WashU McKelvey Engineering

Department of Energy, Environmental & Chemical Engineering

PhD Student Handbook 2025-2026

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Program Overview

Program Mission & Philosophy: The Department of Energy, Environmental & Chemical Engineering brings together an interdisciplinary group of faculty to tackle global challenges. By focusing on cleaner air, water, and sustainable energy, we meet the rising demand for energy and goods. Our research is organized into three key areas: Energy—focusing on sustainable systems and energy conversion; Environmental Engineering—addressing air, water quality, and resource recovery; and Chemical Engineering—advancing materials, processes, and synthetic biology.

Degree(s)/Specialization(s)/Certificate(s) Offered:

- PhD in Energy, Environmental & Chemical Engineering
- MS in Energy, Environmental & Chemical Engineering
- MEng in Energy, Environmental & Chemical Engineering
- MEng/MBA Program

Program Contacts and Leadership

Role	Name	Contact	When to Contact
Director of Graduate Studies	Dr. Zhen (Jason) He	Zhenhe@wustl.edu	Academic policies, exceptions
Graduate Program Advisor	Megan Morrissey	Megan.m@wustl.edu	Course registration, forms
Department Chair	Dr. Joshua Yuan	joshua.yuan@wustl.edu	Broad concerns or unresolved issues
University Ombuds		https://www.mwi.org/washu-ombuds/	Confidential reporting, inclusion-related concerns
First-Year Advisor	Dr. Marcus Foston	mfoston@wustl.edu	Course planning, rotations
McKelvey Graduate Student Services		eng-gradstudserv@wustl.edu Lopata Hall, Room 203	University-wide support
Director of Master's Program	Dr. Trent Silbaugh	tsilbuagh@wustl.edu	Master's Program Questions

Department Chair is responsible for all tasks supporting shared governance, from shaping the department mission and building consensus around department goals to conducting department meetings and implementing long-range department programs, plans, goals, and policies. The chair is available to speak with any student by appointment and welcomes interactions with students.

Director of Graduate Studies (DGS) serves as the administrative supervisor and coordinator of graduate studies within a program, overseeing all components of graduate education and promoting academic quality and integrity. The DGS oversees the Master's and PhD programs and is available to speak with any student by appointment.

First-year PhD Advisor is a full- time faculty member in EECE and will be responsible for acquainting the student with first-year procedures, research rotations, procedures to select permanent advisor, and initial choice of courses as per guidelines in the PhD Handbook. The First-year PhD Advisor is available to speak with any student by appointment.

Graduate Program Advisor is part of the McKelvey Graduate Student Services office and serves as the primary point of contact for PhD degree requirements, policies/procedures, and campus services and resources.

Director of Undergraduate Studies coordinates the academic advising and administration necessary to support the academic experience for undergraduate students.

PhD Graduate Committee supports the DGS's role in overseeing and administering the PhD program and is the liaison between the DGS and the faculty members in the department. The PhD Program Committee exist to ensure that the PhD program reflects the consensus view of the department's faculty and addresses the needs the department's students.

Director of Master's Program is responsible for the operation of the students and improving their experience.

Master's Program Committee serves the same role as the PhD Program Committee only for the Master's Program supports both the DGS and Director of Master's Program.

EECE Graduate Student Council (GSC) is a group organized by graduate students, geared towards advocating for EECE graduate GSC organizes professional development events to guide students through the milestones of the program and encourage networking with industry and academia professionals in the Wash U alumni network. As interactions and friendship with fellow EECE students is key to the graduate student experience, GSC also leads several social events throughout the year, particularly geared towards integrating first-year students into the program. The GSC executive board consists of a president, secretary, treasurer, Graduate Student Senate representative, professional development chair, social chair, and social media chair. Additionally, one representative from each lab serves as a liaison to the GSC executive board and attends a bi-annual meeting. Serving on the council is a great opportunity to grow leadership skills and play a role in decision making in EECE. Elections are held at the end of each fall semester and first-year students are welcome to join the team.

McKelvey Graduate Student Services offers academic and resource support for all McKelvey graduate students. https://engineering.wustl.edu/offices-services/student-services/graduate-student-services/index.html

Faculty Directory: https://eece.wustl.edu/faculty-research/directory.html

Staff Directory: https://eece.wustl.edu/about/staff.html

First-Year PhD Milestones

First-Year Timeline

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug
Orientation													
Semester 1 courses													
1st research rotation													
2nd research rotation													
Advisor matching													
Begin dissertation research					Begin when lab affiliation form is approved								
Semester 2 courses													
Qualifying Exam													

