



Engineering Education Research Program

Graduate Manual

Effective for students enrolling in
Fall 2025 or later

Last updated July 9, 2025. Key updates from the previous version, many of which are formatted in red text, include that we've:

- Added language to provide more context about the *Leave of Absence* policy (Section 3.3).
- Clarified that the minimum course grade of B– or better pertains to both the credit hour and coursework requirements (Sections 3.4, 4.2, 8.1, and 9.2).
- Updated the *Changes in Advisor* policy (Section 3.11) to provide more explicit guidelines and practices, including implications for doctoral student funding, good academic standing, and academic probation policies. These updates were effective January 8, 2025, the first day of the Winter 2025 semester.
- Added language to clarify dissertation committee membership rules (Section 5.3).
- Changed the Research Methods core to require an introductory and advanced course in both qualitative research methods and quantitative research methods and reiterated that some courses may have enrollment challenges (Section 7.4).
- Updated the sample programs for a hypothetical student earning a Chemical Engineering M.S.E. degree as well as the EER Ph.D. and M.S. degrees (Table 9 and Table 10).
- Made minor wording adjustments throughout.

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1. INTRODUCTION

The Engineering Education Research (EER) Program at the University of Michigan (U-M) comprises a small core of EER courses and experiential learning requirements, and it builds on research methods courses as well as elective courses from the Schools of Education, Information, and Social Work, the Departments of Psychology, Public Policy, and Sociology, and other units across the university. The program includes a Doctor of Philosophy (Ph.D.) and a Master of Science (M.S.) degree. The program also offers an EER Certificate for U-M students earning a Ph.D. in a traditional engineering discipline.

The **EER Program Faculty*** teach courses in the EER Program and work with graduate students to refine students' plans of study, establish research projects, and guide the dissertation research. The intentional combination of course-based and experiential learning is intended to promote interdisciplinary and transdisciplinary research in engineering education and allow students to individualize their learning experience. The program further encourages linkages across U-M and the College of Engineering by fostering an intellectual community of faculty and students committed to the study and improvement of engineering education across the K-16 educational system who will benefit from a regular seminar series and additional activities to promote community.

The market for EER professionals is strong. EER graduates earning a Ph.D. or M.S. degree have a number of job options including tenure-line faculty in traditional engineering or engineering education departments, instructors or research scientists in universities or national labs, professional staff in centers for teaching and learning, administrators in educational institutions or federal agencies, learning scientists at educational IT companies, and higher-educational liaisons to industry.

This EER Program Graduate Manual provides information on the requirements for the **EER Ph.D. degree**, the **EER M.S. degree**, and the **EER Certificate**, and it pertains to students entering the program on or after the date listed on the front cover of the document. The manual is subject to change; however, any changes that affect currently enrolled students will only be enforced if they will be beneficial to the students' academic studies. Such changes will be communicated to all students affected.

The EER Ph.D. and M.S. degrees are part of U-M's Horace H. Rackham School of Graduate Studies (Rackham) which publishes the Graduate School Academic Policies with regulations that apply to all graduate students. Students in the EER Program should consult both this EER Program Graduate Manual and the Rackham Academic Policies guide (<https://rackham.umich.edu/academic-policies/>).

The **EER Graduate Chair** (eer-grad-chair@umich.edu) oversees recruiting, graduate admissions, fellowships, and degree requirements (including progress reports and Qualifying Examinations). The graduate chair also serves as academic advisor for EER Ph.D. and M.S. students and coordinates the program's curriculum.

The **EER Graduate Coordinator** (eer-grad-coordinator@umich.edu) helps students navigate the policies and guidelines of both the EER Program and Rackham. The coordinator assists with issues related to student admissions, EER Certificate applications, advising, curricula, and degree audits, and will refer students to the other appropriate U-M organizations as needed. This person also provides support for various EER activities and programs, publicizes and coordinates EER events, and maintains the EER website.

The **EER Financial Administrator** (eer-fin-admin@umich.edu) is responsible for processing fellowships and employment paperwork for EER graduate and undergraduate students.

* Through a unique College of Engineering initiative, several tenured/tenure-track faculty whose primary area of scholarship is EER are embedded in traditional engineering departments. These *EER Program Faculty* maintain a thriving EER portfolio, contribute to the EER community, and teach in and support the mission of their home engineering departments.

