph.D. without formally applying to and being accepted into the program.
- Students enrolling in the Professional program cannot simultaneously enroll in another graduate program at UW-Madison.
- Due to the accelerated, course-based nature of the Professional program, applicants to and students in this program will neither be considered for nor will receive department funding (department RA, TA, or PA positions or fellowships). Applicants may apply on their own for external fellowships and/or scholarships.

8.3   Degree Credit Requirement

The accelerated Professional option Master of Science in Electrical Engineering degree requires a minimum of 30 credits subject to the following constraints:
- ECE courses must be 400-level or above.
- A maximum of nine credits at the 300-level or above in other departments, provided these courses are approved in writing (including email) by a faculty advisor.
- A maximum of one credit ECE 610.
- A maximum of three credits of independent study (ECE 699 and ECE 999).
- A maximum of three credits of ESL courses 300-level or above.
- A maximum of three credits of ECE 702 CPT/internship.

- A maximum of three credits of ECE 601 and ECE 901 (special topics courses) with written faculty advisor approval.
- Some credits taken as an UW-Madison undergraduate may be eligible. See "Prior Coursework" Section 8.10 below for specifics.
- Some credits taken as an undergraduate or graduate student at a previous institution may be eligible. See "Prior Coursework" Section 8.10 below for specifics.

The following categories of courses may **not** be used to satisfy the 30-credit requirement.
- Audited courses.
- Courses taken Pass-Fail.
- ECE 611.
- Research credits (ECE 790 or similar courses).

8.4   Credit Loads

The Professional program has an accelerated curriculum and students are expected to complete the required 30 credits within 16 months. During fall and spring semesters, the maximum credit load for a graduate student is 15 credits. Exceeding this limit is not advisable and cannot be made without department approval. A sample credit load is provided below:

Semester	Credits	Notes
First Fall Semester	10-13	Including 1 credit ECE 610
Spring semester	9-12	
Summer	0-3	ECE 702 CPT/Internship
Second Fall semester	2-11	

8.5   Curriculum

Students in the Professional option are expected to adhere to the following curriculum:
- Required in fall semester – ECE 610 (1 credit).
- Twelve credits in a specified curriculum path approved by the faculty advisor in writing or email. Course lists associated with example curricular areas are given below.
- Fifteen credits must be designed for graduate work as designated in **Guide**. Nine of these fifteen credits must be ECE courses.
- Students are strongly encouraged to participate in one of the following professional development opportunities:
    o ECE 702 CPT/Internship (see Section 8.7 below)
    o InterEGR 601 Introduction to Interdisciplinary Design and Innovation for three credits during the summer term
    o Independent study (ECE 699 or ECE 999) being co-supervised by an advisor working in industry (choice of industry advisor is subject to program approval)
    o At least two of the online one-credit Foundations of Professional Development courses, which are each eight weeks long:
        1. EPD 701 Writing for Professionals
        2. EPD 702 Professional Presentations
        3. EPD 703 Managing Digital Information
        4. EPD 704 Organizational Communication and Problem Solving
        5. EPD 706 Change Management
        6. EPD 708 Creating Breakthrough Innovations

7. EPD 712 Ethics for Professionals
8. EPD 713 Key Legal Concepts for Professionals
9. EPD 781 Financial and Business Acumen
10. EPD 782 Marketing for Non-Marketing Professionals
11. EPD 783 Leading Teams
12. EPD 784 Project Management Essentials
13. EPD 785 Effective Negotiation Strategies

Courses in Example Curricular Areas
- Students may take courses from combinations of areas to create custom degrees that are well-aligned with their professional goals. Written advisor approval is required for course selections.

Computer Engineering (CMPE)
- ECE 453 - Embedded Microprocessor Design
- ECE 454 – Mobile Computing Laboratory
- ECE 537 - Communication Networks
- ECE 551 – Digital System Design and Synthesis
- ECE 552 – Introduction to Computer Architecture
- ECE 554 – Digital Engineering Laboratory
- ECE 555 – Digital Circuits and Components
- ECE 556 – Design Automation of Digital Systems
- ECE 707 – Mobile and Wireless Networking
- ECE 750 – Real-Time Computing Systems
- ECE 751 – Embedded Computing Systems
- ECE 752 – Advanced Computer Architecture I
- ECE 753 – Fault-Tolerant Computing
- ECE 755 – VLSI Systems Design
- ECE 756 – Compute-Aided Design for VLSI
- ECE 757 – Advanced Computer Architecture II

E&M Fields and Waves
- ECE 453 – Embedded Microprocessor System Design
- ECE 545 – Advanced Microwave Measurements for Communications
- ECE 547 – Advanced Communications Circuit Design
- ECE 552 – Introduction to Computer Architecture
- ECE 740 – Electromagnetic Theory
- ECE 742 – Computational Methods in Electromagnetics
- ECE 744 – Theory of Microwave Circuits and Devices
- ECE 748 – Linear Waves Named Option Proposal Form v 5-2-16
- ECE 749 – Coherent Generation and Particle Beams
- ECE 841 – Electromagnetic Radiation and Transmission
- ECE 848 – Nonlinear Waves

Energy and Power Systems

The on-campus program, not the online Power Engineering program
- ECE 411 – Introduction to Electric Drive Systems
- ECE 412 – Power Electronic Circuits
- ECE 427 – Electric Power Systems
- ECE 504 – Electric Machine and Drive System Laboratory
- ECE 511 – Theory and Control of Synchronous Machines

- ECE 512 – Power Electronics Laboratory
- ECE 711 – Dynamics and Control of AC Drives
- ECE 712 – Solid State Power Conversion
- ECE 713 – Electromagnetic Design of AC Machines
- ECE 714 – Utility Applications of Power Electronics
- ECE 723 – On-line Control of Power Systems
- ECE 731 – Advanced Power System Analysis

Solid State/Photonics
- ECE 434 – Photonics
- ECE 445 – Semiconductor Physics and Devices
- ECE 466 – Electronics of Solids
- ECE 536 – Integrated Optics and Optoelectronics
- ECE 541 – Analog MOS Integrated Circuit Design
- ECE 542 – Introduction to Microelectromechanical Systems
- ECE 544 – Processing of Electronic Materials
- ECE 548 – Integrated Circuit Design
- ECE 549 – Integrated Circuit Fabrication Laboratory
- ECE 741 – Semiconductor Diode Lasers and Other Optoelectronic Devices
- ECE 743 – High-Power Diode Lasers and Amplifiers
- ECE 745 – Solid State Electronics
- ECE 746 – Quantum Electronics
- ECE 845 – Transport in Semiconductor Devices

8.6 ECE 610 Requirement

All Professional program students must enroll in ECE 610 (1 credit) during their first fall semester of graduate studies. Students with a course conflict with ECE 610 should discuss with their faculty advisor as to how to resolve the problem.

The purpose of ECE 610 is to prepare students for success in graduate school and to expose students in their first semester of graduate school to various areas within ECE and to areas outside of ECE to which ECE has or could have connections, for example, biotechnology, physics, mathematics, business, or software. Electrical and Computer Engineering is very interdisciplinary in nature, and so it is important for students to be aware of advanced research and development in areas other than their own.

8.7 Cooperative Education (CPT) and Internships

Through the **Engineering and Career Services** Co-op and Summer Internship programs students gain valuable "real world" engineering experiences working with a variety of industries and governmental agencies.

All students in these programs will get the opportunities to work full-time, be competitively paid, complete engineering assignments, and work under the supervision of an engineer.

Students participating in a co-op or internship will enroll in ECE 702. ECE 702 can be used toward the Professional curriculum and credit requirements (see Sections 8.3 and 8.5 for more information).

Obtaining work experience prior to completing your degree requirements typically increases employment opportunities and starting salaries after graduation.

Any questions regarding Cooperative Education and Internships should be directed to Engineering Career Services. Make sure to mention that you are a graduate student.

8.7.1 Cooperative Education

Co-op students work full-time in an engineering position from January-August or May-December. The co-op provides 26-28 weeks of full-time, paid engineering work experience. Alternating assignments are also an option.

Cooperative education is an academic option as part of your engineering education. Students who participate in co-op complete assignments and receive academic credit toward graduation. For SPML students, CPT is an option after completing the second semester of coursework. While on co-op, students are considered full-time students and are eligible to maintain family or UW health insurance.

The advantage of a co-op over an internship is the increased level of responsibility received due to the longer duration of the work term. Co-ops are able to work on larger and complex projects that require more time to complete.

See instructions on the **CPT Process**.

8.7.2 Internships

The Summer Internship is for students seeking engineering employment during the summer months. For SPML student, a summer internship is possible after completing the second semester of coursework in the program. These 12-14 week, full-time assignments provide students exposure to engineering while enabling the employer to fill short-term project needs.

8.8 ECE Course Requirement

A least 21 of the 30 credits used to satisfy the degree requirement must be taken in the ECE Department. Please keep in mind that only ECE courses 400-level and above can count toward this accelerated master's degree.

8.9 Graduate Coursework (50%) Requirement

The Graduate School minimum graduate coursework (50%) requirement states that at least 50% of credits applied toward the program's graduate degree credit requirement (15 of 30 credits) must be courses designed for graduate work as designated in **Guide**.

8.10 Prior Coursework

Students may count prior coursework toward their Professional option M.S.E.E. degree under the following circumstances:
- **Graduate Work from Other Institutions:** With program approval, students may count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions may be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison Undergraduate:** With program approval, up to seven credits from UW–Madison numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to seven credits of ECE courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework, please contact the Graduate Student Services Coordinator.

- **ABET-Accredited Institution Undergraduate:** With program approval, students may count up to 7 credits of undergraduate coursework from a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Electrical and Computer Engineering, Electrical Engineering and Computer Science, or Computer Science from an ABET-accredited program at other institutions (not UW–Madison) toward fulfillment of minimum degree requirements. Courses numbered 300 or above may be counted towards the minimum graduate degree credit requirement and courses numbered 700 or above may be counted towards the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison University Special:** With program approval, students are allowed to count up to 9 credits of coursework numbered 400 or above taken as a UW–Madison University Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. Courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.
- All prior coursework must have been earned with a grade of B or better.
- Coursework earned five or more years prior to matriculation into a UW-Madison Master's degree program is not allowed to satisfy requirements.
- Prior coursework from other institutions or from a UW-Madison undergraduate career will not appear on a student's UW-Madison graduate transcript. It will not count toward the student's graduate GPA.

8.11 Grades and GPA

The Graduate School requires that students maintain a graduate grade point average (GPA) of 3.00 (on a 4.00 scale) for all graduate courses (excluding research) to receive a degree.

Courses taken for audit (S/NR), credit/no credit (CR/N), or pass/fail do not affect the GPA. Research courses graded on a Satisfactory/Unsatisfactory (S/U) basis do not impact GPA but do not count toward the Professional option requirements. U grades are monitored by the Graduate School for satisfactory progress. A Permanent Incomplete (PI) grade does not impact the GPA. A No Report (NR) or Incomplete (I) grade does not impact the GPA, but in a graded course this is a temporary grade, indicating the instructor has not yet submitted a final grade.

The following grade and GPA requirements must be satisfied for courses to count toward your degree requirements:

ECE Courses
- Grades of B or better are always acceptable.
- BC grades are acceptable if the cumulative GPA for graduate ECE classroom courses is equal to or greater than 3.0.
- Grades of C or lower are not acceptable.

Non-ECE Courses
- Grades of B or better are always acceptable.
- BC and C grades are acceptable if approved by the ECE Graduate Committee.
- Any grade lower than a C is not acceptable.

Independent Study Courses
- S grades are acceptable, while U grades are not.
- If ECE 699 or 999 was letter-graded, only grades of B or better are acceptable.

Incomplete Grades

If a student is unable to complete coursework by the end of the term, an instructor may enter a temporary grade of "I" for "incomplete" for that term. The student must resolve the incomplete grade by the end of the following term in which they are enrolled. Please note that instructors may impose an earlier deadline. If the incomplete grade is not resolved by the respective deadline, the student is considered in "bad academic standing" by the Graduate School. Students may be placed on probation or suspended from the Graduate School for failing to complete the work and receive a final grade in a timely fashion. Outstanding incompletes must be resolved before a degree is granted. An unresolved I grade lapses to a grade of PI ("Permanent Incomplete") after five years. Please see the **Graduate School Policy on Incomplete Grades**.

8.12   Exceptions

Exceptions to the policies indicated above for this M.S. degree program may be made under unique circumstances. In such unusual cases, a student must first consult their faculty advisor and contact the ECE Graduate Student Coordinator with written request including the rationale for granting an exception. The exception request will be forwarded to the appropriate program coordinator and ECE Graduate Committee for adjudication. Please notice that appeals for receiving exceptions from clearly-defined program rules are rarely approved by the Graduate Committee.

8.13   Graduation Procedures and Checklist

The ECE Graduate Coordinator (Graduate Student Services) will send out an e-mail at the beginning of each term requesting the names of students who plan to graduate as well as with instructions and deadlines for submitting final degree forms and warrant requests. Students must also indicate their plans for graduation during their final semester in their MyUW Student Center.