First-Year Checklist

Task	Due Date	Related Forms or Actions
Onboarding and Enrollment	July 31	Complete in WorkDay
Orientation Week	Aug 18-21	Attend the EECE Departmental and McKelvey Orientation Programs and meeting with First-Year Advisor
Lab Rotation Preferences	Aug 19	Complete Lab Rotation Preference Survey
First Lab Rotation	Aug 25 – Oct 3	Assigned by Rotation Mentor
Second Lab Rotation Preferences	Oct 1	Complete Lab Rotation Preference Survey
First Lab Rotation Report	Oct 5	Submit Report to Canvas and to your Rotation Mentor
Second Lab Rotation	Oct 6-Nov 14	Assigned by Rotation Mentor
Final Permanent Advisor Preferences	Nov 12	Complete Preferences Survey
Second Lab Rotation Report	Nov 16	Submit Report to Canvas and to your Rotation Mentor
Enroll in Spring Courses	Nov-Dec	Meet with Faculty Advisor and Enroll in Workday
Permanent Lab Affiliation	Dec 22	PhD Lab Affiliation Form
Qualifying Exam	May of First Year	Attend First-Year QE Workshop held in the Spring Semester -Meet 3.25 minimum cumulative GPA -Complete a minimum 18 credit hours of graded graduate coursework in order to take the QE
Complete Mckelvey Teaching Prep Part 1 & 2	July 1	Complete Canvas Prep Courses and Complete Teaching Preferences Survey
Enroll in Fall Semester	July	Meet with Advisor to discuss courses and Enroll in WorkDay

Program Milestones

Milestone	Typical Timing	Related Forms or Actions
Lab Affiliation	End of First Semester	Match with a permanent research advisor after completing lab rotations in the first semester of the first year. -Sign PhD Lab Affiliation Form
Qualifying Exam	May of First Year	Attend First-Year QE Workshop held in the Spring Semester -Meet 3.25 minimum cumulative GPA -Complete a minimum 18 credit hours of graded graduate coursework in order to take the QE
Research Advisory Committee Formation and Proposal	Within 12–18 months post-qualifier	Research Advisory Committee Approval Form, Written and oral components, PhD/Title, Scope, & Procedure Form
Mentored Teaching Experience	First and Second Year	Complete Two Preparatory Engagements prior to the start of Fall Semester in the Second Year. -Complete teaching preferences survey -Teaching Assignments begin in second year
Coursework Completion		Complete a minimum of 72 credits (at least 36 graduate coursework credits and a minimum of 30 credits of doctoral research)
Final Dissertation Defense and Dissertation Submission to ProQuest	Final Year	Contact your Graduate Program Advisor at minimum 6 months prior to planned defense for instructions. -File “Program Completion” in WorkDay by the deadline listed In the academic calendar

Degree Requirements and Course Planning

Candidates for this degree must complete a total of **72 credits** beyond the bachelor’s degree. Of these, a minimum of **36 credits must be graduate coursework and a minimum of 30 must be doctoral research units**. To be admitted to candidacy, students must have completed at least 18 credits at WashU, have an overall GPA equal or greater than 3.25 and pass the qualifying examination. The student must also have completed the research rotations and have affiliated with a permanent advisor.

Required Courses:

- **EECE 5997: Seminar in EECE** (one credit, Pass / Fail). This is required each Fall and Spring Semester until graduation. Up to six credits may be used towards fulfilling coursework requirement.
- **EECE 5010: Transport Phenomena in EECE** (Students without an undergraduate or Master’s degree in Chemical Engineering may substitute EECE 5001 “Introduction to Chemical Engineering” for EECE 5010 “Transport Phenomena in EECE”).
- **EECE 5030: Mathematical Methods in EECE**
- **EECE 8991: Research Rotations**: Required in the first semester of the first year.

Elective Courses:

- Students are required to take electives in two areas of EECE research expertise in the first- year. Research areas are: Aerosol Science & Engineering, Engineered Aquatic Processes, Bioprocesses, Multi-scale Engineering. Students should consult with their First-Year Advisor and their Faculty Advisor on course scheduling.
- Students must take courses offered by the EECE Department in the first-year. Taking graduate courses in other departments in the first-year must be approved by the advisor and Director of Graduate Studies. First-year students must take courses at the graduate level (5000 level) unless approved for an exception by the Director of Graduate Studies.
- A maximum of 9 credits of 4000-level courses may be applied toward the required 36 academic credits with approval from your advisor and the Director of Graduate Studies. Undergraduate-only courses (below the 4000 level) are generally not permitted for graduate credit by the university and may not be used to fulfill this requirement.
- Students are not permitted to take CAPS (School of Continuing and Professional Studies) courses
- Summer courses must be approved by your advisor and must be courses within the engineering school

Doctoral Research

To reach a total of 72 credits, students must complete the following:

- Minimum of 30 credits of EECE 8998 Doctoral Research under the advisement of an EECE Graduate Program Faculty Member.

First-Year Recommended Course Plan Option 1

Fall Semester (13 credits minimum)

- **EECE 5030: Mathematical Methods in EECE** (three credits, REQUIRED)
- Two Elective Courses (select graduate-level elective courses based on discussions with first-year PhD advisor). Electives must be taken in at least two different research areas in the first-year.
- EECE 5001: Introduction to Chemical Engineering (optional for students who do not have an UG or MS degree in Chemical Engineering)
- **EECE 8991: Research Rotations** (three credits, Pass/Fail, REQUIRED)
- **EECE 5997: Seminar in EECE** (one credit, Pass / Fail)

Spring Semester (10 credits minimum)

- **EECE 5010: Transport Phenomena in EECE** (REQUIRED, Students without an UG or Master's degree in Chemical Engineering may substitute EECE 5001 "Introduction to Chemical Engineering" for EECE 5010 "Transport Phenomena in EECE").
- **Two Elective Courses** (select from Graduate-level Elective Courses below based on discussions with permanent advisor). Electives must be taken in at least two different research areas in the first-year.
- **EECE 5997**: Seminar in EECE (one credit, Pass/Fail, REQUIRED)

