

University of Virginia

Department of Engineering Systems & Environment (ESE)

GRADUATE STUDENT HANDBOOK

Revised August 21, 2019

EFFECTIVE FOR STUDENTS ENTERING FALL 2019 OR LATER

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1. INTRODUCTION

1.1 Department of Engineering Systems and Environment

The Department of Engineering Systems and Environment (ESE) at the University of Virginia (UVA) was founded in 2018. It was created to combine and grow elements of what had previously been two separate departments: Civil and Environmental Engineering (CEE) and Systems and Information Engineering (SIE). The motivation behind the creation of the new department was to draw together expertise and skill sets from civil, systems, and environmental engineering to advance education and research in fundamental and applied engineering that improves the quality of life for communities and people.

ESE is now home to more than 40 full and joint-appointed faculty members with active teaching and research programs. We offer two accredited undergraduate degrees: Bachelor's of Science in Civil Engineering (CE), and the Bachelor's of Science in Systems Engineering (SE). We also offer two classes of Master's degrees, the Master of Science (with thesis) and Master of Engineering (non-thesis). Each Masters degree is offered in both CE and SE. We also offer PhD degrees, one each in CE and SE. Finally, we offer an Accelerated Master's Program (AMP) in SE, which is another ME program offered on weekends for working professionals. It has its own separate handbook.

ESE graduate students play a critical role in our department's research and teaching activities, partnering with faculty and staff to deliver excellence in education and discovery. We believe that a better future is possible for all by training the leaders of tomorrow in a collaborative academic environment that encourages excellence in the classroom and laboratory.

1.2 Mission

The Department serves the Commonwealth, the Nation, and the world by graduating engineers with the broad knowledge necessary to design and manage the operation of complex systems integrating people and technology at scales that range from personalized technologies to large-scale civil and environmental infrastructure. We create and disseminate new technical knowledge resulting from high-impact research to advance these human- and socio-technical systems.

1.3 Diversity and Community

ESE is committed to sustaining a vibrant and inclusive environment that fully reflects the Engineering School's core value of diversity, which is defined as "excellence expressing itself through the intersection of every individual's perspectives and lived experiences." Faculty, staff, and students will strive for excellence in all that we do and treat all with respect and show gratitude and provide outstanding stewardship for the resources that support our mission that come from tuition, the Commonwealth, research sponsors, and our friends and alumni.

4. DOCTOR OF PHILOSOPHY (PhD)

4.1 OVERVIEW

The DOCTOR OF PHILOSOPHY (PhD) is an advanced graduate degree for students wishing to contribute to knowledge creation through independent, original, cutting-edge research.

ESE offers two parallel doctoral programs: a PhD in Civil Engineering (CE), and a PhD in Systems Engineering (SE). These degree programs are distinct from each other in their emphasis on specific knowledge domains, but they are also unified by several cross-cutting components. The unifying elements underscore the interrelationships among modern civil, environmental, and systems engineering. Both programs provide a springboard for careers as an academician, researcher, consultant, or in management/leadership within a university, institute, industry, or government setting. ESE doctoral programs include three components.

- **Coursework and Teaching** to gain fundamental and advanced knowledge, as both student and graduate teaching assistant (GTA)
- **Research** conducted in a collaborative environment leading to a doctoral dissertation and scholarly papers.
- **Engagement** in UVA's intellectual life

4.2 ADMISSION AND APPLICATIONS

The deadline for ESE graduate applications is January 5. All ESE faculty are eligible to advise students enrolled in the CE and/or SE PhD programs. Applicants may apply to both the CE and the SE programs concurrently. We accept applications from candidates with degrees from all engineering and some affiliated backgrounds. In some cases, candidates who do not have engineering or similar credentials will be offered conditional admission, which will require them to take selected undergraduate coursework in addition to the coursework required for their PhD. All candidates are evaluated by one or more of the ESE research sub-groups. Some students are admitted directly into a specific research group with a specific adviser. Other candidates are admitted into a sub-group and are then connected with an adviser during the first year.