During the final semester prior to graduation (graduation term), the following must be completed:
- Must be enrolled in at least two credits during graduation term (Note: must also satisfy any other enrollment requirements, for example as required by international student status).
- **Apply to Graduate** in Student Center.
- Notify the ECE Graduate Coordinator (Graduate Student Services) of plans to graduate via email (include name, campus ID, degree, and faculty advisor's name).
- Thoroughly read the Graduate School's webpage **Completing Your Master's Degree** and complete all the respective tasks.
- Confirm all final grades entered, with exception to the current semester (no incomplete, unreported, or P[rogress] grades.
- Complete the **Master's Degree Survey**.
- Ask their faculty advisor to complete the Graduate Learning Outcome Report. This report must be submitted online prior to turning in the M.S. Degree Requirement Approval Form.
- Turn in the **M.S. Degree Requirements Approval Form** with faculty advisor's signature to the ECE Graduate Coordinator (ECE Graduate Student Services) immediately after the add/drop deadlines.
- Turn in the **M.S. Degree Warrant Request Form** to the ECE Graduate Coordinator (ECE Graduate Student Services) at least three weeks prior to the end of the semester or thesis defense date, whichever is sooner.
- After receiving the warrant from the Graduate School, obtain the necessary signatures, and return it to the ECE Graduate Coordinator (ECE Graduate Student Services) by the degree deadline.
- Make sure "diploma" "mailing" address is up to date in Student Center in order to receive diploma
- Review **Diploma and Degree Posting** information.
- As soon as the degree conferral date has passed, students may request a **Degree Completion Letter** in order to prove their degree prior to receiving their diploma.
- Review **UW-Madison** and the **College of Engineering** commencement information.

8.14 Transfers to Other ECE M.S. Degree Programs

Students desiring to transfer from Professional to another ECE M.S. degree program, e.g., Research, must formally apply for a transfer. Requests must be received by the Graduate Student Services Coordinator no later than October 15 for transfers effective the following spring semester and March 15 for transfers effective the following summer or fall semester. Transfer requests are not accepted in summer. The request should include: a current transcript, brief reason for the change, and (optionally) an updated statement of purpose. Requests for transfers into the Research program require a letter from a faculty member indicating their willingness to supervise your research project.

9.0   MASTER OF SCIENCE IN ELECTRICAL ENGINEERING, RESEARCH OPTION

9.1   Introduction to the Research Option

The Research option Master of Science in Electrical Engineering is a traditional research-oriented, two-year degree program, emphasizing the enhancement of professional knowledge and research techniques within Electrical and Computer Engineering. A student enrolled in the Research option must engage a graduate level research project under an ECE faculty supervision and is required to submit a Master Thesis (Thesis option) or a Project Report (Project option) before graduation.

Upon completion of the required 30-credit coursework and research project, students will receive a diploma stating "Master of Science in Electrical Engineering." The transcripts will state" Master of Science-Electrical Engineering, Major: Electrical Engineering, Option: Research."

9.2   Degree Credit Requirement

The Research option Master of Science in Electrical Engineering degree program requires a minimum of 30 credits subject to the following constraints:
- ECE courses must be 400-level or higher.
- A least 15 credits must be ECE courses.
- At least 15 credits must be 700-level or above, including ECE and courses from other departments
- At least three credits must be ECE 790.
- A maximum of one credit ECE 610 may be used.
- A maximum of nine credits of research or independent study courses (ECE 699, ECE790 and ECE 999) may be used. Research or independent study courses taken at other departments are subject to the nine credit limit. For example, if a student takes nine credits of ECE independent study or research courses (combinations of ECE 699, 790, and 999) and three credits of Computer Science independent courses, only nine of these twelve credits can be counted towards the degree requirements.
- A maximum of three credits of ESL courses 300-level or above.
- A maximum of seven credits of UW-Madison coursework numbered 400-level or above taken by a student with a bachelor's degree at UW-Madison may count toward these 30 credits (see Section 9.8).
- A maximum of seven credits of undergraduate or graduate-level coursework from other institutions may count toward these 30 credits (1) upon approval of **Course Equivalency Petition** and (2) provided these courses have not been used toward a master's degree at another institution (see Section 9.8).

The following categories do NOT count toward degree requirements:
- Audited courses.
- Courses taken Pass-Fail.
- ECE 611.
- ECE 702 CPT/internship credits.

Students can take more than 30 credits with advisor approval.

9.3 Degree Options

Students enrolled in the Research option Master of Science in Electrical Engineering degree program must choose one of two options: the thesis option or the project option. Both options have identical degree credit requirements as detailed in section 9.2. In both options, students must perform research work under the supervision of a faculty advisor. The prime distinction of these options is the scope of research work and the way the research report will be formatted and deposited.

9.3.1 Thesis Option

Each student who elects the Thesis Option is required to perform research in consultation with a master's thesis committee. Master's thesis committees must have at least three members, two of whom must be graduate faculty or former graduate faculty up to one year after resignation or retirement. At the conclusion of the research program, a thesis must be prepared. The thesis must: 1) conform to Graduate School and library formats; 2) be approved by the master's thesis committee; 3) be filed with the Memorial Library where it is catalogued and stacked for future reference (if required by the master's thesis committee); and 4) an electronic copy must be sent to the ECE Graduate Student Services Coordinator, who will deposit it into Minds@UW, Department of Electrical and Computer Engineering Thesis Collection. The Minds@UW system will provide a permanent URL, safe long-term archiving and is indexed by Google, Google Scholar and other specialty academic search engines.

At the conclusion of the thesis, all grades of P (Progress) and I (Incomplete) in ECE 790 are changed to either S (Satisfactory) or U (Unsatisfactory) by the advisor. In the final semester the student is required to check in at the ECE Graduate Student Services Office to apply for a degree warrant by the announced deadline. The MSEE Course Approval Form is available in the Graduate Student Services office or **online**.

9.3.2 Project Option

Students choosing the project option will submit a type-written project report describing their research project, for approval by the faculty advisor. The approved report must be sent to the ECE Graduate Student Services Coordinator. Project reports will not be deposited into Minds@UW or the UW-Madison Memorial Library.

9.4 Credit Loads

Graduate students usually enroll in eight to twelve credits in fall and spring terms, although students with specific appointments may enroll in fewer credits per term. Graduate students cannot enroll in more than 15 credits in the fall and spring terms without prior approval. Summer term enrollment is only required in some circumstances. Questions regarding your credit load should be brought to the ECE Graduate Coordinator (Graduate Student Services) and/or your faculty advisor.

9.5 ECE 610 Requirement

All graduate students must enroll in ECE 610 (1 credit) during their first semester of graduate studies. Students with a course conflict with ECE 610 should discuss with their faculty advisor as to how to resolve the problem.

The purpose of ECE 610 is to expose students in their first semester of graduate school to various areas within ECE and to areas outside of ECE to which ECE has or could have connections, for example, biotechnology, physics, mathematics, business, or software. Electrical and Computer Engineering is very interdisciplinary in nature, and so it is important for students to be aware of advanced research and development in areas other than their own.

9.6 Research Courses and Independent Studies

The M.S. research course ECE790 involves a structured research projects that may lead to new knowledge, technology, or invention that contributes to a M.S. Thesis or M.S. Project report. Independent study courses (ECE699, ECE999) provide students opportunities to learn course materials that are not available as a regularly scheduled courses or new topic area to facilitate research activities. The distinction between different course levels are explained as follows:

Research Courses:

ECE 790: Master's Research or Thesis
  - For M.S. Research option students
  - For Ph.D. students getting an M.S. along the way to a Ph.D.

ECE 890: Pre-Dissertator's Research
  - Only for Ph.D. students who have not yet taken their preliminary examination
  - Does not count toward M.S. degree requirements.

ECE 990: Research or Thesis
  - Only for dissertators, who are Ph.D. students that have already passed their preliminary examination
  - Does not count toward M.S. degree requirements.

Independent Study Courses:
  - ECE 699 course content generally corresponds to 500 or 600 level coursework.
  - ECE 999 course content generally corresponds to 700 and higher level coursework.

All research and independent study courses must be enrolled individually under the specific Section number of the research advisor/instructor. Research courses and independent study courses are variable-credit courses; students agree upon the number of credits with their research advisor/instructor.

Instructor consent is always required for research courses and independent studies. For research courses, the student may enroll after receiving consent of the research advisor. Non-ECE graduate students wishing to enroll in ECE graduate research or independent study courses must contact ECE Graduate Coordinator or COE Graduate Student Services for permission to do so.

All students require administrative permission to enroll in independent study courses. Please have your instructor email the ECE Graduate Coordinator their confirmation of allowing you to enroll in their Section. After receiving such an email, the ECE Graduate Coordinator will grant the necessary permission in the system for the student to enroll.

9.7 Cooperative Education (CPT) and Internships

Through the **Engineering and Career Services** Co-op and Summer Internship programs students gain valuable "real world" engineering experiences working with a variety of industries and governmental agencies.

All students in these programs will get the opportunities to work full-time, be competitively paid, complete engineering assignments, and work under the supervision of an engineer.

Students participating in a co-op or internship will enroll in ECE 702. While ECE 702 cannot be applied to Research option curriculum requirements, co-ops and internships can provide very valuable experiences.

Obtaining work experience prior to completing your degree requirements typically increases employment opportunities and starting salaries after graduation.

Any questions regarding Cooperative Education and Internships should be directed to Engineering Career Services. Make sure to mention that you are a graduate student.

9.7.1 Cooperative Education

Co-op students work full-time in an engineering position from January-August or May-December. The co-op provides 26-28 weeks of full-time, paid engineering work experience. Alternating assignments are also an option.

Cooperative education is an academic option as part of your engineering education. Students who participate in co-op complete assignments and receive academic credit toward graduation. While on co-op, students are considered full-time students and are eligible to maintain family or UW health insurance.

The advantage of a co-op over an internship is the increased level of responsibility received due to the longer duration of the work term. Co-ops are able to work on larger and complex projects that require more time to complete.

Instructions on the **CPT Process**.

9.7.2 Internships

The Summer Internship is for students seeking engineering employment during the summer months. These 12-14 week, full-time assignments provide students exposure to engineering while enabling the employer to fill short-term project needs.

9.8 Prior Coursework

Students may count prior coursework toward their Research option M.S.E.E. degree under the following circumstances:

- **Graduate Work from Other Institutions:** With program approval, students may count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions may be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison Undergraduate:** With program approval, up to seven credits from UW–Madison numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to seven credits of ECE courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework, please contact the Graduate Student Services Coordinator.
- **ABET-Accredited Institution Undergraduate:** With program approval, students may count up to 7 credits of undergraduate coursework from a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Electrical and Computer Engineering, Electrical Engineering and Computer Science, or Computer Science from an ABET-accredited program at other institutions (not UW–Madison) toward fulfillment of minimum degree requirements. Courses numbered 300 or above may be counted towards the minimum graduate degree credit requirement and courses numbered 700 or above may be counted towards the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison University Special:** With program approval, students are allowed to count up to 9 credits of coursework numbered 400 or above taken as a UW–Madison University Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. Courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.

- All prior coursework must have been earned with a grade of B or better.
- Coursework earned five or more years prior to matriculation into a UW-Madison Master's degree program is not allowed to satisfy requirements.
- Prior coursework from other institutions or from a UW-Madison undergraduate career will not appear on a student's UW-Madison graduate transcript. It will not count toward the student's graduate GPA.

9.9 Grades and GPA

The Graduate School requires that students maintain a graduate grade point average (GPA) of 3.00 (on a 4.00 scale) for all graduate courses (excluding research) to receive a degree.

Courses taken for audit (S/NR), credit/no credit (CR/N), or pass/fail do not affect the GPA. Research courses graded on a Satisfactory/Unsatisfactory (S/U) basis do not impact GPA. However, U grades are monitored by the Graduate School for satisfactory progress. A Permanent Incomplete (PI) grade does not impact the GPA. A No Report (NR) or Incomplete (I) grade does not impact the GPA, but in a graded course this is a temporary grade, indicating the instructor has not yet submitted a final grade.

In order for courses to count toward your master's degree, students must satisfy the following grade and GPA requirements:

ECE Courses
- Grades of B or better are always acceptable.
- BC grades are acceptable if the cumulative GPA for graduate ECE classroom courses is equal to or greater than 3.0.
- Grades of C or lower are not acceptable.
- Satisfactory/unsatisfactory (S/U) grades are only acceptable for research and independent study courses (e.g., ECE 790, 890, 990, 699, and 999 at other departments)

Non-ECE Courses
- Grades of B or better are always acceptable.
- BC and C grades are acceptable if approved by the ECE Graduate Committee.
- Any grade lower than a C is not acceptable.
- Satisfactory/unsatisfactory (S/U) grades are only acceptable for research and independent study courses (e.g., courses that are equivalent to ECE 790, 890, 990, 699, and 999 in other departments)

Research Courses and Independent Study Courses
- S grades are acceptable, while U grades are not.
- If ECE 699 or 999 was letter-graded, only grades of B or better are acceptable.

Incomplete Grades
- If a student is unable to complete coursework by the end of the term, an instructor may enter a temporary grade of I for "incomplete" for that term. The student must resolve the incomplete grade by the end of the following term in which they are enrolled. Please note that instructors may impose an earlier deadline. If the incomplete grade is not resolved by the respective deadline, the student is considered in "bad academic standing" by the Graduate School. Students may be placed on probation or suspended from the Graduate School for failing to complete the work and receive a final grade in a timely fashion. Outstanding incompletes must be resolved before a degree is granted. An unresolved I grade lapses to a grade of PI ("Permanent Incomplete") after five years. Please see the **Graduate School Policy on Incomplete Grades**.

9.10 Department Funding

Please refer to Section 12.0 for more information on department funding.