First-Year Recommended Course Plan Option 2

(Recommended for students who do not have a Chemical Engineering degree)

Fall Semester (13 credits minimum)

- **EECE 5030: Mathematical Methods in EECE** (three credits, REQUIRED)
- **EECE 5001: Introduction to Chemical Engineering**
- **One Elective Course** (select graduate-level elective courses based on discussions with your first-year advisor).Electives must be taken in at least two different research areas in the first-year.
- **EECE 8991: Research Rotations** (three credits, Pass/Fail, REQUIRED)
- **EECE 5997: Seminar in EECE** (one credit, Pass / Fail)

Spring Semester (10 credits minimum)

- **Three Elective Courses** (select from Graduate-level Elective Courses below based on discussions with permanent advisor). Electives must be taken in at least TWO different research areas in the first-year.
- **EECE 5997**: Seminar in EECE (one credit, Pass/Fail, REQUIRED)

Recommended First-Year Electives by Research Area

Aerosol Science & Engineering

1) EECE 5040* Aerosol Science & Technology (fall)
2) EECE 5020 Advanced Thermodynamics in EECE (fall)
3) EECE 5080 Combustion Phenomena (fall)
4) EECE 5100 Measurement Techniques for Particle Characterization (fall)
5) EECE 5116 Special Topics: Plasma Science and Engineering (Spring)

Engineered Aquatic Processes

1) EECE 5050* Aquatic Chemistry (fall)
2) EECE 5120 Environmental Organic Chemistry (fall)

3) EECE 5140 Environmental Nanochemistry (spring)
4) EECE 5160 Environmental Resource Recovery (fall)
5) EECE 5130 Physical & Chemical Processes for Water (spring)

Bioprocesses

1) EECE 5060* Bioprocess Engineering 1 (spring)
2) EECE 5190 Molecular Biochemical Engineering (spring)
3) EECE 5180 Biomass Energy Systems & Engineering (fall)
4) EECE 5260 Application of Generative AI in Bioprocess Engineering (Fall)

Multi-scale Engineering

1) EECE 5070* Kinetics & Reaction Engineering Principles (spring)
2) EECE 5420 Polymers for Energy, Sustainability, and Human Health (fall)
3) EECE 5200 Electrochemical Engineering (spring)
4) EECE 5210 Chemical Kinetics and Catalysis (spring)

*Indicates anchor course areas of EECE research expertise. The designation of anchor courses within the areas of EECE research expertise—Aerosol Science & Engineering, Engineered Aquatic Processes, Bioprocesses, and Multi-scale Engineering—provides a structured pathway for first-year students to engage deeply with critical topics in these specialized fields. These courses are strategically chosen to align with the department's core research strengths, ensuring that students gain targeted, in-depth knowledge that directly supports their progression into advanced study and research. This approach fosters early specialization while maintaining a broad understanding of key engineering principles, thereby preparing students to contribute effectively to the department's cutting-edge research initiatives.

Menu of Graduate-level Elective Courses

(Please review list of exact offerings each year — current listings of courses are maintained in Workday.wustl.edu.) The best place for students to find information and instructions related to registration in WorkDay is on the Student Tasks landing page at Workday.wustl.edu. Navigate to the landing page and click on *Registration in Workday Student* in the *Registration* card. Here students will find step-by-step instructions for registering in Workday.

Fall 2025

EECE 5001-01 - Introduction to Chemical Engineering

EECE 5020-01 - Advanced Thermodynamics in EECE

EECE 5030-01 - Mathematical Methods in EECE

EECE 5040-01 - Aerosol Science and Technology

EECE 5050-01 - Aquatic Chemistry

EECE 5080-01 - Combustion Phenomena

EECE 5100-01 - Measurement Techniques for Particle Characterization

EECE 5120-01 - Environmental Organic Chemistry

EECE 5160-01 - Environmental Resource Recovery

EECE 5180-01 - Biomass Energy Systems and Engineering

EECE 5260-01 - Application of Generative AI in Bioprocess Engineering

EECE 5420-01 - Polymers for Energy, Sustainability, and Human Health

EECE 5997-01 - Seminar in Energy, Environmental, and Chemical Engineering

EECE 8991-01 - Research Rotation

EECE 8998 – Doctoral Research

Spring 2026

EECE 5010-01 - Transport Phenomena in EECE

EECE 5060-01 - Bioprocess Engineering I: Fundamentals & Applications

EECE 5070-01 - Kinetics and Reaction Engineering Principles

EECE 5116-01 - Special Topics: Plasma Science and Engineering

EECE 5130-01 - Physical and Chemical Processes for Water Treatment

EECE 5140-01 - Environmental Nanochemistry

EECE 5190-01 - Molecular Biochemical Engineering

EECE 5200-01 - Electrochemical Engineering

EECE 5210-01 - Chemical Kinetics and Catalysis

EECE 5997-01 - Seminar in Energy, Environmental, and Chemical Engineering

EECE 8998 – Doctoral Research

Transfer Credit Policy: At most, **12 graduate credits** in a graduate program from another university may be counted as transfer credits toward the required 36 units of coursework. Core course credits cannot be transferred unless a student has taken the same courses in EECE during MS/MEng study. PhD students can apply for transfer credit by submitting a formal petition to the department through the Transfer Credit Request Form after passing the qualifying exam.