2. ADMISSION

2.1. APPLICATION TO THE EER PROGRAM

Admission to the EER Program is through Rackham (<https://eer.engin.umich.edu/admissions/>). Dual enrollment students – current Rackham graduate students wishing to concurrently enroll in the EER M.S. program or the EER certificate – are invited to apply at any time. Other applications are only accepted during the normal application timeline (each Fall term for admission the following Fall). It is the applicant's responsibility to ensure the EER Program receives the completed application materials by the specified deadlines.

Effective Fall 2021, students are required to have at least a bachelor's degree in engineering and are encouraged to have a master's degree in a traditional engineering discipline. As an alternative to the master's degree, students are allowed to demonstrate outstanding qualifications in other ways (e.g., related graduate coursework or work experience) as well. Encouraging students to have an M.S. degree (or equivalent) in engineering ensures that they (1) enter the program with the maturity and traditional engineering expertise necessary to understand the context critical for developing high quality EER research, and (2) graduate from the program with marketable skills and ample career opportunities.

Applications for both the EER Ph.D. and M.S. degrees can be accessed at the Rackham website. Applying to the program requires:

- A completed application form;
- An academic statement of purpose that describes how the EER Program will support the student's career and educational goals;
- A personal statement that describes background and life experiences that have influenced the student's decision to pursue an EER degree at U-M;
- Three letters of recommendation;
- Transcripts from B.S. and M.S. degrees and from other previous academic coursework; and
- TOEFL scores (for all non-native English speakers).

For students applying in Fall 2020 or later, GRE scores will not be accepted. Competitive applicants must clearly articulate a clear reason for pursuing an EER graduate degree at U-M, describe what other EER Programs across the U.S. offer, and explain how the U-M EER Program is uniquely aligned with personal goals, demonstrate knowledge of at least one EER faculty's research focus, and articulate alignment with a potential EER advisor and research group. Students admitted to the EER Ph.D. program will be assigned an EER Faculty Advisor.

2.2. DEFERRALS

Admissions deferrals may be available for up to one term under special conditions (<https://rackham.umich.edu/admissions/applying/respond-to-the-offer/#deferring>). Typically, circumstances such as employment, enrollment at another institution, funding, or indecisiveness regarding enrollment are not appropriate justifications for requesting deferred enrollment. It is the policy of the EER Program that requests for a one-year deferral will require a new application. To request a deferral, send an email to eer-grad-coordinator@umich.edu.

3. GENERAL ACADEMIC POLICIES

3.1. ENGLISH PROFICIENCY

Based on English language proficiency test scores (such as the TOEFL), some students will be encouraged by Rackham to take specific academic writing or speaking courses offered by the English Language Institute (ELI) to support their studies. The ELI courses are typically 1 to 3 credits, and they help students gain capability and confidence in English. These courses will not count toward the degree requirements or grade point average (GPA).

The quality of a student's written and spoken English is also evaluated when Ph.D. students participate in the oral Qualifying Examination and Dissertation Proposal Examination presentations. Students who are unable to complete degree requirements or make satisfactory progress toward the degree because of significant deficiency in English may be placed on probation. If the EER faculty consider students to be otherwise qualified for the EER Program, taking *English as a Second Language* courses (typically offered through the English Language Institute) may be recommended.

3.2. ENROLLMENT STATUS

To be considered full-time, students who are serving on a Graduate Student Instructor (GSI) or Graduate Student Research Assistant (GSRA) appointment must be enrolled in at least 6 credits in a given term; while students who are not serving on a GSI or GSRA appointment (e.g., students on a fellowship) must be enrolled in at least 8 credits in a given term. Students who enroll in fewer than these credits will be considered to be part-time. There is no upper limit on the number of credits in which a pre-candidate may enroll; however, students who have achieved candidacy are subject to the limits outlined in Section 5.2. Courses in the English Language Institute do not count towards enrollment status, nor does Visit/Audit of a class.

Students who enroll full time are charged a flat tuition rate based on residency and candidacy status, while those who maintain part-time enrollment will accrue a per-credit tuition charge. Michigan residents qualify for in-state tuition, and students who achieve candidacy qualify for a lower tuition rate.