Most accepted PhD students receive financial aid. Funding offers take the form of graduate research assistantships (GRAs), graduate student teaching assistantships (GTAs), and/or various fellowships. ESE is committed to acquiring the resources to fund PhD students for five years, contingent upon satisfactory progress towards the degree; i.e., completion of milestones as laid out in Table B, cumulative GPA ≥ 3.0 , and no U or NC grades in coursework or graduate teaching. Students should regularly discuss their progress with their adviser. The department's default stipends are \$22,000 per year for students entering without an MS until the year after they take and pass the Qualifying Exam (QE); and \$24,000 per year for students entering with an MS and/or having passed the QE. This bump in pay will occur in the semester following the exam date. Individual advisers may pay more than the default rates but not less. Funded offers also

include tuition and health insurance in addition to stipend. Some PhD students are funded by third-party entities (e.g., their employer, government or military agencies), and a small number of students are self-funded.

4.3 SEAS REQUIREMENTS

SEAS requirements are described in the [UVA Graduate Record](#). The Graduate Record also addresses admission requirements, rules and regulations pertaining to financial assistance and outside employment, and other matters. The portion of the School of Engineering website devoted to [Current SEAS Graduate Students](#) also contains many helpful resources (e.g., [forms](#)).

4.4 ESE REQUIREMENTS AND MILESTONES

4.4.1 COURSEWORK, PROFESSIONAL DEVELOPMENT, AND ENGAGEMENT

ESE has three general classes of PhD requirements: 1) coursework, 2) professional development, and 3) scholarly engagement. These are described below.

Coursework. The CE and SE programs require relevant coursework to help students access foundational knowledge in their discipline; while striking a balance between depth and breadth. All ESE PhD students entering with a Master’s degree from another institution must take at least 6 credits of ESE graduate coursework at UVA. Each degree program has its own coursework requirements, as summarized in Table A.

Table A. ESE coursework requirements by degree program and concentration area. All ESE PhD students, including those entering with an MS from another institution, must complete at least 6 credits of ESE coursework. Students who earn an ME or MS degree at UVA en route to a PhD in ESE may use ESE credits from their Master’s degree to meet this requirement. A minimum of 30 credits beyond the BS is required for all SEAS PhDs.

Program	Coursework Requirements
CE	<ul style="list-style-type: none"> ● 2 “core courses” from any CE ME framework (EWRE, STR, TRN, or ISE)* ● 2 additional courses selected from the “core”, “systems, sustainability , resilience, and risk” (SSRR) relectives, and/or “technical electives” of any CE ME framework* ● ESE Colloquium (CE 7001) - each semester

SE	<ul style="list-style-type: none"> ● SYS 6001 ● 3 “foundation” courses** ● 5 “methodological” courses from at least two bins** ● 3 electives ● ESE Colloquium (SYS 7069) - 2 semesters
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*See the CE ME frameworks in Section 2.3 (TBD) or [this portion of the ESE website](#).

**See the SE curriculum appendix or [this portion of the ESE website](#).

Previous Coursework at Other Institutions. PhD students entering the SE program with a Master’s degree from another institution are bound by the coursework requirements in Table A; however, they may use their prior graduate courses to fulfill the above requirements. The request for credit transfer must be submitted separately and must include the following documents: [a petition form](#), a description of course content or syllabus, and an official transcript. Regardless of transfer credit, students must take at least 6 hours of ESE graduate course offerings at UVA. PhD students entering the CE program with a Master’s degree in civil engineering or environmental engineering are not bound by the coursework requirements in Table A. They may take any 6 credits of ESE graduate coursework. CE students entering with a Master’s degree in other disciplines from UVA or elsewhere are bound by the requirements in Table A.

Professional Development and Scholarly Engagement. The ultimate goal of an ESE PhD is to give students the best possible preparation for their careers in research, government, or industry. The following professional training requirements help students prepare for the full spectrum of career choices.

Graduate Teaching Assistantships (GTA). Students will serve as GTA for at least **one semester**. GTAs will enroll for three credits (S/U basis) of CE 8001 or SYS 6097 in a section corresponding to their supervising instructor. ESE students assigned as GTA for APMA courses will register for APMA 8897, again in the section corresponding to his/her supervising instructor. A GTA assignment will not count towards completion of the teaching requirement if the student does not receive an “S” grade. Receipt of one or more U grades for graduate instruction may endanger a student’s eligibility to serve as GTA in future semesters. See Section XX for more information about SEAS language-skills requirements for international students serving as GTAs. This requirement can also be met by participating in the [SEAS Graduate Teaching Internship Program](#) in which a graduate student co-teaches a course with a faculty mentor.