9.11 Graduation Procedure and Checklist

The ECE Graduate Student Services Coordinator will send out an e-mail at the beginning of each semester requesting the names of students who plan to graduate as well as with instructions and deadlines for submitting final degree forms and warrant requests. Students must also indicate their plans for graduation during their final semester in their MyUW Student Center.

In students' final semester (graduation term), the following must be completed:

- Must be enrolled in at least two credits during graduation term (Note: must also satisfy any other enrollment requirements required by funding or international student status).
- Apply to **Graduate in Student Center**.
- Notify the ECE Graduate Coordinator (Graduate Student Services) of plans to graduate via email (include name, campus ID, degree, whether or not continuing to Ph.D., and faculty advisor's name).
- Thoroughly read the **Graduate School's web page** "Completing Your Master's Degree" and complete all the respective tasks.
- Confirm all final grades entered, with exception to the current semester (no incomplete, unreported, or P[rogress] grades
- Complete the **Master's Degree Survey**.
- Ask their faculty advisor to complete the Graduate Learning Outcome Report. This report must be submitted online prior to turning in the M.S. Degree Requirement Approval Form.
- Turn in the **M.S. Degree Requirements Approval Form** with faculty advisor's signature to the ECE Graduate Coordinator (ECE Graduate Student Services) immediately after the add/drop deadlines.
- Turn in the **M.S. Degree Warrant Request Form** to the ECE Graduate Coordinator (ECE Graduate Student Services) at least three weeks prior to the end of the semester or thesis defense date, whichever is sooner.
- After receiving the warrant from the Graduate School, obtain the necessary signatures, and return it to the ECE Graduate Coordinator (ECE Graduate Student Services) by the degree deadline
- Make sure "diploma" "mailing" address is up to date in Student Center in order to receive diploma
- Review **Diploma Information**.
- Review **Certified Electronic Diploma Information**.
- Review **Official Conferral Dates**.
- Review **Posting of Degrees**.
- As soon as the degree conferral date has passed, students may request a **Degree Completion Letter** in order to prove their degree prior to receiving their diploma.
- Review **UW Commencement Information** and **College of Engineering Commencement Information**.

9.12 Submitting M.S. Thesis or Project Report

Thesis option students may submit their master's thesis to Memorial Library. Some faculty/research advisors may require that their students submit a thesis. Students should discuss with their faculty/research advisor about whether or not they are required to submit their thesis. Students may choose to deposit their thesis to Memorial Library even if the faculty/research advisor is not requiring it.

Students submitting their thesis to Memorial Library must have three committee members listed on their M.S. Degree warrant (and M.S. Degree Warrant Request form). At least two committee members must be graduate faculty or former graduate faculty up to one year after resignation or retirement. The student's research advisor must chair the committee. If the student has more than one advisor, all advisors should be on the committee.

If depositing your thesis to Memorial Library, it must conform to the standards. Thoroughly read the instructions and information about submitting your thesis to Memorial Library on the **Graduate School's "Completing Your Master's Degree" web page**.

An electronic copy of your thesis must be sent to the ECE Graduate Student Services Coordinator, who will deposit it into **Minds@UW**, Department of Electrical and Computer Engineering Thesis Collection. The

Minds@UW system will provide a permanent URL, safe long-term archiving and is indexed by Google, Google Scholar and other specialty academic search engines.

9.13 Adding Major Outside of ECE

Students wishing to add or change to a major (master's or Ph.D.) in another department must submit an application for an Add/Change/Discontinue Program Request in the Grad Portal. It is advisable to check-in with the other department before completing the request, as they may require or suggest additional application materials.

See the Graduate School's **Addition/Change of Program, Plan, or Named Option** policy.

9.14 Continuing to ECE Ph.D.

Students who wish to enter the ECE Ph.D. program that were not originally admitted to the ECE Ph.D. program must complete an internal application. Please contact the ECE Graduate Student Services Coordinator for instructions. Applications will be reviewed by the ECE Graduate Admissions Committee.

The application deadline is October 1 for transfers effective in the Spring semester, and March 1 for transfers effective in the Summer or Fall semester. Students must apply in the semester before planning to enroll in the Ph.D. program. It is strongly recommended that students apply in or before their third semester of graduate studies.

10.0 DOCTORAL DEGREE

10.1 Introduction

The Doctorate Degree in Electrical Engineering (Ph.D. EE) is a research degree emphasizing creativity and original approaches to problem-solving in electrical engineering.

Ph.D. students must satisfy the UW-Madison Graduate School credit requirements, and pursue Primary, Secondary, and Minor fields of study in consultation with a faculty advisor. A PhD student must pass the PhD Qualifier Examination (Q-II), usually in the 4th semester, and be awarded Advanced Graduate Standing (AGS) status by the ECE department Graduate Committee. After completion of all course requirements in the Primary, Secondary, and Minor fields of study, a PhD student with the AGS status will advance to the dissertator status when he/she passes a preliminary examination administered by his/her PhD advisory committee. The preliminary examination must be taken no later than three semesters after receiving AGS status. Upon completion of the proposed research work, a dissertator will submit a PhD dissertation to his/her PhD advisory committee and present the work in a public oral defense. With the approval of the PhD advisory committee, the dissertator will be awarded a doctorate degree titled "PhD in Electrical Engineering".

A student enrolled in Ph.D. in ECE degree program will specialize in one or more of the PhD primary areas as listed in Section 11 of this handbook. Students may also pursue Ph.D. Research in interdisciplinary cooperative projects with advisor support.

10.2 Credit Requirement

The Ph.D. degree in Electrical Engineering requires a minimum of 51 credits subject to the following constraints:
- ECE courses must be 400-level or above.
- Non-ECE courses must be 300-level or above.
- Research credits (ECE 790, 890, or 990) and independent study courses (ECE 699 and 999) may be used, although:
    - Research credits cannot count toward primary, secondary, and minor areas.

- o Independent study courses may be used to meet primary, secondary, and minor areas in some circumstances. See the specific areas below for specifics.
  - ESL courses 300-level or above are applicable, but cannot be used to meet primary, secondary, and minor areas.
  - ECE 702 CPT/internship credits are applicable but cannot be used to meet primary, secondary, and minor area requirements.
  - Some credits taken as a UW-Madison undergraduate may be used as described in the "Prior Coursework" Section 10.11.
  - Some credits taken as an undergraduate or graduate student at a previous institution may be used as described in the "Prior Coursework" Section 10.11.

The following categories of courses may **not** be used to satisfy the 51-credit requirement.
- Audited courses.
- Courses taken Pass-Fail.

Students are allowed to take more than 51 credits, but are expected to graduate within a reasonable time.

10.3 Graduate Coursework (50%) Requirement

The minimum graduate coursework (50%) requirement states that at least 50% of credits applied toward the program's graduate degree credit requirement (26 of 51 credits) must be courses designed for graduate work (this includes but is not limited to online, thesis/research, independent study, and practicum/internship credits). Courses 700-level and above will always satisfy the (50%) requirement. Courses below the 700-level identified with the graduate course attribute (G50%) in the University's Course Guide and Class Search also meet the (50%) requirement.

10.4 Credit Loads

Students are expected to satisfy minimum enrollment requirements (see Section 19 for more details). Graduate students usually enroll in 8-12 credits in fall and spring terms, although students with specific appointments may enroll in fewer credits per term. Graduate students cannot enroll in more than 15 credits in the fall and spring terms without approval. Summer term enrollment is only required in some circumstances. Questions regarding your credit load should be brought to the ECE Graduate Student Services Coordinator (Graduate Student Services) and/or your faculty advisor.

10.5 ECE 610 and ECE 611 Requirement

All doctoral students must enroll in ECE 610 (1 credit) during their first semester of graduate studies and in ECE 611 (2 credits) during their second semester of graduate studies. Students with a course conflict with ECE 610 or ECE 611 should discuss with their faculty advisor as to how to resolve the problem.

Electrical and Computer Engineering is very interdisciplinary in nature, and so it is important for students to be aware of advanced research and development in areas other than their own. ECE 610 will expose graduate students in their first semester at UW-Madison to various areas within ECE and to areas outside of ECE to which ECE has or could have connections, for example, biotechnology, physics, mathematics, business, or software. ECE 611 will emphasize research experiences and methodologies to prepare students to pursue PhD research work.

10.6 Primary Area

A PhD student will declare a primary area of study when registering for the Ph.D. Qualifying Examination. After the student passes the Qualifying Exam and achieves Advance Graduate Standing, a different primary area may be chosen only with the approval of the ECE Graduate Committee. A special primary area course program

tailored for a student whose interests do not lie within a single area requires approval by the student's advisor and the ECE Graduate Committee at least one year before the Preliminary Examination. The primary area course requirement consists of the courses specified by each of the graduate research areas as listed in Section 11. A cumulative grade point average of 3.3 or higher must be achieved for the primary area coursework. Courses used to fulfill the primary area requirements cannot be used to fulfill other Ph.D. course requirements.

Students should complete and turn in their Ph.D. course forms (Primary Area, Secondary Area, and Minor forms) at the beginning of the last semester of which they are taking a classroom course required for Ph.D. coursework. All three forms should be submitted together. Forms should be turned into the ECE Graduate Coordinator (Graduate Student Services), who will verify the student's grades and pass the forms to the ECE Graduate Committee for approval. Before submitting the Ph.D. course forms, all temporary grades must be resolved. All incomplete grades and progress grades, for example, must be changed to final grades.

10.7   Secondary Area

The secondary area course requirement consists of a minimum of six credits of ECE courses numbered 700-level or above outside the student's primary area. The secondary area courses do not need to be in the same ECE specialty area. Courses used to fulfill the secondary area requirements cannot be used to fulfill other Ph.D. course requirements. No research courses can be used to satisfy this requirement, but ECE independent study courses may be used with justification. Students should submit extra documentation, signed by their faculty advisor, explaining the reasoning why their independent study credits should be able to satisfy the requirement. ECE 702 may not be used for the secondary area. The secondary area courses must be achieved with a cumulative grade point average of 3.25 or higher. Up to six credits of the secondary area courses may be substituted with other graduate-level courses if approved by the student's advisor and the ECE graduate committee following submission of a coherent course plan that justifies the substitution.

Students should complete and turn in their Ph.D. course forms (Primary Area, Secondary Area, and Minor forms) at the beginning of the last semester of which they are taking a classroom course required for Ph.D. coursework. All three forms should be submitted together. Forms should be turned into the ECE Graduate Coordinator (Graduate Student Services), who will verify the student's grades and pass the forms to the ECE Graduate Committee for approval. Before submitting the Ph.D. course forms, all temporary grades must be resolved. All incomplete grades and progress grades, for example, must be changed to final grades.

10.8   Doctoral Minor

The doctoral minor is meant to serve as a supplementary body of work to the major ECE field of study. All ECE Ph.D. students must complete the doctoral minor course requirement. Typical doctoral minor fields for ECE students include, but are not limited to, other Engineering disciplines, Computer Science, Mathematics, Physics, Physiology, and Statistics. The minor is designed to represent a coherent body of work and should not simply involve an after-the-fact ratification of a number of courses.

Students should complete and turn in their Ph.D. course forms (Primary Area, Secondary Area, and Minor forms) at the beginning of the last semester of which they are taking a classroom course required for Ph.D. coursework. All three forms should be submitted together. Forms should be turned into the ECE Graduate Coordinator (Graduate Student Services), who will verify the student's grades and pass the forms to the ECE Graduate Committee for approval. Before submitting the Ph.D. course forms, all temporary grades must be resolved. All incomplete grades and progress grades, for example, must be changed to final grades.

Students have two options to satisfy the doctoral minor requirement: a minor in a single department (Option A) or a distributed minor in two or more departments, including ECE (Option B).

10.8.1 Option A: Single Department

To satisfy Option A, a student must satisfy the minor course requirements as dictated by a single department outside of ECE. It is important to note that some departments may require more than nine credits; many departments require 12 credits. Students should confirm the requirements with the minor department before taking courses. Minor requirements of other departments can be found on the **Graduate GUIDE**.

A cumulative grade point average of at least 3.0 must be achieved for the minor. Courses used to fulfill the minor requirements cannot be used to fulfill other Ph.D. course requirements. Approval of the courses for the Option A minor is certified by the minor department.

10.8.2 Option B: Distributed

To satisfy Option B, a student must earn at least nine credits in two or more departments. One of the departments can be ECE. Three credits in each of the (at least two) option B minor departments must be numbered 700-level or above. Courses used to fulfill the minor requirements cannot be used to fulfill other Ph.D. course requirements. A cumulative grade point average of at least 3.0 must be achieved for the doctoral minor. Approval of the courses for the Option B minor is certified by the ECE Graduate Committee. If the student takes courses in three departments, at least two of the courses must be 700 level or above. Graduate-level courses offered by external department(s) that are designated by the offering department as being equivalent to a 700-level course for the purpose of a PhD minor can be counted as 700 level. The Option B minor form may only be submitted to the student's file after all approved courses are satisfactorily completed.

10.8.3 Doctoral Minor Option A for Non-ECE Students

Ph.D. students from other UW-Madison graduate programs who wish to earn a minor in ECE are required to complete a minimum of nine credits of ECE courses numbered 400-level or above. At least three of these nine credits must be earned in courses numbered 700-level or above. Students must earn a B or better in all courses used for the minor. At most, one course cross-listed with the student's major department may be counted toward the minor requirement, provided the course was taught by an ECE faculty member. Courses used to fulfill the minor requirements cannot be used to fulfill other Ph.D. course requirements. Approval of the courses for the Option A minor of non-ECE students is certified by the ECE Graduate Committee. In order to obtain minor approval from the ECE Department, students must complete the Option A Minor Approval Form, get it signed by their faculty advisor, and turn the form into the ECE Graduate Coordinator (COE Graduate Student Services).