Note that the EER Ph.D. is considered a full-time program. Students are expected to focus full-time effort to their studies and research, and they are required to limit any external employment to a maximum of ten hours per week during the fall and winter semesters and a maximum of twenty hours per week during spring and summer semesters. Any employment during the student's time at U-M must be approved by the student's Faculty Advisor and the EER Graduate Chair.

3.3. LEAVE OF ABSENCE

Doctoral students wishing to officially suspend work towards their degree for a limited time period during the Fall or Winter term may request an *official* leave of absence (LOA) from Rackham. Rackham outlines four types of LOAs (medical, family necessity or dependent care, military service, and personal) and lists the maximum time permitted for each, the required documentation, and other information at their website (<https://rackham.umich.edu/navigating-your-degree/leave-of-absence/>).

Personal LOA applications must be submitted before the first day of classes. Medical, Family, and Military LOA applications should ideally be submitted by the drop/add deadline to avoid tuition charges but are required by the last day of classes. Students on any LOA will have access to basic university services (e.g., email, library). Students taking a LOA are not eligible for university-administered fellowships and grants, new loans, or student employment (GSIs, GSRA's, GSSAs, etc.). GradCare will only be available for Medical LOAs. Students with F-1 or J-1 visas should meet with the International Center to discuss the implications of taking a LOA.

During a Spring/Summer term when registration is not required, students may suspend work through an *unofficial* LOA overseen by the EER Program. Rackham is not informed about unofficial leaves; therefore, an unofficial LOA is not counted against the student's eligibility for future LOAs.

Students who require accommodations immediately following the birth or adoption of a child under the age of 6 years old can apply for Rackham's Parental Accommodation (<https://rackham.umich.edu/navigating-your-degree/parental-accommodation-policy/#q012>), which is different from a Leave of Absence. Students maintain their registered full-time student status and are required to make degree progress, but the expectations are modified. Students must consult with their faculty advisor regarding how to meet academic goals and requirements before applying. The length of the accommodation period will be limited to 6 or 12 weeks. Students will continue to receive their stipend and benefits during the parental accommodation period.

For any LOA, students should meet with the EER Graduate Chair to develop a re-entry plan.

3.4. GRADE REQUIREMENTS

Except for research credits (EER 690, EER 990, and EER 995) and the Immersive Learning Experience (EER 610), which are graded as “S” (satisfactory) or “U” (unsatisfactory), all courses must be letter-graded. Grades are assigned according to the following Rackham scale:

A+ 4.3	B+ 3.3	C+ 2.3	D+ 1.3
A 4.0	B 3.0	C 2.0	D 1.0
A– 3.7	B– 2.7	C– 1.7	D– 0.7

Graduate students must maintain a GPA of at least 3.0, based on Rackham’s 4.0 scale, and only course grades of B– or better will be counted towards the credit hour **and coursework** requirements for the EER Ph.D. degree, M.S. degree, **or Certificate**. Students whose cumulative GPA falls below 3.0 on the 4.0 scale may be placed on probation, as described in Section 3.10.

3.5. COURSE WITHDRAWAL

At the beginning of each term, there is a drop/add period (the first three weeks of classes) during which students are allowed to register for courses through Wolverine Access without penalty. University-wide deadlines are set by the Office of the Registrar (<https://ro.umich.edu/calendars>). After the drop/add deadline, students may continue to drop and add courses through Wolverine Access, but this will be considered a “late-drop” or “late-add.” A late-drop will result in students receiving a “W” grade on the transcript (signifying withdraw), which cannot be removed from the transcript.

After the eighth week of a full term (fourth week of a half term), courses may be dropped or changed to Visit/Audit status only under exceptional circumstances and with the approval of the course instructor, the EER Faculty Advisor, and the EER Graduate Chair.

3.6. TRANSFER OF CREDIT

Students who wish to transfer credits must follow the Rackham Transfer of Credit guidelines (<https://rackham.umich.edu/navigating-your-degree/transfer-of-credit-information/>), and they may only apply the transfer credit towards Specialization Electives within the EER Program. Specifically, with approval from the EER Graduate Chair, students may be allowed to transfer up to 6 credits from external institutions or 15 credits from within U-M. Transferred credits must be used in whole and cannot be split (e.g., students cannot choose to only use two credits earned from a 4-credit course).