Maximum Research Units per Semester: At most, nine units of doctoral research may be taken in a semester.

Seminar Credits: Students are required to enroll in seminar each Fall and Spring semester in the program. The one-unit EECE seminar course may be taken for graduate coursework credit in up to six semesters for a total of **six credits**.

Independent Study Credits: At most, three credits of coursework may be taken as graduate independent study. An independent study must be entirely separate from study done as part of the graduate thesis research. The student should prepare a proposed plan of study to be completed, and this plan must be described on the Independent Study Petition Form approved by the independent study instructor, student's advisor, Director of Graduate Studies and Department Chair for the independent study credits to count toward the 36 required units of coursework. This credit will not be counted toward the cumulative GPA for the qualification exam requirement.

4000-level Courses: Up to three 4000-level courses may count towards the degree, provided they are approved by the DGS.All other coursework should be at the graduate level, 5000-level or above.

Registration

Registration takes place each semester and registration deadlines may be found on the academic calendar (https://engineering.wustl.edu/academics/academic-calendar.html). The best place for students to find information and instructions related to registration in Workday is on the Student Tasks landing page at Workday.wustl.edu. Navigate to the landing page and click on *Registration in Workday Student* in the *Registration* card. Here students will find step-by-step instructions for registering in Workday.

All graduate students in the department must be enrolled full-time each semester until all degree requirements are completed. The maximum time period for completing all PhD degree requirements is seven years.

Students admitted to a PhD program in McKelvey Engineering must maintain full-time continuous enrollment throughout the approved length of their programs. McKelvey PhD programs are to be completed within six years under normal conditions. During those years, students will be considered full-time with one or a combination of the following enrollments: Registered for 9 or more course units (including doctoral research units); or registered in EGS 9000 Full-time Graduate Research/Study or EGS 9001 Full-time Graduate Study in Absentia (see below). These courses indicate the student's full-time engagement in research or academic writing and should be used once a student has completed the 72-unit requirement for the program. PhD students who are not registered as above may find themselves in a part-time status and could be in jeopardy of the loss of certain benefits or be in violation of their visa status. Part-time enrollments will be permitted only in extraordinary circumstances. EGS 9002 Full-time Graduate Student Extension should be used for enrollment in circumstances requiring a seventh year.

Students who fail to register in one of the previously mentioned categories will automatically have their graduate standing revoked. Students whose graduate standing has been revoked may apply for reinstatement. There is an application fee for reinstatement ($100). Students

seeking reinstatement may be required to take a special reinstatement examination and to repeat any previously met requirements that fails to meet contemporary standards. Candidates for the PhD degree who apply for reinstatement may be required to repeat the qualifying examination.

Qualifying Exam

The EECE PhD qualifying examination is held in May of the first year of study in the program. It is administered by the EECE Graduate Committee and department faculty as appointed by the Chair. To be eligible to take the qualifying examination, students must earn a **3.25 cumulative GPA** in their core math and science courses and have completed 18 credits of graded graduate level coursework credits. Research rotations, seminar, and independent studies will not be counted towards the GPA cutoff. Courses taken as Pass/Fail are not counted towards the GPA. Students must be matched with a permanent advisor to be eligible to take the qualifying exam.

Disability accommodations formally determined WashU Disability Resources (Disability Resources - Students (wustl.edu) will be respected.

Qualifying Exam Process

The qualifying exam is based on a literature analysis and oral exam. Students should select one journal paper from a list of papers provided by faculty and conduct extensive review and analysis. A 3-page (single spaced, 12 pt font) critical review on the selected paper must be submitted by the deadline provided. Oral exams will be held in mid-May of the first-year.

Students will present their analysis, qualitatively and quantitatively, at the 30-min oral exam and address questions from the exam committee. To pass the oral qualifier a student must demonstrate the ability to:

- Recognize and articulate a research question or problem
- Express a research question or problem's background from existing information
- Employ reasoning and critical thinking skills
- Use basic engineering concepts and fundamentals to understand and solve problems
- Effectively communicate in an oral format and respond to scholarly questions
- Comprehend and apply core course content

Qualifying Exam Outcome

The final outcome of the EECE PhD qualifying examination will be determined by the EECE faculty based on the recommendation of the EECE Graduate Committee. The student can receive a Pass/Conditional Pass/Fail grade for the examination.

A conditional pass occurs when a student demonstrates a weakness and/or a lower exam score in one or more areas that the faculty feel could be rectified. In a conditional pass situation, the student will be a given a written notice of what conditions they have to meet and the deadline by which they need to be met in order to continue in the program.

If the student fails the PhD qualifying examination, they can petition to obtain a Master's of Engineering or Master's of Science degree. There is an option to obtain a Master's of Engineering with a modified curriculum that replaces project management and social, legal, policy aspects requirements with 6 credits of independent research. The requirements for the either Master's level degree has to be met, and no financial aid is guaranteed to students who fail the qualifying exam after the first-year of study. Students who fail the qualifying exam may request to re-take the qualifying examination at the end of the following fall semester based on a petition.