10.9 Research Courses and Independent Studies

Research courses (ECE790, ECE890, and ECE990) are structured research projects that may lead to new knowledge, technology, or invention. The expected outcomes are a Master Thesis, Master Project report, or PhD dissertation. Independent study courses (ECE699, ECE999) provide students opportunities to learn course materials that are not available as a regularly scheduled courses or new topic area to facilitate research activities. The distinction between different course levels are:

Research Courses:

ECE 790: Master's Research or Thesis
- For M.S. Research option students

- For Ph.D. students getting an M.S. along the way to a Ph.D.

ECE 890: Pre-Dissertator's Research
- Only for Ph.D. students who have not yet taken their preliminary examination
- Does not count toward M.S. degree requirements.

ECE 990: Research or Thesis
- Only for dissertators, who are Ph.D. students that have already passed their preliminary examination
- Does not count toward M.S. degree requirements.

Independent Study Courses:
- ECE 699 course content generally corresponds to 500 or 600 level coursework.
- ECE 999 course content generally corresponds to 700 and higher level coursework.

All research and independent study courses must be enrolled individually under the specific Section number of the research advisor/instructor. Research courses and independent study courses are variable-credit courses; students agree upon the number of credits with their research advisor/instructor.

Instructor consent is always required for research courses and independent studies. For research courses, the student may enroll after receiving consent of the research advisor. Non-ECE graduate students wishing to enroll in ECE graduate research or independent study courses must contact ECE Graduate Coordinator or COE Graduate Student Services for permission to do so.

All students require administrative permission to enroll in independent study courses. Please have your instructor email the ECE Graduate Coordinator their confirmation of allowing you to enroll in their Section. After receiving such an email, the ECE Graduate Coordinator will grant the necessary permission in the system for the student to enroll.

10.10 Cooperative Education (CPT) and Internships

Through the **Engineering and Career Services** Co-Op and Summer Internship programs students gain valuable "real world" engineering experiences working with a variety of industries and governmental agencies.

All students in these programs have the opportunity to work full-time, be competitively paid, complete engineering assignments, and work under the supervision of an engineer.

Students participating in a co-op or internship will enroll in ECE 702. ECE 702 can be used toward the Ph.D. degree requirements, but cannot be used to satisfy primary area, secondary area, or minor course requirements (see Sections 10.3 and 10.5 for more information).

Obtaining work experience prior to completing your degree requirements typically increases employment opportunities and starting salaries after graduation.

Any questions regarding Cooperative Education and Internships should be directed to Engineering Career Services. Make sure to mention that you are a graduate student.

10.10.1 Cooperative Education

Co-op students work full-time in an engineering position from January-August or May-December. The co-op provides 26-28 weeks of full-time, paid engineering work experience. Alternating assignments are also an option.

Cooperative education is an academic option as part of your engineering education. Students who participate in co-op complete assignments and receive academic credit toward graduation. While on co-op, students are considered full-time students and are eligible to maintain family or UW health insurance.

The advantage of a co-op over an internship is the increased level of responsibility received due to the longer duration of the work term. Co-ops are able to work on larger and complex projects that require more time to complete.

See instructions on the **CPT Process**.

10.10.2 Internships

The Summer Internship is for students seeking engineering employment during the summer months. For SPML student, a summer internship is possible after completing the second semester of coursework in the program. These 12-14 week, full-time assignments provide students exposure to engineering while enabling the employer to fill short-term project needs.

10.11 Prior Coursework

Students may count prior coursework toward their doctoral degree under the following circumstances:

- **Graduate Work from Other Institutions:** With program approval, students may count graduate coursework from other institutions toward the minimum graduate degree credit requirement and the minimum graduate coursework (50%) requirement. No credits from other institutions may be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison Undergraduate:** With program approval, up to seven credits from UW–Madison numbered 300 or above can be counted toward the minimum graduate degree credit requirement. Up to seven credits of ECE courses numbered 700 or above can be counted toward the minimum graduate coursework (50%) requirement. No credits can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework, please contact the Graduate Student Services Coordinator.
- **ABET-Accredited Institution Undergraduate:** With program approval, students may count up to 7 credits of undergraduate coursework from a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Electrical and Computer Engineering, Electrical Engineering and Computer Science, or Computer Science from an ABET-accredited program at other institutions (not UW–Madison) toward fulfillment of minimum degree requirements. Courses numbered 300 or above may be counted towards the minimum graduate degree credit requirement and courses numbered 700 or above may be counted towards the minimum graduate coursework (50%) requirement. No credits from other institutions can be counted toward the minimum graduate residence credit requirement. To request evaluation of prior coursework from a different institution, please submit a **Graduate Course Equivalency Request Form** to the Graduate Student Services Coordinator.
- **UW–Madison University Special:** With program approval, students are allowed to count up to nine credits of coursework numbered 400 or above taken as a UW–Madison University Special student toward the minimum graduate residence credit requirement, and the minimum graduate degree credit requirement. Courses numbered 700 or above taken as a UW–Madison Special student toward the minimum graduate coursework (50%) requirement.
  - All prior coursework must have been earned with a grade of B or better.
  - Coursework earned five or more years prior to matriculation into a UW-Madison Master's degree program is not allowed to satisfy requirements.
  - Prior coursework from other institutions or from a UW-Madison undergraduate career will not appear on a student's UW-Madison graduate transcript. It will not count toward the student's graduate GPA.

10.12 Grades and GPA

The Graduate School requires that students maintain a graduate grade point average (GPA) of 3.00 (on a 4.00 scale) for all graduate courses (excluding research) to receive a degree.

Courses taken for audit (S/NR), credit/no credit (CR/N), or pass/fail do not affect the GPA. Research courses graded on a Satisfactory/Unsatisfactory (S/U) basis do not impact GPA. However, U grades are monitored by the Graduate School for satisfactory progress. A Permanent Incomplete (PI) grade does not impact the GPA. A No Report (NR) or Incomplete (I) grade does not impact the GPA, but in a graded course this is a temporary grade, indicating the instructor has not yet submitted a final grade.

In order for courses to count toward your doctoral degree, students must satisfy the following grade and GPA requirements:

ECE Courses
- Grades of B or better are always acceptable.
- BC grades are acceptable if the cumulative GPA for graduate ECE classroom courses is equal to or greater than 3.0.
- Grades of C or lower are not acceptable.
- Satisfactory/unsatisfactory (S/U) grades are only acceptable for research and independent study courses (e.g., ECE 790, 890, 990, 699, and 999)

Non-ECE Courses
- Grades of B or better are always acceptable.
- BC and C grades are acceptable if approved by the ECE Graduate Committee.
- Any grade lower than a C is not acceptable.
- Satisfactory/unsatisfactory (S/U) grades are only acceptable for research and independent study courses (e.g., courses that are equivalent to ECE 790, 890, 990, 699, and 999 at other departments)

Research Courses and Independent Study Courses
- S grades are acceptable, while U grades are not.
- If ECE 699 or 999 was letter-graded, only grades of B or better are acceptable.

Incomplete Grades
- If a student is unable to complete coursework by the end of the term, an instructor may enter a temporary grade of I for "incomplete" for that term. The student must resolve the incomplete grade by the end of the following term in which they are enrolled. Please note that instructors may impose an earlier deadline. If the incomplete grade is not resolved by the respective deadline, the student is considered in "bad academic standing" by the Graduate School. Students may be placed on probation or suspended from the Graduate School for failing to complete the work and receive a final grade in a timely fashion. Outstanding incompletes must be resolved before a degree is granted. An unresolved I grade lapses to a grade of PI ("Permanent Incomplete") after five years. Please see the **Graduate School Policy on Incomplete Grades**.

10.13 Department Funding

Please refer to Section 12.0 for more information on department funding and consult with your advisor.

10.14 Doctoral Qualifying Exam

The Ph.D. Qualifying Examination is a general examination that places emphasis on a student's ability to reason, formulate and solve problems, apply basic engineering and analytical skills, and communicate effectively. Special emphasis is placed on the student's area of specialization.

All ECE students intending to pursue a doctoral degree are required to take the Ph.D. Qualifying Examination. Students must complete at least one semester of full-time graduate coursework before taking the examination. Students must take the examination no later than the fourth semester after entering to the ECE graduate

program (summers not included). If a second attempt is required, it must occur no later than the fifth semester after admission. No student is allowed to take the examination more than twice. If a student leaves the department (i.e., to work between M.S. and Ph.D. degrees), the time spent away from study will not count as part of the four semesters. In addition, one extra semester will be allotted for every two semesters the student is away, accumulating to at most four semesters after returning to take the exam for the first time. These rules apply to every graduate student, including those who initially set out to pursue only the M.S. degree. It is the student's responsibility to take the qualifying exam on time. If a student does not take the qualifying exam within the time required, the student may be requested to leave the ECE Ph.D. degree program.

A committee of three ECE professors, selected by the ECE Graduate Committee, will examine each student. Two examiners are chosen from the student's primary area, and one is chosen from one of the remaining specialty areas. When possible, examiners will only serve once on a student's committee.

The ECE Ph.D. Qualifying Examination is given twice a year, during the fall and spring semesters. Only enrolled ECE graduate students may participate in the Ph.D. Qualifying Examination. At the beginning of each semester, an email from the ECE Department will be sent to all enrolled ECE students about the Qualifying Examination. Students are responsible for following the instructions in this email to register properly for the Qualifying Examination.

Because part of the exam will assess communication skills, students who have difficulty conversing in English are advised to take the necessary steps toward improvement in spoken English prior to taking the Qualifying Examination.

The detailed structure of the Ph.D. Qualifying Examination is as follows:
1) Students receive email from the ECE Department about registering for the examination.
2) Upon registration for the examination, the ECE Graduate Committee selects three examiners for each participating student:
    - Two faculty members are chosen from the student's primary area. (Primary areas are listed in Section 11)
    - One faculty member is chosen from outside of the student's primary area.
    - Usually, one committee member will examine all students in a particular area. If there is a large number of students in a particular area taking the examination in a given semester, more than one committee member may be needed to accommodate all the students. In this case, students will be assigned to one of the area's committee members.
3) Students must contact the examiners and arrange convenient times for taking the various parts of the exam. The student is responsible for making the necessary room reservations.
4) The entire examination and all its parts will be held within a two-week period by the ECE Graduate Committee. The examination period is announced at the beginning of each semester.

The goal of the exam is to evaluate the student's ability to read, understand, and critically evaluate scientific literature in their general area, as well as to engage in a scientific discussion. The examination committee will assign a scholarly paper for the student to read and review. This scholarly paper will form the basis for the examination. The student is fully responsible for the content in the paper, which includes relevant references and background source material. In addition to understanding the technical content, the student should be able to answer queries about why the paper is important, how the authors may have decided on their approach, why the result matters, how it compares to related work, and what could be improved.

The format of the examination is as follows:
  - The paper will be assigned at least 10 days prior to the examination.
  - During the oral exam, the student should be prepared to give a 15-minute presentation on the assigned scholarly paper, if presented without interruption. During and/or after the presentation, the committee members will ask questions about various aspects of the paper and related background material.
  - The remainder of the examination will be a question and answer session.

- o The questions should determine the student's competency in the primary area material.
- o The questions may address the student's review of the paper, but are not limited to the paper.
  - The examination committee will also assess the student's communication skills.
    - o Students who have difficulty conversing in English are advised to take the necessary steps toward improvement in spoken English prior to taking the Qualifying Examination.
    - o As the student may be presenting to a mixed audience of experts and non-experts in the field, the presentation should include sufficient high-level overview so that non-experts can understand the importance and basic approach of the work.

Each examination committee member independently grades the examination, turning in a grade of either Excellent, Pass, Marginal, or Fail. Please note that the student will not learn the grades of their exam. Faculty should not inform the student of their grade, and the student should not ask. Examination grades are tabulated for each student at the end of the examination period and are forwarded to the ECE Graduate Committee. The grades become part of the student's case for achieving Advanced Graduate Standing.

10.15 Advanced Graduate Standing

Advanced Graduate Standing is the departmental designation for official permission to pursue a Ph.D. degree in ECE. The ECE Graduate Committee grants AGS.

The process of evaluation for AGS is based on:
1. The student's performance on the Ph.D. Qualifying Examination.
2. The student's performance in graduate courses. Although a cumulative grade point average of 3.3 and 3.25 is the minimum requirement for satisfaction of the primary area and secondary area course requirements respectively, a substantially higher overall GPA in graduate coursework is usually required before AGS is granted.
3. The letter of recommendation from the student's research advisor.

Any additional supporting materials, such as publications, that the student wishes to provide are also welcomed.

Each student is automatically evaluated for AGS after taking the Ph.D. Qualifying Examination. Notification of the outcome of the review is made via email. If a student is turned down after the first AGS review, they are notified of the reasons with an indication of how and to what extent the student's chances of receiving AGS in the future can be improved. Typically, such a student is required to retake the Qualifying Exam. No student is reviewed for AGS more than twice. A student who is turned down for AGS a second time will be requested to leave the ECE Ph.D. program.