To transfer credits, students must have been enrolled at U-M for at least one term, have completed at least 8 credits of letter-graded, graduate-level coursework at U-M, and have a minimum GPA of 3.0. Transfer credits may only be awarded for courses that are at the 500-level or higher. Students must have earned a “B” grade or higher in the course, and students cannot have used the course to satisfy any undergraduate or graduate degree requirements. To request a transfer of credit for qualifying coursework, students should upload a copy of the college transcript, a catalog course description, relevant course materials, and an official letter from the institution’s registrar at the Rackham website.

3.7. GRADUATION

Graduation for the Ph.D. or M.S. degree is not automatic. Students who have completed the degree requirements must (1) submit a signed, completed final Ph.D. or M.S. Plan of Study to the EER Graduate Coordinator (**the Graduate Coordinator will route the plan for signature by the EER Graduate Chair**) and (2) apply for graduation via Wolverine Access. The last day to apply for graduation for the M.S. for a given term is the last day of classes for that term (not the last day of the final exam period). Ph.D. students must complete all requirements prior to the deadlines stated by Rackham to qualify for graduation.

3.8. ACADEMIC INTEGRITY AND THE HONOR CODE

The EER Program at U-M follows the College of Engineering Honor Code, which outlines standards of ethical conduct. (<https://elc.engin.umich.edu/policies-and-interpretations/>). Reported violations are investigated by the Honor Council.

3.9. INTERNATIONAL STUDENTS

Curricular Practical Training (CPT) for F-1 Students

The intent of Curricular Practical Training (CPT) is for international students to engage in practical job experience that directly relates to their academic program of study. Students must choose their internships carefully with the understanding that any job that is NOT specifically related to the applicant's major area of study will likely result in the denial of the CPT request.

International students who wish to enroll in CPT should contact the EER Graduate Coordinator (eer-grad-coordinator@umich.edu) to receive the CPT instruction form and complete all necessary paperwork. Credit for CPT (ENGR 998: *Curricular Practical Training*) may not be counted toward any EER degree requirements.

International students who wish to complete the practicum portion of their Immersive Learning Experience during Spring/Summer or Fall terms should follow the process outlined in Section 7.2.

Optional Practical Training (OPT) for F-1 Students

Optional Practical Training (OPT) is defined in the Federal Regulations as temporary employment directly related to a student's field of study. During OPT, students remain in F-1 status. The end result of the OPT request process is an Employment Authorization Document (EAD) issued by United States Citizenship and Immigrations Services (USCIS). Processing OPT applications typically requires 60 to 90 days. Some STEM students may be eligible for a 17-month extension of OPT.

Reduced Course Load (RCL) for F-1 Students

International students who drop below full-time status or who need fewer than eight credits to complete their program requirements should contact the EER Graduate Coordinator (eer-grad-coordinator@umich.edu). Such students should also apply for Reduced Course Load (RCL) through the International Center (<http://internationalcenter.umich.edu>).

Please note that students are eligible for RCL only if they have not yet completed their degree requirements. Due to Federal regulations, students must apply for their degree in the term in which they complete their degree requirements. If students wish to remain in the country after completing their requirements, they must apply for OPT. The International Center can provide more information.

3.10. PETITION FOR WAIVER OR MODIFICATION OF POLICY OR REQUIREMENT

If there are special circumstances that warrant it, students may petition for a waiver or modification of EER Program policies or requirements. Students should first seek the advice of their EER Faculty Advisor, and then should complete the Petition Request Form (available from the EER website). The student should submit this form, signed by their EER Faculty Advisor, and in most cases should also submit an updated plan of study to the EER Graduate Coordinator (eer-grad-coordinator@umich.edu) who will route it for signature by the EER Graduate Chair and submit the documents to the proper unit for final approval.