This petition should be submitted in writing to the Department Chair within a week of receiving notification. The decision to allow a student to re-take a qualifying examination will be based on the student's performance (e.g., GPA, written and oral qualifying examinations, research rotations, and feedback from the faculty and the student's advisor) and will be made by the Department Chair and Director of Graduate Studies in consultation with the PhD Graduate Committee. Given that no financial support from the department will be provided after the summer semester of the first-year, students wanting to re-take the qualifying examination will need to successfully join and progress through a master's program in the fall and spring semesters following the summer.

Regarding Conditional Pass, if a student fails to satisfy the condition from the decision letter of the qualifying exam within one year, the students will be advised to withdraw from the PhD program and financial support will be terminated. Although, if requirements for the master's degree have to be met, the student can petition to obtain a Master's of Engineering or Master's of Science degree. There is an option to obtain a Master's of Engineering with a modified curriculum that replaces project management and social, legal, policy aspects requirements with 6 credits of independent research.

Research Advisor and Advising Committees

First-Year Advising

All PhD students will be assigned to the First-Year PhD Advisor upon being admitted. The First-Year PhD Advisor will guide each new student through being admitted to being assigned a permanent faculty advisor including orientation the week before courses start, course registration advising, and advisement on all academic procedural issues. The permanent faculty advisor will be assigned in December of the first year of residency in the program.

Rotation and Match Procedure

All students must register for EECE 58991 Research Rotation in their first semester of the program. To become better acquainted with potential faculty advisors and learn about their research in greater detail, cohort students will then spend approximately one month rotating with each of two different research groups in the EECE Department. Direct admitted students will spend both rotations with the same faculty member.

Students will be given instructions during orientation to submit preferences for research rotations. Cohort students are encouraged to discuss potential rotation opportunities with several faculty prior to submission of their research rotation preferences. Students should only

include faculty with whom they have had a dialogue with about joining their lab and that the student is interested in investigating as a potential permanent advisor.

Rotation advisors will set detailed expectations for the rotation, however, these may include attending research group meetings, conducting a literature review on a relevant topic, and/or learning some of the research methods relevant to the advisor's work.

Students are required to submit short (~3 pages, single-spaced, 12-point font) reports summarizing their research rotation experiences. These reports will be submitted to the rotation advisor and are due according to the schedule provided. The purpose of the report is to provide an overview of what the student learned about their rotation topic. This may include a brief summary of the relevant literature or a description of the research techniques learned. Note that the report is an opportunity to reflect on the experience, and students are not expected to generate and report on significant new data during their month-long rotation projects.

Students are encouraged to communicate with several faculty members and determine their mutual interest in working together. Students can explore opportunities with any EECE faculty member, even if they did not rotate with them. It is the responsibility of the student to meet with faculty and convince them to select the student as an advisee. Based on these discussions between students and faculty, students will submit a list of four rank-ordered choices for their permanent advisor selection during the end of the second semester (dates and forms will be communicated to students by the Graduate Program Advisor). When submitting the ranked faculty preferences, students should only include faculty with whom they have had a dialog with about joining their lab and that they are interested in as a permanent advisor. These ranked choices will be distributed to the faculty prior to permanent advisor assignments. All attempts will be made to assign the student to one of their choices for permanent advisor; however, the final assignment decisions will be at the discretion of the faculty advisors and the Graduate Director. It is in each student's best interest to discuss their mutual level of interest with each potential advisor before ranking them on their selection form. Students will be informed of their permanent advisor assignment by the Graduate Director before the end of the fall semester. Once students are assigned a permanent advisor, students must submit the Lab Affiliation Form. Students should begin research with their assigned permanent advisor soon after and follow other guidelines as outlined in the handbook.

Research Advisory Committee

Students must select a Research Advisory Committee (RAC) to oversee and guide their research as part of the thesis proposal and defense. The RAC must be approved by the Director of Graduate Studies and the Associate Dean of Graduate Student Services prior to scheduling the thesis proposal. Students must submit the Research Advisory Committee Approval Form for approval approximately one to two months prior to the thesis proposal and no later than two weeks prior to scheduling their proposal. The RAC must have five members and must meet the following conditions:

- Four of the five members must be tenured or tenure-track Washington University faculty (one of these four may be an emeritus faculty member)
- Three of the five must come from the student's degree program
- The fifth member must have a doctoral degree and an active research program, whether at Washington University, at another university, in government, or in industry

- At least one of the five must ***not*** come from the student's degree program

Dissertation Proposal

The dissertation proposal should be successfully presented to the Research Advisory Committee within 18 months of passing the Qualifying Examination.

Following successful completion of the qualifying examination, the student and advisor will decide on a suitable research problem whereupon the student will prepare a comprehensive written research proposal that includes a thorough survey of the literature relevant to the field, a discussion of those areas needing further research, and a clear definition of the proposed research. Results of preliminary studies or feasibility studies should be included. The format and guidelines of the PhD thesis proposal are included in the last portion of this section. Students must schedule their thesis proposal examination within 18 months of passing the Qualifying Examination. Extensions may be requested with support of the student's advisor to the Director of Graduate Studies. The written proposal should be submitted to the Research Advisory Committee at least one week prior to a Thesis Proposal Examination consisting of an oral presentation to the student's committee followed by a Q&A. Upon completion of the proposal, students must submit the Proposal/Title, Scope, & Procedure Form. The Proposal/Title Scope & Procedure Form must be submitted prior to beginning the student's fifth year of study in the program.