10.16 Preliminary Examination

The Preliminary Examination is a detailed examination covering the proposed research leading to the Ph.D. thesis. The purpose of the exam is to ascertain the capability of the student to perform the proposed research and the quality and appropriateness of the project. Upon successful completion of the Preliminary Examination and Ph.D. requirements (except the completion of the dissertation), students are classified as dissertators (see Section 10.17).

Every Ph.D. student is required to pass the Preliminary Examination. Before taking the Preliminary Examination, the student must first achieve Advanced Graduate Standing (AGS) and satisfy the English Competency Requirement. There is no limit to the number of times a student may take the Preliminary Examination. The Preliminary Examination must be taken for the first time no later than three semesters after receipt of Advanced Graduate Standing.

The examination is generally oral and is administered by a committee convened by the student with the approval of the student's research advisor. The committee consists of no less than three members, but

preferably four members, least two of which must be selected from the ECE Department. Some minor departments require that a representative from their department serve on the committee. If a student has an Option A minor in a single other department, the student should check with the minor department to confirm if a minor department committee member is necessary.

At least two months prior to the Preliminary Examination, students are required to turn in their Ph.D. course forms with their advisor's signature to the ECE Graduate Coordinator (Graduate Student Services).

Before a Preliminary Examination Warrant can be requested, a student's Ph.D. course forms must be approved by the ECE Graduate Committee. The ECE Graduate Coordinator will verify the student's grades and pass the forms to the ECE Graduate Committee for approval. Students should complete and turn in their Ph.D. course forms at the beginning of the last semester of which they are taking a classroom course required for Ph.D. coursework. Before submitting the Ph.D. course forms, all temporary grades must be resolved. All incomplete grades and progress grades, for example, must be changed to final grades.

Once a student's Ph.D. course forms have been approved, they may submit the Preliminary Examination Warrant Request form. This form should be submitted at least three weeks prior to the date of the examination.

Students must complete their Final Oral Defense Examination and deposit their dissertation within five years of the date of passing their Preliminary Examination.

10.17 Dissertator Status

As soon as a student has completed and passed all the requirements of the Ph.D. degree, with exception of the completion of the dissertation, a student is classified as a dissertator. Specifically, a student must:
1) have completed 32 graduate credits at UW-Madison;
2) have satisfied the Primary Area course requirements;
3) have satisfied the Secondary Area course requirements;
4) have satisfied the Doctoral Minor course requirements;
5) have satisfied the English Competency Requirement;
6) have satisfied the ECE Seminar Requirement;
7) have passed the Preliminary Examination; and
8) have a cumulative graduate GPA of 3.0.

Dissertator status is achieved by turning in the signed and dated Preliminary Examination Warrant to the ECE Graduate Coordinator (Graduate Student Services) by the dissertator eligibility deadline. Dissertator status is effective at the start of the semester following the completion of all dissertator requirements for the doctoral degree except for the dissertation. Students will receive a confirmation email from the Graduate School once dissertator status is applied to the student's record.

Dissertators must be enrolled in exactly three credits each term, including summer sessions, until the Ph.D. is conferred. Usually, a dissertator enrolls in three credits of ECE 990 in the Section of their research advisor. Enrollment must be maintained every semester, regardless of whether the student is performing research on or off campus.

A dissertator who enrolls for more (or fewer) than 3 credits will be removed from dissertator status for the fall or spring term in which the enrollment is not exactly 3 credits. During the summer, however, an enrolled dissertator may ask their advisor to request an overload of 1-2 additional credits in a short session and still retain dissertator fee status, if the course is related to dissertation research or professional training that is not offered in regular semesters. Please confirm this overload request with the ECE Graduate Coordinator. If a dissertator chooses to pursue a graduate degree or certificate in another area, the dissertator fee status will be discontinued and regular graduate fees will be assessed, with possible consequences as listed below.

The removal of dissertator status may have the following consequences:

- Graduate assistant (TA/PA/RA) salary rates may have to be adjusted to the non-dissertator rate, or percent limitations
- Fees are assessed at the non-dissertator rate
- Full-time status may change to part-time, possibly affecting loan deferral, visa status, etc.

Students considering the removal of their dissertator status should contact the ECE Graduate Coordinator immediately.

10.18 Final Oral Defense Examination

The final oral examination (often called "defense") normally covers a student's dissertation and areas of study. Students may not take the final oral examination until they have satisfied all other requirements for their degree. A Final Oral Defense Examination is required of all Ph.D. students. There is no limit to the number of times a student may take the Final Oral Defense Examination.

Doctoral students have five years from the date of passing their Preliminary Examinations to take their Final Oral Defense Examination and submit their dissertation.

The examination is administered by a committee chosen by the student and their research advisor and approved by the Graduate School. The committee is chaired by the student's research advisor. If the student has multiple advisors, all advisors should be on the committee. The committee must consist of at least four members. At least three members of the committee must be current UW-Madison graduate faculty or former UW-Madison graduate faculty up to one year after resignation or retirement. Two members, at minimum, must be from within the ECE Department. At least one committee member must be from outside of the ECE Department and field. Students must designate at least three members of their committee to be readers of their dissertation. For more information about **Doctoral Committees**.

A student must provide a copy of their Ph.D. thesis to the defense committee members at least two weeks prior to the scheduled defense.

If it is not possible for all committee members to attend the same defense time, students may conduct the defense multiple times. However, it is highly suggested that students never complete their defense one-on-one with a committee member. The student's committee chair should be present at all defense times in order to best support the student. Likewise, students may conduct their defense using teleconference technology such as Skype.

At least three weeks prior to the defense date, students must turn in the Final Oral Defense Examination Warrant Request form to the ECE Graduate Coordinator (Graduate Student Services).

10.19 Graduation Procedures and Checklist

The ECE Graduate Coordinator (Graduate Student Services) will send out an e-mail at the beginning of each term requesting the names of students who plan to graduate as well as with instructions and deadlines for submitting final degree forms and warrant requests. Students must also indicate their plans for graduation during their final semester in their MyUW Student Center.

In students' final semester (graduation term), the following must be completed:

- Must be enrolled in at least three credits during graduation term
- **Apply to Graduate in Student Center**.
- Notify the ECE Graduate Coordinator (Graduate Student Services) of plans to graduate via email (include name, campus ID, degree, faculty advisor's name, and approximate date of defense).
- Thoroughly read the Graduate School's **Guide to Preparing Your Doctoral Dissertation** and complete all the respective tasks.

- Confirm all final grades entered, with exception to the current semester (no incomplete, unreported, or P[rogress] grades
- Schedule and complete a **Pre-check Appointment** with the Graduate School to answer formatting questions, embargo/delayed release questions, and/or questions related to the degree granting process (optional, but highly encouraged)
- Confirm defense time with committee members (Note: defense date and time can change as long as it is within the same semester, but committee members need to stay the same)
- Request Final Oral Defense Examination warrant at least three weeks prior to defense date by turning in the Final Oral Defense Examination Warrant Request form (link) to the ECE Graduate Coordinator (Graduate Student Services)
- Send thesis to committee members at least two weeks prior to defense date
- Pay **Dissertation Deposit Fee**.
- Complete the **Doctoral Exit Surveys**.
- After receiving the warrant from the Graduate School, obtain the necessary signatures, and return it to the ECE Graduate Coordinator (ECE Graduate Student Services) by the degree deadline (electronic copy accepted) as well as upload an electronic copy with your dissertation when depositing it
- Have their Ph.D. committee submit the graduate learning and outcomes report on their behalf. This is done online and should be completed on the day the student defends his/her Ph.D. Usually, the Ph.D. advisor will submit the form in consultation of the other committee members right after the Ph.D. defense is done.
- Deposit dissertation with **Electronic Copy of Warrant** in ProQuest.
- Schedule and complete **Graduate School Final Review** appointment (optional).
- Make sure "diploma" "mailing" address is up to date in Student Center in order to receive diploma
- Review **Diploma Information**.
- Review **Certified Electronic Diploma Information**.
- Review **Official Conferral Dates**.
- Review **Posting of Degrees**.
- If a student needs proof of degree sooner than the degree conferral date, they may request a paper grade change form from the ECE Graduate Coordinator that then needs to be signed by the student's instructor, the ECE Department Chair, and then turned in to the ECE Graduate Coordinator, who will then send it to the Graduate School for processing
- As soon as the degree conferral date has passed, students may request a **Degree Completion Letter** in order to prove their degree prior to receiving their diploma.
- Review **UW Commencement Information** and **College of Engineering Commencement Information**.

10.22 Adding a Major Outside of ECE

Students wishing to add or change to a major (master's or Ph.D.) in another department must submit an application for an Add/Change/Discontinue Program Request in the Grad Portal. It is advisable to check-in with the other department before completing the request, as they may require or suggest additional application materials.

See the Graduate School's **Addition/Change of Program, Plan, or Named Option** policy.

10.23 Getting a Master's Degree Along the Way

Students admitted straight to the ECE Ph.D. degree program may pursue a Master's degree in the ECE department or in another department along the way.

In order to get a Master's degree along the way in ECE, students must satisfy all Research option M.S. degree requirements (see Section 9) and follow through with all the necessary graduation procedures (see Section 9.11). Students getting a Master's degree along the way should apply for M.S. degree graduation immediately after completing all M.S. requirements.

Students who wish to get a Master's degree along the way in a different department should contact the respective department about requirements and procedures. Courses used to fulfill the Ph.D. minor requirement may be used toward a Master's degree in a different department, so long as the ECE Department and the other department agree.

11.0 DOCTORAL PRIMARY AREA COURSE REQUIREMENTS

Ph.D. students must choose one primary area of study. The eight areas within the ECE Department have established the following primary area course requirements for their Ph.D. students:

11.1 Automatic Control Systems

Faculty: Bernard Lesieutre; Laurent Lessard; and William Sethares

Requirements:
- ECE 717, ECE 817, and ECE 821 are required.
- At least six credits chosen from the following courses: ECE 719, ECE 739, ECE 777, ECE 818, ECE 901, or Math 521.
- At least three credits chosen from the following courses: ECE 730 or Math 831.

11.2 Biomedical Engineering

Faculty: John Booske; Susan Hagness; Yu Hen Hu; Hongrui Jiang; Zhenqiang Ma; Paul Milenkovic; Robert Nowak; J. Leon Shohet; Barry Van Veen; and Daniel van der Weide

Requirements:
- At least 12 credits of ECE courses.
  - Only three of these credits are allowed to be at the 600-level or below.
- At least three credits 300-level or above in the biological sciences.
  - Courses that are cross-listed with ECE are not eligible to satisfy the biological sciences requirement.
  - Examples of suitable biological sciences courses include Anat&Phy 335 Physiology, Neuroscience 524, BME/CBE 510 Introduction to Tissue Engineering, BME/CBE 520 Stem Cell Bioengineering, Zoology/Psych 523 Neurobiology, Zoology 570 Cell Biology, and Biochem 501 Introduction to Biochemistry.
- A student's specific course plan must be approved by a committee of three ECE faculty members from the Biomedical Engineering area, which may include the advisor. Confirmation emails should be printed and turned in with the ECE Primary Area Course Requirements Form to the ECE Graduate Coordinator.

11.3 Communications, Machine Learning, and Signal Processing

(Includes optimization, image processing, information theory, coding theory, detection, estimation, and networks)

Faculty: Nigel Boston; John Gubner; Yu Hen Hu; Varun Jog; Laurent Lessard; Paul Milenkovic; Robert Nowak; Dimitris Papailiopoulos; William Sethares; and Barry Van Veen

Requirements:
- Math 521.
- At least nine credits chosen from the following courses: ECE 729, ECE 730, ECE 734, ECE 735, ECE 736, ECE 738, ECE 761, ECE 830, or ECE 861. ECE 901 can count toward the nine-credit requirement with advisor approval.

11.4 Computer Engineering

Faculty: Azadeh Davoodi; Kassem Fawaz; Yu Hen Hu; Younghyun Kim; Bhuvana Krishnaswamy; Jing Li; Mikko Lipasti; and Parmesh Ramanathan; Joshua San Miguel.

Requirements:
- ECE 552 is required.
- It is required to take ECE 453 or ECE454 or ECE 554.
- At least 12 credits chosen from the following courses: ECE 537, ECE 551, ECE 553, ECE 555, ECE 556, ECE 707, ECE 750, ECE 751, ECE 752, ECE 753, ECE 755, ECE 756, ECE 757, ECE 901, or ECE 902. At least six of the twelve credits must be 700-level or above.

11.5 Electromagnetic Fields and Waves

Faculty: David Anderson, Nader Behdad, John Booske, Susan Hagness, William Hitchon; Mikhail Kats; J. Leon Shohet; Daniel van der Weide; and Amy Wendt.

Requirements:
- At least 12 credits chosen from the following courses: ECE 545, ECE 547, ECE 740, ECE 742, ECE 744, ECE748, ECE 749, ECE 841, ECE 848, or ECE 901.
  - ECE 740 is considered to be the core course for this area and is strongly recommended for students to take.
  - No more than two semesters of ECE 901 can be used to fulfill this requirement.