In special circumstances, a student may petition his/her committee to substitute a substantive alternative professional development and/or specialized training experience

(e.g., externship, etc.) for one of the two required GTA experiences. This determination is at the discretion of the graduate committee.

Research Dissemination. Students will disseminate their research via papers and conferences. Before scheduling the final defense, have two first-author journal papers (published or accepted), two conference proceedings, or one of each. Students must also present in at least one conference. To support student travel to conferences, all ESE PhD students are eligible to receive up to \$1500 one time during their academic career. Students should get approval from their adviser before requesting the funds. The student should then fill out the Student Travel Funds Request form (online). This form requires information about the conference logistics (title, location, dates, etc), a brief description of the work the student will present and/or why it will be valuable for them to attend, and a very high-level.

Scholarly Engagement. Doctoral students are valued members of ESE's community of scholars. They are expected to be good citizens of ESE by engaging in departmental and school-wide events (e.g., seminars, milestone defenses, symposia, workshops, social events, etc.) Attending events such as seminars and student thesis/dissertation defenses are one crucial mechanism to learn from their peers, critically evaluate research, improving presentation skills, and expand their knowledge. **Section XX** provides more information about the role of the ESE Graduate Student Council and opportunities for students to be involved in departmental leadership.

Milestones. The three main milestones towards completion of an ESE PhD include: the Qualifying Exam, the Dissertation Proposal, and the Dissertation Defense. **Sections 4.3 and 4.4** provide additional information on the goals, format, timing, and administration of these milestones, including policies governing committee composition.

Table B depicts a typical timeline for completion of the PhD in ESE. This timeline assumes that students enter the PhD after first completing a Master's degree; however, ESE also routinely accepts students directly into the PhD program without first requiring them to complete an MS. For these students, it may be valuable to extend the initial timeline by one year, in which case students can delay the Qualifying Exam until the end of their second year. The rest of the timeline then proceeds as shown in Table B. The time limit for the PhD degree completion is seven years although most students graduate in five years or less.

Table B. Typical timeline for ESE doctoral students entering with a Master’s degree. Students entering without a MS may need one extra year before taking the Qualifying Exam. Different research groups offer Qualifying Exams at different times of year.

YEAR 1	<ul style="list-style-type: none"> ● Establish a working relationship with the faculty advisor(s) ● Begin coursework ● Identify a research area ● Prepare a draft PLAN OF STUDY* ● Pass the Qualifying Exam
YEAR 2	<ul style="list-style-type: none"> ● Finish coursework ● Establish research and identify a doctoral committee (December) ● Present and defend Dissertation Proposal (March – June) ● Finalize PLAN of STUDY*
YEAR 3	<ul style="list-style-type: none"> ● Continue research ● Continue or complete teaching requirement (as GTA) ● Submit a paper for publication ● Attend and present at a research conference (and publish in proceedings as needed)
YEARS 4-5	<ul style="list-style-type: none"> ● Complete research ● Continue or complete teaching requirement (as GTA) ● Publish additional paper(s) or proceeding(s) ● Defend Dissertation

*The Plan of Study form can be accessed from the ESE website ([case.illinois.edu](#)). This form is for departmental use only. Students should file the form with a Graduate Student Services Coordinator in [OLS XXX](#) and access it whenever they convene their committee and/or complete a requirement. Official tracking for SEAS and ESE requirements is done using the Academic Requirements Report (ARR) in SIS.

[Section XX](#) of this handbook summarizes information pertaining to requesting a leave of absence (e.g., family, health, or other reasons) and/or transitioning away from full-time status for one or more semesters. When considering these options, students are urged to talk with their adviser, their program’s Graduate Director, and the SEAS Graduate Registrar. These individuals are committed to helping students find and navigate their best possible paths.

4.4.2 QUALIFYING EXAM

The principal objective of the Qualifying Exam (QE) (also referred to as “comprehensive exam” or “PhD exam”) is to assess a student’s research aptitude and confirm that he/she has the skills necessary to make a substantive contribution in their field. The exam also provides an

opportunity for students to receive early, individualized feedback regarding their strengths and weaknesses in research and foundational knowledge.