The following guidelines are recommended for the PhD Thesis Proposal:

1) The main body of the proposal should include

   - Executive summary (no more than one page)
   - Introduction (no more than five pages)
   - Research objectives (no more than two pages)
   - Preliminary work (no more than five pages in the body of the proposal; additional preliminary data or papers can be included in the Appendices)
   - Research plan (no more than 15 pages)
   - Timeline (no more than one page)
   - References (as needed)

2) The following Appendices should be included at the end of the proposal:

   - List of courses taken and to be taken with grades
   - Mentored teaching experience
   - A short CV of the student highlighting conference presentations and journal papers (published/submitted/to be submitted)

- Copies of papers (optional)

3) Format:

- Font: Times New Roman
- Font size: no less than 11 points
- Line spacing: single-spaced
- Page margin: one-inch margin around the pages
- PhD Students should refer to the National Science Foundation (NSF) Guidelines for Proposal Writing Document as a reference.

Dissertation Defense

Students must present the thesis in a public forum and successfully defend the thesis before their Dissertation Defense Committee.

Dissertation Defense Committee: Prior to scheduling the final dissertation defense, students must submit the Dissertation Defense Committee Approval Form (1-3 months prior to the final dissertation defense). The final dissertation defense committee has the same requirements as the Research Advisory Committee. The DDC Approval Form is required prior to scheduling the final dissertation defense. Students must contact their graduate program advisor to initiate this form.

At least four dissertation defense committee members must be present at the defense (including the committee chair). Members of the dissertation defense committee attend in person, but one of the five (or, in case of an emergency, one of the four) members may attend virtually instead. Exceptions (ex: additional committee members that need to attend virtually) may be requested and must be approved by the Director of Graduate Studies.

Scheduling the Dissertation Defense: Students must contact the graduate program advisor at least one month in advance of the dissertation defense with the following information: PDF copy of CV, PDF Dissertation Abstract, Title of Dissertation, Date, Time, and Location of the final defense. Students must submit their completed thesis to their committee at least two weeks prior to the final dissertation defense.

Publications: The student should also have submitted at least one paper to a peer-reviewed journal prior to defending their thesis. Students are expected to have at least one paper accepted in a peer-reviewed journal, and at least another paper submitted prior to graduation.

Dissertation Defense Approval and Submission: Upon completion of the dissertation defense, students must submit the Dissertation Defense Approval Form. Once approved, students must submit their final dissertation to ProQuest following the instructions in the Doctoral Dissertation Guide. Students should follow the deadlines in the McKelvey Academic Calendar.

The dissertation and oral defense requirements are set by the McKelvey School of Engineering.

If the committee members feel that the dissertation has deficiencies, they may recommend that the candidate address them and send the revised dissertation to the committee members for approval. The committee may also recommend that the candidate present another oral defense of the modified work. The Dissertation Committee will inform the DGS of their recommendation,

and the DGS will warn the student in writing that they must submit a revised dissertation and pass the oral defense (if recommended) in order to complete the PhD program. If, after revision and reexamination, the Dissertation Committee still finds deficiencies and cannot reach unanimous agreement to approve the dissertation, the University's Policy on Dissenting Votes (found in the Graduate Bulletin) will apply.

Teaching Expectations

All full-time PhD students at Washington University are required to gain teaching experience. The MTE consists of serving as an Assistant in Instruction (AI). AIs engage with students in recitation/discussion sections, small groups, or laboratory settings. They may also be asked to prepare and present guest lectures.

Students must complete the MTE Preparatory Workshops prior to July 1 of the first year. Students will be sent information on the EECE courses with AI positions and students will complete a survey to indicate their preferences. Students will be matched to a course typically in the Fall and Spring of the second year of the program, however, due to course needs some students may be scheduled to serve as an AI in their third year. Once assigned to be an AI, students must register for EGS 8010.

Requirements

1. Complete two McKelvey Preparatory Engagement workshops
2. Complete 20 units of Mentored Teaching Experience (two semesters of EGS 8010)

Preparatory Engagement

Students in the EECE PhD program will participate in two Preparatory Engagement workshops introducing them to the foundational skills associated with teaching or communication. Pedagogical preparation engagement activities are normally completed before students are permitted to engage in assisting or teaching in a classroom.

Two preparatory workshops are required:

1. McKelvey Teaching Orientation (Canvas Course)
2. McKelvey Teaching Workshop (Canvas Course)

After completion of these workshops, students are expected to fulfill a total of at least 20 units of Mentored Teaching Experience (MTE), as described below.

Optional Activity: Teaching Intensive Pathway (Contact Graduate Program Advisor if interested)

The Teaching Intensive Pathway is an optional pathway for those students whose career interests lie in academia or another field that would benefit from extended teaching experiences. This immersive experience allows students to further explore the breadth and depth of teaching best practices and pedagogy related to their respective field. Students who are interested in

participating in this elective experience must formally request to participate, which is subject to departmental approval. Due to this experience being an elective, unpaid experience, students who participate in the Teaching Intensive Pathway will not receive compensation.

a. Complete at least Level 3 of the CTL's Professional Development in Teaching Program (https://ctl.wustl.edu/professional-development-in-teaching/)
b. One Mentored Independent Teaching experience in which the student will act as a co-instructor with an EECE faculty member with a record of strong teaching. The faculty member will mentor and support the student to:
    i. Independently teach a significant fraction of the course, Develop formative and summative assessments
    ii. Learn about and attempt other activities related to effective, evidence-based teaching
    iii. EGS 6020 Take 1 time

Other Policies

Graduate Student Support

EECE graduate students who do not have external or university fellowships are financially supported for the first semester by the McKelvey School of Engineering or their research advisor. After the first semester, in order to remain in good standing, the student is responsible for identifying a research advisor from among the EECE Graduate Program Faculty who is willing and able to provide continued support for the duration of their degree program.