11.6 Energy and Power Systems

Faculty: Thomas Jahns; Bernard Lesieutre; Daniel Ludois; Line Roald; Bulent Sarlioglu; Eric Severson; Giri Venkataramanan

Requirements:
- ECE 411, ECE 412, and ECE 427 are required. If a student has taken equivalent courses in their undergraduate or previous graduate coursework, the student's faculty advisor should email the ECE Graduate Coordinator exempting the student from taking the respective courses at UW-Madison. This email confirmation will be printed and put into the student's Student Services file. If a UW-Madison undergraduate student took the courses here, no action is required; the student's undergraduate UW-Madison transcript will simply be referenced.
- At least 12 credits chosen from the following courses: ECE 504, ECE 511, ECE 512, ECE 711, ECE 712, ECE 713, ECE 714, ECE 723, or ECE 731.
  - At least nine of these credits must be 700-level or above.
  - Note: ECE 512 is not regularly scheduled.
- Students with strong interdisciplinary interests (e.g., control, reliability, materials, optimization techniques, numerical methods, electromagnetics, energy policy, thermal issues, electric transportation, or wind energy) may take up to six credits in a related area with their faculty advisor's approval.
- A student's course plan must be discussed with and approved by their faculty advisor.

11.7 Plasmas and Controlled Fusion

Faculty: David Anderson; William Hitchon; J. Leon Shohet; and Amy Wendt

Requirements:
- ECE 525 is required.
- At least three credits chosen from the following courses: NEEP 526, ECE 527, or ECE 528.
- At least three credits chosen from the following courses: ECE 724, ECE 725, ECE726, ECE 748, ECE 848, or ECE 908.

11.8   Solid State Electronics and Photonics

Faculty: Dan Botez; William Hitchon; Hongrui Jiang; Mikhail Kats; Irena Knezevic; Zhenqiang Ma; Luke Mawst; J. Leon Shohet; Daniel van der Weide; and Zongfu Yu

Requirements:
- At least 12 credits selected from the following list: ECE 434, 445, 466, 536, 541, 542, 544, 548, 549, 601, 602, 741, 743, 745, 746, 845, or 901. Of these, at least three credits must be earned in courses level 400-602, and at least six credits must be earned in courses above 700 level.

12.0   FUNDING AND FINANCIAL INFORMATION

Students in the Professional, Signal Processing and Machine Learning, and Online Power Engineering options for the M.S.E.E. degree are not eligible for departmental financial support.

The ECE Department awards a limited number of fellowships, research assistantships, teaching assistantships, and grader positions to graduate students in the Research option M.S.E.E. and Ph.D. degree programs. Research assistantship appointments are determined by individual faculty. Students are encouraged to contact faculty for information about available research assistantships. The **ECE TA portal** is used to apply for teaching assistantships and grader positions. Fellowship decisions are made by the Graduate Fellowship, Admissions, and Recruiting Committee. The procedure to apply for fellowship applications varies; some require nomination by a faculty member while others may involve open applications.

All Research option M.S.E.E. and Ph.D. degree program students are evaluated for financial support at the time of admission. Funding is limited and M.S.E.E. degree program students should be prepared to pay for the cost of their education.

13.0   INFORMATION FOR INTERNATIONAL STUDENTS

13.1   International Student Services (ISS)

International Student Services (ISS) is the main resource on campus for international students and has advisors who can assist students with visa, social, and employment issues. Utilize their walk-in advising hours or schedule an appointment with an International Student Advisor.

13.2   Student Visas

Graduate School Admissions issues the federal I-20 form for initial F-1 visa procurement. The initial J-1 visa document (DS-2019) is handled by ISS. In order to issue an I-20, the Graduate School will request proof of adequate financial resources to cover expenses for the duration of a student's studies at UW-Madison. If a student is funded by an appointment, this may completely or partially serve as financial proof. After a student is enrolled, all visa, I-20/DS-2019, and other immigration documents and matters are handled by ISS.

13.3   Information for New International Students

New international students must meet additional requirements before and after arriving on campus. Please see Section 5 for more information.

13.4   Funding for International Students

International students most often need to prove adequate financial resources for immigration purposes during the admissions process. For more information regarding the proof of funding requirement, please review **Requirements for Admission** and **International Applicant Financial Information**.

13.5   ESLAT and ESL Requirements

According to ECE policy, all international students who are non-native speakers of English must take the ESLAT (English as a Second Language Assessment Test) immediately upon arriving on campus, unless qualifying for an exemption as stated below. Regardless of your TOEFL/IELTS score or whether or not you took it, all international students who are non-native speakers of English must take the ESLAT. Only the exemptions listed below will be considered. Please note that ECE's policy is stricter than the Graduate School's policy. Although the Graduate School does not require it for everyone, ECE does. Students must take the ESLAT upon arriving on campus before the start of the semester. In order to remain in the program, it is critical that students follow ECE's ESLAT policy.

More information can be found about the **ESLAT Placement** and **ESLAT Testing Information**.

An international student who is a non-native speaker of English is exempt from taking the ESLAT if one of the following applies to them:
- English is the exclusive language of instruction at the undergraduate institution (verification from ECE Graduate Coordinator required);
- the student earned a degree from a regionally accredited U.S. college or university not more than 5 years prior to start term; or
- the student has completed at least two full-time semesters of graded coursework, excluding ESL courses, at a U.S. college or university, or at an institution outside the U.S. where English is the exclusive language of instruction, not more than five years prior to the start term (verification from ECE Graduate Coordinator required.

A student's ESLAT score will not affect their status in the program. However, based on ESLAT performance, specific ESL courses may be recommended. These courses must be taken and passed within 12 months of the ESLAT. If the recommended courses are not taken and passed within a year, the student will not be permitted to enroll in courses for their third semester in the graduate program. The recommended ESL courses are a requirement for graduation according to ECE policy.

13.6   SPEAK Test

UW System policy requires that non-native English speakers demonstrate proficiency in spoken English before they are assigned classroom duties as teaching assistants. Non-native speakers of English may be required to take the SPEAK Test before being able to work as a TA. This requirement is not intended to be punitive, but rather is necessary to ensure that both TA's and students are a part of a successful, positive learning experience.

Different departments have different requirements regarding the SPEAK Test requirement. If a student has a TA appointment in a department other than ECE, the student should confirm the SPEAK Test requirement of the other department.

ECE requires all non-native speakers of English to take the SPEAK Test unless they are exempt for one of the following reasons:
- they scored a 26/30 or higher on the speaking Section of the iBt TOEFL test;
- they scored an 8.0 or higher on the speaking Section of IELTS; or
- they were exempt from taking the ESLAT per ECE policy.

Students are only allowed to take the SPEAK Test once in a three-month period. The SPEAK test has several **Test Dates** throughout every semester.

Students with a TA appointment, or expected appointment, in ECE need to register for the SPEAK test by following the link on the **ECE TA Portal**.

Students with TA appointments in a different department should inquire with the other department about how to register for the **SPEAK Test**.

13.7   Change of Education Level and Other ISS Forms

It is critically important that international students keep ISS updated with their student status. If a student changes their education level, qualifies and would like to apply for Reduced Course Load, or has another immigration notification, the student must fill out the appropriate forms and paperwork with ISS. The ECE Graduate Coordinator can assist in filling out ISS forms as necessary.

14.0 COURSE ENROLLMENT

All students using University facilities must be enrolled in university credits according to Graduate School regulations. **Students must be enrolled during the semester in which they graduate.**

The Graduate School enforces **Enrollment Requirements** and restrictions for students with Teaching and Research Assistantships and Fellowships.

Please note that summer enrollment requirements are different than Fall and Spring rules.

International students have strict enrollment requirements and should consult with an advisor from **International Student Services Office** with questions about their visa regulations.

15.0 PROFESSIONAL DEVELOPMENT AND CAREER PLANNING

There are a wide range of professional development and career planning resources offered through the Graduate School Office of Professional Development, collaborators across campus, and in conjunction with national organizations.

15.1   Skill Identification, Development, and Planning

DiscoverPD is a competencies framework and planning tool built by the Graduate School for UW–Madison master's and doctoral students. Features include a skills self-assessment and activity tracker, customized reports and recommendations, and a database of 400+ in-person and online opportunities. DiscoverPD helps students identify and articulate transferable skills, and provides scaffolding and recommendations for planning professional development. Login to the tool at **my.grad.wisc.eu/DiscoverPD** and watch a 3-minute overview at **youtu.be/jz1KoblmaBk**.

15.2   Individual Development Plan

myIDP is a long-standing career planning tool tailored to meet the needs of PhD students and postdocs in the STEM disciplines. Features include exercises to examine skills, interests, and values; twenty scientific career paths matched to users' skills and interests; a tool for setting strategic goals, with optional reminders; and career exploration articles and resources.

15.3   Development of Faculty and Future Faculty

Key campus partners have teamed up to coordinate and cross-promote robust support for graduate students preparing to enter the tenure track. Sponsors include: the Center for the Integration of Research, Teaching and Learning; the Delta Program in Research, Teaching and Learning; the Graduate School Office of Professional Development; the Office of Postdoctoral Studies; the Writing Center; and the UW-Madison Postdoctoral Association. See the **For Future Faculty Series**.

UW–Madison has an institutional membership to the **National Center for Faculty Development and Diversity**(NCFDD), an independent organization that provides professional development, training, and a mentoring community to graduate students, postdocs, and faculty members. The site offers advice on developing a daily writing practice, dealing with stress and rejection, navigating department politics, and much

more. **Activate your individual account** through the UW–Madison institutional membership, sponsored by the Division of Diversity, Equity and Educational Achievement, to take advantage of these resources at no cost to you.

15.4 Non-Academic Careers

The Versatile PhD is a web-based resource and online community for exploring non-academic careers. The UW–Madison Graduate School Office of Professional Development and the Office of Postdoctoral Studies purchase an institutional membership, which means that current students, faculty, staff and alumni get access to the high-quality PhD Career Finder on the Versatile PhD site. Access the tool through our **Institutional Membership**.

15.5 Job Searches

Engineering Career Services coordinates co-op and internship opportunities, career fairs, interviews, and provides job search advice. The university uses Handshake to identify employment openings. Over 2,700 job postings are currently tagged as relevant to master's degree holders and 1,200 to doctoral. You may login and explore **Handshake**.

16.0   OPPORTUNITIES FOR STUDENT INVOLVMENT

The ECE Department Graduate Student Association GSA is a student-run group engaging in social and service activities. You may connect with the GSA through their **Facebook** page.

The College of Engineering has more than fifty **Student Organizations** that span a wide range of activities and interests.

17.0 STUDENT HEALTH AND WELLNESS

17.1   Health and Wellness at UW-Madison

Maintaining good health, physically and emotionally, is extremely important in order to succeed as a student. Our campus provides a wealth of resources to support students, including through University Health Resources, other bodies on campus, and the ECE Department.

17.2   University Health Services (UHS)

Students who pay segregated fees are eligible for **University Health Services**. There is no charge to students for many basic services, including counseling sessions, because services are paid through tuition and fees. Personal health and wellness services are also available in addition to medical services.

UHS provides many resources specifically for graduate students and engineering students, including targeted **Group Counseling** and **Let's Talk** sessions. Let's Talk is an opportunity for students to have walk-in, anonymous counseling.

It is strongly encouraged that students review the UHS website early in their first semester to ensure they are aware of all UHS has to offer.

17.3   UWell

UW-Madison has a holistic resource for all things wellness called **UWell**. The site includes information and opportunities for wellness in all dimensions of life: physical, emotional, school/work, spiritual, social/cultural, financial, and environmental.

Again, it is highly encouraged that graduate students review the resource early in their career, setting themselves up for success.

17.4 Securing Health Insurance Coverage

Graduate students who hold an appointment as an assistant of 33.33% or more or who have a fellowship may be eligible for health insurance and other benefits beyond University Health Services. Contact the ECE Payroll and Benefits Specialist to select one of several health care plans within 30 days of your hire date. Students may also be interested in waiving SHIP as described below.

Graduate students without an assistantship or fellowship who are currently enrolled can use the services of University Health Services (UHS), the campus health clinic. Many services are provided at no extra cost, including outpatient medical care during regular business hours, Monday through Friday. **UHS** is located in the Student Services Tower at 333 East Campus Mall, 608-265-5000.

Prescription medications, emergency room visits, and hospitalization are not included in UHS benefits. Therefore, supplemental insurance covering these drugs and services is recommended for all students and is required for international students. The UHS Student Health Insurance Plan (SHIP) is an excellent option for many students. Contact the SHIP office at 608-265-5600 for more information.

17.5 Disability Information

Students with disabilities, physical, learning, or other, have access to disability resources through UW-Madison's McBurney Disability Resource Center. As an admitted student, you should first go through the steps to **Apply for Accommodations**.

Additional [non-academic] disability campus resources (not found through the McBurney Center) can be found at:
- **Transportation**
- **Housing**
- **Personal Care**
- **Policies and Grievances**
- **Campus Accessibility Resources**

17.6 Mental Health Resources On and Off Campus

University Health Services (UHS) is the primary mental health provider for students on campus. UHS Counseling and Consultation Services offers a wide range of services to the diverse student population of UW-Madison. They offer immediate crisis counseling, same day appointments, and ongoing treatment, as well as Let's Talk sessions and group counseling. UHS service costs are covered for students through tuition and fees.

Also, there are many mental health resources throughout the Madison community, but UHS Counseling and Consultation Services is the best resource for referrals to off-campus providers. Call 608-265-5600 for assistance in finding an off-campus provider.