The goal of the qualifying exam is not to directly assess any content in required courses, but to provide a comprehensive use of the foundational principles and methods in research. Thus, students must have already completed some but not all of the required coursework (Table A), subject to his/her committee's discretion, before taking the qualifying exam. Required coursework varies by program and concentration. **See Section 4.4.1.**

Successful students will demonstrate that they can:

- a) Understand, interpret, and critically evaluate relevant literature.
- b) Analyze data (via experiments, observations, surveys, simulation, etc.) and draw meaningful conclusions.
- c) Apply technical/engineering tools, concepts, and/or approaches to gain insight on real-world problems.
- d) Effectively communicate results in both oral and written formats.
- e) Answer questions and respond to critical feedback when sharing, defending, and revising his/her ideas.

The examination consists of two parts, written and oral. The following guidelines apply.

Committee Composition

The examining committee will include 3-5 members including the student's adviser. At least 3 of the committee members must be from ESE. External (non-ESE) faculty may be a part of the committee but do not count towards the ESE requirement. ESE courtesy members may count as either an ESE or external member, at the discretion of the student and adviser. ESE courtesy members also count as SEAS faculty members for the purposes of satisfying SEAS committee composition requirements. In most instances, the qualifying committee contains many of the same members as the student's dissertation proposal and defense advisory committee. However, this is not mandatory.

The chair of the qualifying exam committee should be an ESE faculty member but cannot be the student's adviser. The chair will be responsible for collecting and delivering feedback to the student, as explained below.

Committee Creation and Preliminary Scheduling

Students should work with their adviser to identify a qualifying exam committee and schedule their exam to take place no later than the end of their second year in the ESE department. Most students will take it after 1 or 1.5 years, subject to committee member availability. The student must file a completed **ESE Qualifying Exam Committee Composition Form** with the graduate coordinator by the end of the semester preceding the examination.

The faculty recognize that preparing for and taking the qualifying exam can be one of the more stressful periods of the PhD program. However, framing the exam as research aptitude assessment is intended to make it such that “preparing for the exam” and “doing research” can be one and the same. Students should meet with each of their committee members prior to beginning their exam preparations, so that they can discuss how the candidate can best make use of their time.

Structure and Format of Exam

Students will work with their individual examination committees to identify dates for the written and oral components of the exam. They should then work backwards from those dates to complete the activities summarized below. **Appendix 1** summarizes a hypothetical example timeline for completing the exam. It should be noted that some groups of faculty give their qualifying exams once per year at a particular time; e.g., Transportation Engineering have typically given their exam in August after the first year, Environmental/Water Resources Engineering has typically done so in January of the second year. The ESE-wide exam structure is intended to be compatible with and accommodate those practices. Therefore, the schedule in Table B may be pushed back accordingly if a student’s committee wishes to give the exam later than the end of the first year.

Once the written exam date has been selected, the student should prepare a 1-page overview of his/her research area, and a preliminary reading list (i.e., research papers, book chapters, policy briefs, etc.) organized by topic. The final reading list is determined by the student in collaboration with their qualifying exam committee. They should circulate these materials to their committee members no later than 1 month before their scheduled exam date. Committee members will have 1 week to respond to the student with suggested modifications to their proposed reading list. The student will then circulate the final reading list to the whole committee no later than 2 weeks before the scheduled exam date. It is recommended that students start this process earlier so they can have a thoughtful, engaged dialogue with the committee, and can prepare a comprehensive reading list.

The student’s examination committee will then prepare their questions based upon the research overview and finalized reading list. They will forward the questions to the adviser and other committee members before the exam with adequate time for everyone to evaluate the exam as a whole before it begins.

The student will work independently on the exam for up to 7 days; however, individual faculty may specify time limits and restrictions for their own individual questions. Students will submit their solutions to the examination committee at the end of the exam period. Each committee member will score his/her own question using the *a-e criteria* noted above using the **ESE Qualifying Exam Assessment Form (Appendix 2)**. Each committee member should complete his/her scoring prior to the oral exam. Students should schedule the oral exam before the written questions are delivered. The exam should be no more than 10-days after the written exam is completed.