Outside Employment

Holders of fellowships, traineeships and assistantships are required to devote full-time effort to graduate studies. They are not permitted to engage in any outside employment without permission of their advisor and the DGS.

Tax Liability

The taxability of the various types of awards is determined by current policy of the US Internal Revenue Service (IRS). It is prudent to assume that all stipends are fully taxable and that the tax will not be withheld. Questions concerning any individual's tax liability must be referred to the IRS.

Graduation Information

Students are responsible for filing for "Program Completion" in WorkDay by the appropriate deadline listed in the McKelvey Academic Calendar. No degree will be awarded if this process is not completed by the deadline. Late filings will not be accepted.

MS Degree

A student who has passed the Thesis Proposal Examination, completed 30 units of required coursework toward the PhD degree, and published or submitted at least one first author peer-reviewed manuscript arising from their thesis research is eligible to receive an MS degree "along the way". No independent study credits can be counted towards the MS degree. The publication and submission of the manuscript must be with the approval of the research advisor. Students must submit their request to receive the MS degree at least one year before the thesis defense. The granting of the MS degree along the way is by approval of the Advisor and Director of Graduate Studies. The actual MS degree is only granted as a courtesy and contingent on fulfilling PhD requirements and passing the doctoral defense, the Director of Graduate Studies can approve the award of the MS degree earlier in special cases. The MS degree along the way may not be added in the middle of a semester. MS Degrees will be opened in the beginning of the semester after receiving approval.

Seminar

Each fall and spring semester the Department Seminar series brings in a variety of academics to give presentations on their areas of research and expertise, represents an essential component of building a vibrant academic culture, and provides students with outstanding opportunities to interact with disparate research and researchers in a variety of focus areas important to our department. All full-time graduate students are required to enroll in EECE 5997 Seminar in EECE, which is an S/U course carrying one unit of coursework credit. Full-time graduate students may receive up to six units of coursework for EECE 5997. A passing grade (S) is required for each semester for all full-time students and is earned by regular attendance at these events. Each student will be granted a specified number of absences (no excuse required) for seminar before being assigned an "Unsatisfactory" grade (see the EECE 5997 syllabus for details). If unforeseen circumstances cause more seminar absences than allocated then special conditions set by the instructor of EECE 5997 will need to be met to pass. Otherwise, the student will obtain a "U" grade.

Time Off

Graduate students receiving financial support are expected to commit themselves fully to their studies and research. Intersession periods listed in the university Academic Calendar denote times when courses are not in session, and graduate students are expected to devote themselves full-time to their research during these periods. Students on full support are permitted to take off a **maximum of two weeks (10 business days)** during the calendar year for vacation, etc. Students will not be asked to work on university scheduled holidays. Additional time off may be arranged in discussion with the research advisor and must be approved by the graduate program advisor but may result in a reduction of the student's stipend and students may be required to take a leave of absence. During the first-year in the program when students do not have a permanent advisor, students should consult their first-year advisor to schedule any time off. Absence of research assistants must be scheduled so as not to impede the progress of an ongoing research project.

Good Standing, Probation, and Termination Policies

The progress of students through the EECE Ph.D. program will be closely monitored by the Graduate Program Advisor, the DGS (prior to candidacy) and the student's research advisor (post candidacy).

In addition to the coursework and research requirements, to remain in good standing students must:

- Enroll in EECE 8997 IMSE Graduate Seminar (0 credits) every Fall/Spring semester of full-time study
- Pass the EECE Qualifying Examination
- Identify an EECE Graduate Program Faculty member willing and able to financially support and supervise the student's dissertation research
- Maintain satisfactory research progress as determined by the research advisor and the Research Advisory Committee
- Successfully complete the Mentored Teaching Experience requirements by the end of the third year
- Successfully complete the dissertation proposal and presentation, with approval from the dissertation examination committee
- Successfully complete and defend a PhD dissertation, with final approval from the dissertation examination committee

Failure to meet these requirements will result in dismissal from the program.

Probation Process

Except for circumstances justifying immediate dismissal, a student cannot be dismissed on the basis of academic performance without the opportunity to return to good standing during an identified period of probation. A student on probation must receive a detailed letter from the Director of Graduate Studies stating the reasons for the probation and explicitly identifying the steps necessary for the student to return to good standing by the end of the probation period. A copy of this letter should be sent to the Associate Dean of Graduate Student Services.

If a student does not meet all criteria for good academic standing but the department does not wish to place the student on probation, an appeal for this exception can be made to the Vice Dean of Research and Graduate Education.

If the student does satisfactorily meet the requirements of the probation, a written notice of reinstatement, including the date that the student has returned to good standing, will be provided to the student. Students may be reinstated before the end of the probation period if they have met the requirements for reinstatement.