18.0 ACADEMIC EXCEPTION PETITION

Academic exceptions are considered on an individual case by case basis and do not constitute a precedent. Deviations from normal progress are highly discouraged, but the program recognizes that there are in some cases extenuating academic and personal circumstances that may warrant exceptions to established policy. Petitions for course exceptions/substitutions or exceptions to the Satisfactory Progress Expectations (academic or conduct) shall be directed to the ECE Graduate Committee. The following procedures apply to all petitions:

1. The specific requirement/rule/expectation pertinent to the petition must be identified.

2. The student's academic advisor must provide written support for the petition.

3. All coursework substitutions and equivalencies will be decided by the Graduate Committee.

More generally, the ECE Graduate Committee, in consultation with the student's advisor, may grant extensions to normal progress requirements for students who face circumstances as noted in university regulations. This includes childbirth, adoption, significant responsibilities with respect to elder or dependent care obligations, disability or chronic illness, or circumstances beyond one's personal control. Where warranted, the petition should provide good evidence of plans and ability to return to conformance with the standard and to acceptably complete the program. The normal extension will be one semester; anything beyond this will be granted only in the event of highly extraordinary circumstances. Extensions will be granted formally with a note of explanation to be placed in the student's file.

Exceptions to the policies described in this handbook may be made by the ECE Graduate Committee under unusual circumstances. A student wishing to petition for an exception must first consult their faculty advisor and then contact the ECE Graduate Student Coordinator with written request including the rationale for granting an exception. The exception request will be forwarded to the appropriate program coordinator and graduate committee for adjudication. Petitions for exceptions to clearly-defined program rules are rarely approved by the Graduate Committee.

19.0 SATISFACTORY PROGRESS – ACADEMIC EXPECTATIONS

Continuation in the Graduate School and ECE is at the discretion of a student's program and the Graduate School. Permission for an M.S. or Ph.D. student in ECE to continue in the Graduate School and ECE is contingent upon progress toward a degree at a rate that is satisfactory to the Department of ECE and the Graduate School. These requirements apply to all graduate students, with or without appointments. Part-time students may make progress at a slower rate; their rate of progress is evaluated on a case-by-case basis.

The Graduate School requires that students maintain a minimum graduate GPA of 3.00 across all courses taken as a graduate student (excluding research, audit, credit/no credit, and pass/fail courses), unless probationary admission conditions require higher grades. The Graduate School also considers Incomplete (I) grades to be unsatisfactory if they are not removed during the subsequent semester of enrollment; however, the instructor may impose an earlier deadline.

The following plan summarizes the minimum satisfactory academic progress for a graduate student entering with only a B.S. degree and pursuing both an M.S. and a Ph.D. (The plan is adapted for students either entering with an M.S. or for those that are pursuing only an M.S.) These guidelines should not be interpreted as a schedule of class for the average student; most students find it practical and desirable to progress more rapidly than is outlined here.

1st Calendar Year of Study (12 consecutive months):
- Complete the ECE Seminar requirements.
- Take any ESL courses recommended per the ESLAT.
- Complete 18 credits of advisor-approved graduate courses with acceptable grades.

2nd Calendar Year of Study:
- Complete 18 graduate credits with acceptable grades.
- Complete the M.S. degree.
- Take the Ph.D. Qualifying Exam.
- Achieve Advanced Graduate Standing.

3rd Calendar Year of Study:
- Complete 18 graduate credits with acceptable grades.
- Satisfy the ECE Ph.D. primary area and secondary area course requirements.

4th Calendar Year of Study:
- Complete 18 graduate credits with acceptable grades.
- Satisfy the Ph.D. minor requirement.

- Take Preliminary Examination.

Additional Study:
- Enroll as a dissertator for exactly three graduate credits each term and continue Ph.D. thesis research.
  - Each semester, the ECE Graduate Committee reviews the progress of all Ph.D. students who have not completed their degree requirements after five years of study. Permission to continue in the Graduate School may be denied if the ECE Graduate Committee determines that it is unlikely that the student can finish the Ph.D. degree in a reasonable period of additional study.

A student may be placed on probation or suspended from the Graduate School for low grades, for failing to resolve incompletes in a timely fashion, or for failing to meet satisfactory academic progress requirements as outlined above. The ECE Graduate Committee may permit departures from this schedule upon recommendation from the student's faculty advisor. In special cases the Graduate School and ECE can permit students who do not meet these minimum standards to continue on probation upon recommendation and support of their faculty advisor.

20.0 SATISFACTORY PROGRESS – CONDUCT EXPECTATIONS

The ECE Department, the Graduate School, and the Division of Student Life all uphold the UW-System policies and procedures in place for academic and non-academic misconduct. Unprofessional behavior toward clients/subjects, faculty, staff, peers, and public are significant issues in the evaluation and promotion of students. In turn, we hold expectations for the highest level of academic integrity and expect professional, ethical, and respectful conduct in all interactions. In addition, graduate students are held to the same standards of responsible conduct of research as faculty and staff.

Students may be disciplined or dismissed from the graduate program for misconduct or disregard for professional, academic, non-academic, or research conduct expectations regardless of their academic standing in the program. Separate and apart from a violation of conduct, a student may face University disciplinary action with regard to the same action. Students are responsible for reading the information here as well as the information published on all the relevant websites. Lack of knowledge of this information does not excuse any infraction.

20.1 Professional Conduct

All students are expected to adhere to the highest standards of professional behavior and ethics. Students should avoid even an appearance of improper behavior or lack of ethical standards while in Graduate School at UW-Madison, in all professional settings, and in their personal lives. Students should conduct themselves according to the standards expected of members of the profession to which the student aspires. Concerns about infractions of Professional Conduct may be effectively handled informally between the instructor/advisor and the student. If a resolution is not achieved, a graduate program representative may be included in the discussion. Separate and apart from a violation of Professional Conduct, a student may face University disciplinary action with regard to the same action. Students are responsible for reading the information here as well as the information published on all the relevant websites. Lack of knowledge of this information does not excuse any infraction.
- Professional Ethics: Students shall show respect for a diversity of opinions, perspectives and cultures; accurately represent their work and acknowledge the contributions of others; participate in and commit to related opportunities; aim to gain knowledge and contribute to the knowledge base of others; understand the UW Student Code of Conduct; represent their profession and the program; strive to incorporate and practice disciplinary ideals in their daily lives; and create resumes/CVs with accurate information.
- Honesty and Integrity: Students shall demonstrate honesty and integrity as shown by their challenging of themselves in academic pursuits; honesty and ethics in research and IRB applications—including honesty in interpretation of data, commitment to an unbiased interpretation of academic and professional endeavors;

and the need to document research activities, protect subject/client confidentiality and HIPPA regulations. Students shall follow-through and pull their weight in group activities and understand where collaboration among students is or is not allowed; not plagiarize others or pass work (self-plagiarism), cheat, or purposefully undermine the work of others; and avoid conflicts of interest for the duration of their time in the program. As a professional, honesty and integrity also extend to personal behavior in life outside of the academic setting by realizing that students are representatives of the program, UW-Madison, and the profession as a whole.

- Interpersonal and Workplace Relationships: Students shall interact with peers, faculty, staff and those they encounter in their professional capacity in a manner that is respectful, considerate, and professional. This includes, but is not limited to, attending all scheduled meetings, honoring agreed upon work schedules, being on-time and prepared for work/meetings, contributing collaboratively to the team, keeping the lines of communication open, offering prompt response to inquiries, and employing respectful use of available equipment/technology/resources. Chronic or unexplained absences are unprofessional in the workplace and could be grounds for termination or removal of funding. To facilitate the free and open exchange of ideas, any criticism shall be offered in a constructive manner, and the right of others to hold different opinions shall be respected.

- Commitment to Learning: Students are expected to meet their educational responsibilities at all times. Students should always come to class ready to actively participate and for questions and answers. It is the responsibility of the student to be on time for every class and always show courtesy during class or if leaving class early. If possible, students should notify the instructor at least one day in advance of a planned absence. Students who are unable to attend class are responsible for finding out what occurred that day and should not expect instructors to give them individual instruction. Recognizing that the pursuit of knowledge is a continuous process, students shall show commitment to learning by persevering despite adversity and seeking guidance in order to adapt to change. Students shall strive for academic excellence and pursue and incorporate all critique, both positive and negative, in the acquisition of knowledge in order to understand and respect the community in which they work.

- Professional Appearance: Students shall convey a positive, professional appearance in order to represent the program in a dignified manner. Appearance includes a person's dress, hygiene, and appropriate etiquette/protocols for the environment (including safety protocols and protective clothing in environments that require them).

20.2   Academic Misconduct

Academic misconduct is an act in which a student (UWS 14.03(1)):
- seeks to claim credit for the work or efforts of another without authorization or citation;
- uses unauthorized materials or fabricated data in any academic exercise;
- forges or falsifies academic documents or records;
- intentionally impedes or damages the academic work of others;
- engages in conduct aimed at making false representation of a student's academic performance; or
- assists other students in any of these acts.

Examples of academic misconduct include, but are not limited to:
- cutting and pasting text from the Web without quotation marks or proper citation;
- paraphrasing from the Web without crediting the source;
- using notes or a programmable calculator in an exam when such use is not allowed;
- using another person's ideas, words, or research and presenting it as one's own by not properly crediting the originator;
- stealing examinations or course materials;
- changing or creating data in a lab experiment;
- altering a transcript;

- signing another person's name to an attendance sheet;
- hiding a book knowing that another student needs it to prepare for an assignment;
- collaboration that is contrary to the stated rules of the course; or
- tampering with a lab experiment or computer program of another student.

Additional information regarding Academic Misconduct can be found at the various links:
- Graduate School Policy & Procedure: **Misconduct, Academic**.
- Dean of Students Office: Information for Students: Why should I know about academic misconduct? How do I avoid academic misconduct? What happens if I engage in academic misconduct? What should I do if I know a classmate is cheating? Review **Academic Integrity for Students** (near bottom) and Dean of Students Office: **Academic Misconduct Flowchart**.
- University of Wisconsin System: Chapter UWS 14: **Student Academic Disciplinary Procedures**

20.3   Non-Academic Misconduct

The university may discipline a student in non-academic matters in the following situations:
- for conduct which constitutes a serious danger to the personal safety of a member of the university community or guest;
- for stalking or harassment;
- for conduct that seriously damages or destroys university property or attempts to damage or destroy university property, or the property of a member of the university community or guest;
- for conduct that obstructs or seriously impairs university-run or university-authorized activities, or that interferes with or impedes the ability of a member of the university community, or guest, to participate in university-run or university-authorized activities;
- for unauthorized possession of university property or property of another member of the university community or guest;
- for acts which violate the provisions of UWS 18, Conduct on University Lands;
- for knowingly making a false statement to any university employee or agent on a university-related matter, or for refusing to identify oneself to such employee or agent;
- for violating a standard of conduct, or other requirement or restriction imposed in connection with disciplinary action.

Examples of non-academic misconduct include, but are not limited to:
- engaging in conduct that is a crime involving danger to property or persons, as defined in UWS 18.06(22)(d);
- attacking or otherwise physically abusing, threatening to physically injure, or physically intimidating a member of the university community or a guest;
- attacking or throwing rocks or other dangerous objects at law enforcement personnel, or inciting others to do so;
- selling or delivering a controlled substance, as defined in 161 Wis. Stats., or possessing a controlled substance with intent to sell or deliver;
- removing, tampering with, or otherwise rendering useless university equipment or property intended for use in preserving or protecting the safety of members of the university community, such as fire alarms, fire extinguisher, fire exit signs, first aid equipment, or emergency telephones; or obstructing fire escape routes;
- preventing or blocking physical entry to or exit from a university building, corridor, or room;
- engaging in shouted interruptions, whistling, or similar means of interfering with a classroom presentation or a university-sponsored speech or program;
- obstructing a university officer or employee engaged in the lawful performance of duties;
- obstructing or interfering with a student engaged in attending classes or participating in university-run or university-authorized activities;
- knowingly disrupting access to university computing resources or misusing university computing resources.

Additional information regarding Non-Academic Misconduct can be found at the various links:
- Graduate School Academic Policies & Procedures: **Misconduct, Non-Academic**
- Dean of Students Office: **Non-Academic Misconduct Standards Statement**
- Dean of Students Office: **Non-Academic Misconduct Process**
- University of Wisconsin System: Chapter UWS 17: **Student Non-Academic Disciplinary Procedures**
- University of Wisconsin System: Chapter UWS 18: **Conduct on University Lands**

20.4   Research Misconduct

Much of graduate education is carried out not in classrooms, but in laboratories and other research venues, often supported by federal or other external funding sources. Indeed, it is often difficult to distinguish between academic misconduct and cases of research misconduct. Graduate students are held to the same standards of responsible conduct of research as faculty and staff. The Graduate School is responsible for investigating allegations of research misconduct. This is often done in consultation with the Division of Student Life as well as with federal and state agencies to monitor, investigate, determine sanctions, and train about the responsible conduct of research. For more information, contact the Associate Vice Chancellor for Research Policy, 333 Bascom Hall, (608) 262-1044.

Please see Section on "Grievance Procedures and Misconduct Reporting" for further information on reporting research misconduct of others.

Additional information regarding Research Misconduct can be found at the various links:
- Graduate School Policies & Procedures: **Responsible Conduct of Research**
- Office of the Vice Chancellor for Research and Graduate Education's - Office of Research Policy: **Introduction & Guide to Resources on Research Ethics**
- Office of the Vice Chancellor for Research and Graduate Education's Office of Research Policy: Policies, Responsibilities, and Procedures: **Reporting Misconduct**
- Office of the Vice Chancellor for Research and Graduate Education's Office of Research Policy: Policies, Responsibilities, and Procedures: **Responsible Conduct of Research Resources**

21.0   DISCIPLINARY ACTION AND DISMISSAL

Failure to meet the program's academic or conduct expectations can result in disciplinary action including immediate dismissal from the program. If a student is not making satisfactory progress in regards to academic or conduct expectations, the advisor will consult with the Graduate Committee to determine if disciplinary action or dismissal is recommended.