The oral exam will consist of two parts: 1) a brief pre-prepared presentation summarizing the questions and their responses to the questions; and 2) follow-up questions from the committee. There maximum time for the oral exam is 2 hours.. Once the oral exam has concluded, each committee member will re-score his/her question, again using the a-e criteria and the **ESE Qualifying Exam Assessment Form**. The chair is responsible for collecting and organizing feedback from the committee and then communicating it to the student after the exam. A key objective for the exam is to give students individualized feedback on their unique strengths and weaknesses.

Exam Outcomes

The outcome of the exam is determined collectively by the examination committee immediately following the exam; choosing from four options: pass with distinction, pass, pass with remediation, or fail. The committee weighs both parts of the exam (written and oral) at its discretion, when determining the outcome. The chair is responsible for communicating the outcome of the exam and delivering feedback from the committee after the exam.

Students who do not pass, or pass with remediation, can retake the examination within 6 months. Committee composition modifications are at the discretion of the committee chairperson. Students who do not pass on their second attempt are dismissed from the PhD program.

Forms

- **ESE Qualifying Exam Committee Composition Form**: Due to an ESE Student Services Coordinator at least 1 semester before scheduled examination.
- [SEAS PhD Examination Report](#): Student brings one copy to the oral exam; committee chair files one completed version with an ESE Student Services Coordinator after the exam has been completed.
- Academic requirements report from SIS: student brings one copy for each committee member to the oral exam.
- **ESE Qualifying Exam Assessment Report**: each committee member brings one copy to the oral exam; committee chair collates committee feedback into final version for sharing with candidate and filing with ESE Student Services Coordinator.

Appendix 1. Hypothetical timeline for an ESE Qualifying Exam for an exam date of May 1.

Date	Task(s)
December 1	Student forms examination committee and files Committee

	Composition form.
January	Candidate circulates research overview and preliminary reading list to examination committee.
February, March	Candidates and committee finalize reading list; committee members formulate and review questions
May 1	Questions delivered to candidate
May 8	Candidate submits written responses to examination committee and graduate coordinator.
May 9	Committee members score written responses to their questions.
May 16	Oral examination takes place; committee rescores candidate responses and chair collects feedback and reports outcome (pass with distinction, pass, pass with remediation, fail) to candidate.
May 17	Follow-up e-mail / interaction with chair if necessary.

**The timeline will vary by research group and doctoral advisory committee. The above is just an example of an appropriate timeline to form committee, prepare reading list, and take the qualification exam.*

Appendix 2. ESE Qualifying Exam Assessment Report. Committees may be comprised of 3, 4, or 5 members, but at least three members must be from ESE. Rating scale: 5 = superior/outstanding, 4 = very good, 3 = acceptable, 2 = marginal/needs attention, 1 = unacceptable for PhD student.

Criterion	Member 1	Member 2	Member 3	Member 4	Member 5
	Initials:	Initials:	Initials:	Initials:	Initials:
a. Understand, interpret, and critically evaluate relevant literature.	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
b. Analyze data and draw meaningful conclusions.	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
c. Apply technical/engineering tools, concepts, and/or approaches to gain insight on real-world problems.	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
d. Effectively communicate results in both oral and written formats.	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
e. Answer questions and respond to critical feedback when defending his/her ideas.	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>	<i>WRITTEN</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>	<i>ORAL</i>
	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA	1 2 3 4 5 NA
Overall assessment (circle):	1	2	3	4	5
Recommended outcome (circle):	Pass with Distinction		Pass	Pass with Remediation	Fail

Comments:

Specific Strengths and Weaknesses:

4.4.3 DISSERTATION PROPOSAL

Formulation of a dissertation proposal is a key step towards completion of the PhD. This milestone allows a student's committee to make three important determinations:

1. To assess whether the student's knowledge of his/her chosen area and their understanding of relevant literature is adequate to complete a PhD.
2. To recommend coursework, approaches/techniques, and other resources that would facilitate or enhance the proposed work.
3. To evaluate whether or not the proposed work, if completed, would constitute an acceptable basis for a doctoral dissertation.