If the student does not meet the requirements of the probation by the specified time and the program recommends dismissal, the program will send a request for dismissal and a draft of the dismissal letter to the Associate Dean of Graduate Student Services, along with copies of all

previous communications and/or warnings. The draft dismissal letter will include the grounds for dismissal, the effective date of dismissal, and advice to the student that voluntary withdrawal from the program is an option. All academic dismissals require approval by the Vice Dean of Research and Graduate Education. If the student is an international student on a visa, the program should consult with the Office of International Students and Scholars prior to drafting the dismissal letter. It is often advisable for an international student to withdraw ahead of a dismissal to avoid an adverse impact on their future entry to the United States.

At the end of a first probation, the student may be (1) returned to good standing; (2) placed on a second consecutive probation; or (3) dismissed from the program.

A second consecutive probation must be accompanied by a new letter identifying the steps required to return to good standing. At the end of a second continuous probation, the student will be either returned to good standing or dismissed.

A third probation will be allowed only if it is not continuous. A fourth probation will not be allowed. A student whose performance would result in a fourth probation will be dismissed immediately. A leave of absence cannot be used by a student to delay or nullify the consequences of a third consecutive or fourth probation.

Possible Causes for Dismissal from the PhD Program

1. Students who do not pass the qualifying examination or that do not meet the eligibility to sit for the qualifying examination will be transitioned to the MEng program.

2. Students who remain unassigned to a permanent advisor at the end of the first-year will be transitioned to the MEng program.

3. Students who are not making satisfactory progress with courses and/or research (or are otherwise impeding progress toward graduation) can be placed on probation. See bulletin.wustl.edu/grad/engineering/doctorates/policies/ for additional details for possible causes for dismissal from the PhD Program.

4. Students who fail their proposal exam or final defense after two attempts with a minimum of 3 months and maximum of 6 months (under probation) between the two attempts will be dismissed from the graduate program with the approval of the permanent advisor, the Director of Graduate Studies and the Department Chair. Depending on the extent of progress toward graduation, the student thus terminated from the PhD program may be awarded or transitioned to a MEng or MS program subject to DGS and advisor approval.

5. Students who violate McKelvey School of Engineering academic integrity code are subject to dismissal from the program pursuant to Graduate School and McKelvey Engineering policies and procedures.

Resources and Student Support

McKelvey Resources

Association of Graduate Engineering Students: https://ages.wustl.edu/

Bulletin PhD Program Information: https://bulletin.wustl.edu/grad/engineering/doctorates/

Engineering Academic Calendar: https://engineering.wustl.edu/academics/academic-calendar.html

Engineering Communication Center: https://engineering.wustl.edu/academics/Communication-Center/index.html

Engineering Graduate Career Resources: https://students.wustl.edu/graduate-student-postdoc-career-resources/

Engineering Machine Shop: https://engmachineshop.wustl.edu/

Engineering Research Toolkit: https://sites.wustl.edu/engineeringresearchtoolkit/

Engineering Subject Librarian: https://library.wustl.edu/directory/lauren-todd/

Environmental Health & Safety: https://ehs.wustl.edu/

McKelvey Graduate Student Services: https://engineering.wustl.edu/offices-services/student-services/graduate-student-services/index.html

McKelvey Professional Development Program: https://engineering.wustl.edu/offices-services/student-services/graduate-student-services/PhD-Professional-Development-Seminars.html

Thesis and Dissertation Submission Procedures: https://engineering.wustl.edu/offices-services/student-services/graduate-student-services/thesis-dissertation-submission.html

WashU Resources

Bias Report and Support System: https://students.wustl.edu/bias-report-support-system/

Center for Teaching and Learning: https://ctl.wustl.edu/

Disability Resources: https://students.wustl.edu/disability-resources/

The Graduate Center: https://gradcenter.wustl.edu/

Office of International Student Engagement (OISE): Office for International Student Engagement (washu.edu)

Office of International Students and Scholars (OISS): https://students.wustl.edu/international-students-scholars/

Relationship and Sexual Violence Prevention Center: https://students.wustl.edu/relationship-sexual-violence-prevention-center/

Religious Celebration Calendar: https://students.wustl.edu/religious-celebration-calendar/

Research Infrastructure Services: https://ris.wustl.edu/

Student Health Center: https://students.wustl.edu/habif-health-wellness-center/

Forms

All forms must be completed and signed electronically in Docusign. Forms may be located on the McKelvey Graduate Student Services site: https://engineering.wustl.edu/offices-services/student-services/graduate-student-services/forms.html. Students should contact the Graduate Program Advisor for questions.

Transcript Credit Request Form: To be completed if requesting transfer credits from an institution outside of Washington University. Students must pass the QE prior to submitting this form.

Lab Affiliation Form: To be signed after matching with a permanent advisor typically in December of the first-year of study.

Research Advisory Committee Approval Form: To be completed once a research advisory committee has been put into place prior to scheduling the thesis proposal examination.

Proposal/Title, Scope & Procedure Form: To be completed immediately after passing the thesis proposal.

Dissertation Committee Approval Form: To be completed once a final dissertation defense committee has been confirmed and at least 5 weeks prior to the final dissertation defense. Students must contact the Graduate Program Advisor to access this form.

Dissertation Defense Approval Form: To be completed following the final dissertation defense and approved and signed by the Dissertation Committee members