The status of a student can be one of three options:
- Good standing (progressing according to standards; any funding guarantee remains in place).
- Probation (not progressing according to standards but permitted to enroll; loss of funding guarantee; specific plan with dates and deadlines in place in regard to removal of probationary status.)
- Unsatisfactory progress (not progressing according to standards; not permitted to enroll, dismissal, leave of absence or change of advisor or program).

21.1   Probation

Students with marginal or questionable undergraduate records are sometimes admitted on probation. Students placed on **probation** will be placed on probation for one semester and will be reviewed by the Graduate Committee following the probationary semester. Students placed on probation may be dismissed or allowed to continue based upon review of progress during the probationary semester.

A student is placed on probation at the end of any semester or summer session in which his or her **graduate cumulative grade point average** falls below 3.0. Removal from probation takes place when the cumulative grade

point average becomes 3.0 or better. While on probation, a Ph.D. student is not eligible to take the Preliminary Examination or the Final Oral Examination. Unusual situations can be handled by appeal to the Graduate Committee Chair. Any student while on probation must earn a grade point average of 3.0 or better every semester or summer session. The Graduate Committee will recommend to the Graduate School that any student who is on probation and obtains a grade point average of less than 3.0 during a semester or summer be dropped from the Graduate School.

ECE 790 or 890 is not considered for the purpose of academic probation determination. ECE 699 or 999 (Advanced Independent Study) is considered for probation determination only if a grade of BC or lower is attained in that course. Audit courses or pass/fail courses may not be used to satisfy the full load requirement of probationary students. Students cannot graduate while on probation.

21.2 Discipline and Dismissal

Any graduate student who fails to meet the program's expectations during two consecutive semesters (not including summer) will be dismissed from the program at the end of the subsequent semester. Any student who fails to meet the program's expectations because of failure to pass any required exams and procedures within designated time limits will be dismissed from the program at the end of the subsequent semester.

Students may be disciplined or dismissed from the graduate program for any type of misconduct (academic, non-academic, professional, or research) or failure to meet program expectations regardless of their academic standing in the program. Separate and apart from a violation of Professional Conduct, a student may face University disciplinary action with regard to the same action. Concerns about infractions of the Professional Conduct may be effectively handled informally between the student and the advisor/faculty member. However, if a resolution is not achieved, the issue may be advanced for further review by the program.

Discipline may include one or more of the following actions:
- Written reprimand
- Denial of specified privilege(s)
- Imposition of reasonable terms and conditions on continued student status
- Removal of funding
- Probation
- Restitution
- Removal of the student from the course(s) in progress
- Failure to promote
- Withdrawal of an offer of admission
- Placement on Leave of Absence for a determined amount of time
- Suspension from the program for up to one year with the stipulation that remedial activities may be prescribed as a condition of later readmission. Students who meet the readmission condition must apply for readmission and the student will be admitted only on a space available basis. See the Graduate School Academic Policies & Procedures: **Readmission to Graduate School**.
- Suspension from the program. The suspensions may range from one semester to four years.
- Dismissal from the program
- Denial of a degree

Depending on the type and nature of the misconduct, the Division of Student Life may also have grounds to do one or more of the following:
- Reprimand
- Probation
- Suspension
- Expulsion
- Restitution

- A zero or failing grade on an assignment on an assignment/exam
- A lower grade or failure in the course
- Removal from course
- Enrollment restrictions in a course/program
- Conditions/terms of continuing as a student

22.0 IMPORTANT POLICIES

22.1   Sexual Harassment and Assault

Sexual harassment is a community concern. When sexual harassment occurs, it degrades the quality of work and education at the University of Wisconsin-Madison. It erodes the dignity and productivity of the individuals involved and diminishes the quality, effectiveness, and stature of the institution. It can occur in any university setting (an office, a classroom, a university program). Each of us has a collective responsibility not to harass others and to act responsibly when confronted by the issue of sexual harassment, thereby promoting an environment that better supports excellence in teaching, research, and service.

What is Sexual Harassment?

Unwelcome sexual advances, requests for sexual favors, and verbal or physical conduct of a sexual nature constitute sexual harassment when: submission to such conduct is a condition of employment, academic progress, or participation in a university program; submission to or rejection of such conduct influences employment, academic, or university program decisions; the conduct interferes with an employee's work or a student's academic career; or when it creates an intimidating, hostile, or offensive work, learning, or program environment.

Key Points about Sexual Harassment:
- Differences in power or status can be a significant component in sexual harassment. A person who seems to acquiesce to sexual conduct may still experience tangible action harassment or hostile environment harassment if the conduct is unwelcome.
- Harassment can occur between men and women or between members of the same gender.
- Sexual harassment may or may not involve a tangible injury (e.g., economic loss, lowered grades). A sexually harassing environment, in and of itself, may constitute a harm.
- Individuals in positions of authority are responsible for ensuring that employees, students, and others do not harass. In an academic or program setting, offenders can be faculty, instructors, lecturers, teaching assistants, coaches, tutors, or fellow students or program participants.
- The person filing a sexual harassment charge does not have to be the person harassed but could be anyone significantly harmed by the harassing conduct.
- Some behavior that is not in violation of university policy may, nonetheless, be unprofessional under the circumstances. Consequences of such unprofessional behavior may include poor performance evaluations or possible discipline.

What to do if you feel you've been sexually harassed:
- Seek advice. Consult your department chair, another divisional resource person, the **Office of Equity and Diversity**, or another campus resource to discuss options for resolution.
- You may choose to seek informal resolution or file a **Sexual Harassment Complaint**.

For more information and other resources on discrimination against students: **Discrimination Complaints Policies & Procedures**.

22.2   Parental Leave for Graduate Student Assistants

The College of Engineering (CoE) is fully committed to providing a supportive climate for women and their partners who choose to have children during their graduate studies. The goal of this CoE parental leave policy is to reduce academic and financial hardships for a) female graduate students during the late stages of their pregnancy, childbirth, and postpartum periods, and b) any graduate student who is a new parent providing care for his/her infant.

All CoE graduate students with current research, teaching, or project assistantships are eligible to request a parental leave under this policy. Upon request, expectant mothers will be provided with 12 weeks of paid accommodation time for childbirth. Other new parents (father, adoptive mother, adoptive father) will, upon request, be provided with 6 weeks of paid accommodation time. There will be no research or teaching expectations of the student during the leave.

Students should notify their department (through the Department Administrator or Department Chair) six months prior to the expected birth to request the leave. Students should alert their research advisor or TA coordinator at that time as well to ensure that the ongoing research and teaching environment is safe for the expectant mother. It is recognized that each case will be unique in terms of the timing of the pregnancy or adoption relative to the academic calendar, and that creative and supportive solutions will be required on the part of advisors, chairs, TA coordinators, etc.

The leave will ordinarily begin at the time of birth, but other proposals will be considered. Departments – both advisors and chairs – are expected to provide flexibility in working out the details of the leave and to adjust the timeline of the leave as needed to accommodate any unexpected medical issues that arise during pregnancy (e.g. doctor-ordered bed rest).

All academic requirement deadlines (e.g., qualifying exams) will be extended for the student requesting the leave, consistent with department academic timelines.

23.0   GRIEVANCE PROCEDURES AND REPORTING MISCONDUCT AND CRIME

23.1   Grievance Procedures

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance. Students' concerns about unfair treatment are best handled directly with the person responsible for the objectionable action. If the student is uncomfortable making direct contact with the individual(s) involved, they should contact the advisor or the person in charge of the unit where the action occurred (program or department chair, Section chair, lab manager, etc.). Many departments and schools/colleges have established specific procedures for handling such situations; check their webpages and published handbooks for information. If such procedures exist at the local level, these should be investigated first. For more information see the Graduate School Academic Policies & Procedures: **Grievances & Appeals**.

The ECE Department's **Associate Chair for Graduate Studies Barry Van Veen,** is available for confidential support, advocacy, and resource referral. In the College of Engineering, **Assistant Dean for Graduate Affairs Laura Albert** provides overall leadership for graduate education and is also available if you have a concern. The Graduate School and the Dean of Students Office **recently announced** a new staff position to support graduate students. **Elaine Goetz-Berman** started this fall as the Graduate Student Assistance Specialist. Her role includes support, advocacy, and resource referral for graduate students, utilizing specialized knowledge about the unique academic and personal challenges faced by graduate students.

The formal procedure for accounting of student grievances is as follows:
- The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved at this level.

- Should a satisfactory resolution not be achieved, the student should contact the ECE graduate program's Grievance Advisor, **Professor David Anderson**, to discuss the grievance. The Grievance Advisor will facilitate problem resolution through informal channels and facilitate any complaints or issues of students. The first attempt is to help students informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisors regarding concerns or difficulties if necessary. University resources for sexual harassment, discrimination, disability accommodations, and other related concerns can be found on the UW Office of Equity and Diversity website: **https://oed.wisc.edu/** Other campus resources include:
    i. **Graduate School**
    ii. **McBurney Disability Resource Center**
    iii. **Employee Assistance Office**
    iv. **Ombuds Office**
    v. **University Health Services**
- If the issue is not resolved to the student's satisfaction, the student can submit the grievance to the Grievance Advisor in writing.
- On receipt of a written complaint, a faculty committee will be convened by the Grievance Advisor to manage the grievance. The program faculty committee will obtain a written response from the person toward whom the complaint is directed. This response will be shared with the person filing the grievance.
- The faculty committee will determine a decision regarding the grievance. The Grievance Advisor will report on the action taken by the committee in writing to both the student and the party toward whom the complaint was directed within 15 working days from the date the complaint was received.
- At this point, if either party (the student or the person toward whom the grievance is directed) is unsatisfied with the decision of the faculty committee, the party may file a written appeal. Either party has 10 working days to file a written appeal to the School/College.
- Documentation of the grievance will be stored for at least 7 years. Significant grievances that set a precedent will be stored indefinitely.

The Graduate School has procedures for students wishing to appeal a grievance decision made at the school/college level. These policies are described in the **Graduate School's Academic Policies and Procedures**.

23.2 Reporting Misconduct and Crime

The campus has established policies governing student conduct, academic dishonesty, discrimination, and harassment/abuse, as well as specific reporting requirements in certain cases. If you have a grievance regarding unfair treatment toward yourself, please reference the procedures and resources identified above. If you learn about, observe, or witness misconduct or other wrongdoing, you may be required to report that misconduct or abuse. Depending on the situation, it may be appropriate to consult with your advisor, Graduate Program Coordinator, or other campus resources.

23.2.1 Research Misconduct Reporting

The University of Wisconsin-Madison strives to foster the highest scholarly and ethical standards among its students, faculty, and staff. Graduate students and research associates are among the most vulnerable groups when reporting misconduct because their source of financial support and the progress in their careers may be at risk by raising questions of wrongdoing. They are also often the closest witnesses to wrongdoing when it occurs and therefore must be appropriately protected from the consequences of reporting wrongdoing and be informed of their **rights**.

23.2.2 Academic Misconduct Reporting

If you know a classmate is cheating on an exam or other academic exercise, notify your professor, teaching assistant, or proctor of the exam. As a part of the university community, you are expected to uphold the standards of the university. Also, consider how your classmate's dishonesty may affect the overall grading curve and integrity of the program.

23.2.3 Sexual Assault Reporting

UW-Madison prohibits sexual harassment, sexual assault, dating violence, domestic violence, and stalking. These offenses violate UW-Madison policies and are subject to disciplinary action. Sanctions can range from reprimand to expulsion from UW-Madison. In many cases, these offenses also violate Wisconsin criminal law and could lead to arrest and criminal prosecution.

Students who experience sexual harassment, sexual assault, domestic violence, dating violence, and/or stalking have many **options** and services available to them on and off campus, including mental health counseling, victim advocacy, and access to the criminal and campus disciplinary systems.

Faculty, staff, teaching assistants, and others who work directly with students at UW-Madison are required by law to report first-hand knowledge or disclosures of sexual assault to university officials for statistical purposes. In addition, disclosures made to certain university employees, such as academic advisors or university administrators, may be forwarded to the campus **Title IX Coordinator** for a response.

23.2.4 Child Abuse Reporting

As a UW-Madison employee (under Wisconsin Executive Order #54), you are required to immediately report child abuse or neglect to Child Protective Services (CPS) or law enforcement if, in the course of employment, the employee observes an incident or threat of child abuse or neglect, or learns of an incident or threat of child abuse or neglect, and the employee has reasonable cause to believe that child abuse or neglect has occurred or will occur. Volunteers working for UW-Madison sponsored programs or activities are also expected to **report suspected abuse or neglect** (midway down, right hand side).

23.2.5 Reporting and Response to Incidents of Bias/Hate

The University of Wisconsin-Madison values a diverse community where all members are able to participate fully in the Wisconsin Experience. Incidents of Bias/Hate affecting a person or group create a hostile climate and negatively impact the quality of the Wisconsin Experience for community members. UW-Madison takes such incidents seriously and will investigate and respond to reported or observed incidents of **bias/hate**.