Selection of a PhD committee is an important component of the dissertation proposal process, insofar as the committee is responsible for helping the candidate navigate his/her path to the PhD. The PhD committee reviews and approves a candidate's plan of study, including coursework, teaching, dissertation proposal, and the final dissertation. ESE faculty place high value on interdisciplinarity and cross-cutting collaborative research. Accordingly, we are firmly committed to letting each student pick a committee that best supports his/her scholarly and professional development. PhD candidates are not subject to any committee composition rules beyond the SEAS requirements. The SEAS rules are as follows: the final dissertation committee must include a minimum of three SEAS faculty, a minimum of four UVA faculty, and a minimum of five total members; and one of the UVA members (the "external member") must be from outside ESE. It is ESE policy that graduate students may use a courtesy-appointed faculty member as either an internal or external member. (See **Section XX** for additional information about the ESE Courtesy Faculty policy.) It is acceptable for a dissertation proposal committee to have four instead of five members, in which case the fifth person is added before the final defense. The external member can be a part of the dissertation proposal committee or be added before the final dissertation.

The proposal milestone has two components: written and oral. Each candidate writes an NSF style proposal (≤ 15 pages inclusive of references and figures, single spaced in 11 point font excluding references) that lays out their proposed dissertation research, including: background/motivation, relevant literature review, goals, proposed work and methodology, relevant preliminary results and expected additional results, conclusions and implications. Students should also prepare a list of expected products (e.g., papers, presentations, etc.) and a tentative timeline for completion of the degree. Candidates circulate their proposals to their dissertation committees no less than one week before the oral defense. While the proposal document is due at least one week prior to the oral defence, it is expected that students have discussed their research and timeline with their committee before this date. All members of the committee will evaluate the proposal, and generate a preliminary assessment of the candidate's achievement of the following research skills: a) identifying relevant problems of interest, b) interpreting existing literature, c) generating hypotheses, d) collecting data (via experiment, observation, modeling, and/or simulation), e) interpreting results and drawing conclusions, f)

communicating results (in oral and written formats), g) answering questions and defending his/her work, and h) commenting/critiquing on the work of others.

The oral defense of a dissertation proposal is advertised within the Department and School. All interested parties are welcome to attend. The candidate gives a brief overview (20-25 min) of their proposed dissertation research then takes questions from the audience and his/her committee. The committee then deliberates and decides whether the candidate has passed. The committee also reviews the student's transcript and plan of study, to recommend additional coursework or other relevant training if necessary. In this way, the emphasis of the dissertation proposal will be on supporting student growth, reviewing scope and preliminary work, rather than just deciding who passes/fails. Candidates who fail the proposal defense must take it again within six months. The chairperson of the candidate's committee takes the lead in identifying an appropriate format and timeline for the second-chance defense. Committee composition modifications are at the discretion of the chair. Students who do not pass on their second attempt are dismissed from the PhD program.

It is the candidate's responsibility to print out and bring the **relevant forms** to the proposal defense, including his/her transcripts and plan of study. Each committee member is responsible for completing a research skills assessment and submitting it to the committee chairperson. The chairperson collates the feedback, submits an aggregated assessment form to the department's graduate coordinator (who sends it to the SEAS registrar), and circulates the feedback to the candidate and his/her adviser within two weeks of the defense. **Section XX provides information about relevant forms.**

Finally, reiterating from **Section XX and Table A**, ESE students typically complete their proposal milestone at the end of Year 2, or the end of Year 3 if they enter the PhD without an MS. The [committee composition form](#) should be submitted to the graduate coordinator no later than December 1.

4.4.4 FINAL DEFENSE

The final dissertation defense is the culminating step of the PhD process. The main objective of this milestone is to confirm that the completed research constitutes a meaningful contribution to the body of knowledge in our field. A secondary objective is to ensure that the written quality of the final document is adequate to highlight the value of the work and make it accessible for an educated audience. We recommend that students meet with their committee members at least once per year to update them on their progress and receive timely feedback.

Students are eligible to defend their dissertation once they have completed all other requirements, including the publication requirement. There is no required format for the dissertation; rather, the candidate should work with his/her committee to prepare a satisfactory document. The candidate should circulate the final dissertation to his/her committee no later than two weeks before the oral defense date. Final defenses are advertised within the Department and School. All interested parties are welcome to attend. The candidate gives a brief overview (30-35

min) of their dissertation research then takes questions from the audience and his/her committee. The committee then deliberates and makes a determination about whether the candidate has passed. Candidates who fail the defense must take it again within six months. The chairperson of the candidate's committee takes the lead in identifying an appropriate for the second-chance defense. Committee composition modifications are at the discretion of the chair. Students who do not pass on their second attempt are dismissed from the PhD program.