3.11. CHANGES IN ADVISOR

Student success in the EER PhD program relies on an effective advising relationship. Accordingly, because the student-advisor match occurs prior to admission in the EER program, prospective students should make every attempt to understand faculty expectations and lab culture (e.g., by meeting with potential faculty advisors and their current students and reviewing the faculty's published mentoring plans) prior to committing to join a specific group.

The relationship between a doctoral student and their faculty advisor(s) is complex, requires investment, and often merits persistence through periods of challenge. Nevertheless, despite all best attempts, the alignment between a student's and faculty's research interests may change or an advising relationship may not fulfill its intended potential, and a student may choose to change their EER Faculty Advisor.

When considering changing advisors, students are encouraged to have an honest dialogue with their current advisor. Students are also encouraged to communicate with other faculty about their activities and interests in a professional and transparent way and should feel comfortable to do so at any time. Any advisor transition should be handled in a timely manner to minimize delay and disruption to a student's PhD studies (it is important to acknowledge that changing advisors, even where the new topic is similar to the student's original focus, will likely extend time to degree).

If a student chooses to pursue a change of advisor, it is in the interest of all parties—student, faculty, and program—to make this change as smoothly and expeditiously as possible. A collaborative meeting between the student, the new advisor(s), and the EER Graduate Chair[†] is required, as is a meeting between the current advisor(s) and the EER Graduate Chair. This may require two separate meetings; however, a single meeting involving all parties is the most efficient way of making the transition.

Changing advisors is not always easy, and there may be serious implications. Potential transition issues such as the status of in-progress research, ongoing project responsibilities, and financial considerations should be addressed collaboratively. Note that international students will not lose their visa and it will not impact their immigration status if they change to another advisor.

The new advisor(s) is expected to assume financial responsibility for the student, such as through GSRA funding, at the start of a term; the current advisor(s) may not terminate GSRA funding mid-semester due to declared or anticipated advisor changes. The student is required to maintain their commitment to any projects that provide their current GSRA funding, up until any agreed-upon transition. In cases where the continuation of GSRA responsibilities under the current advisor is unfeasible, emergency transition funding may be sought from the College of Engineering. See “Master's and Ph.D. Graduate Student Emergency Funding Support” (<https://scholarships.engin.umich.edu/graduate-departments-programs/>) for information about how to initiate a cost share support request.

To formalize the change, after meeting with the new advisor(s) and the EER Graduate chair, the student should complete a “Change of Advisor” form, provided by the EER Graduate Coordinator. The form should detail the rationale for the change and the intended plan for transition.

Students must have an EER Faculty Advisor at all times in order to remain in satisfactory academic standing. If a student secures external funding (e.g., as a Graduate Student Instructor), the student may have a gap between advisors for up to a single term. If a student is without an EER Faculty Advisor at the start of a second term, the EER faculty will discuss whether the student should be declared to be in “Unsatisfactory Academic Standing” and placed on probation.

A change of advisor is a serious decision, and the EER Program is committed to ensuring that all transitions are conducted with the utmost respect for the interests of the student, faculty, and the integrity of the program. Consistent, open communication, and a spirit of cooperation are essential throughout this process.

[†] If the EER Graduate Chair is also the student's EER Faculty Advisor, the EER Program Faculty will elect an acting EER Graduate Chair who will serve that role for the change in advisor process.

3.12. CONCERNS AND DISPUTES

Students are invited to reach out to the EER Program Director or the EER Graduate Chair at any time to discuss any issues related to emergencies, accommodations, funding/financial concerns, advisor relationships, academic misconduct, student progress, disputes, and more. Student concerns will always be treated in a sensitive and confidential manner (except in cases where there is an imminent threat). Alternatively, students may wish to discuss sensitive issues with an objective outsider, and there are several safe and confidential environments to share concerns. Students may contact the Michigan Engineering C.A.R.E. Center (<https://care.engin.umich.edu/student-support-services/concern-report/>), the College of Engineering Director of Graduate Degree Programs (vkamat@umich.edu), Rackham's Graduate Student and Program Consultation Services (GSPCS, <https://rackham.umich.edu/about/directory/graduate-student-and-program-consultation-services/>), or the U-M Student Ombudsperson (<https://ombuds.umich.edu/>), depending on the issue and their level of comfort.

4. PH.D. DEGREE IN EER

The EER Ph.D. is a typical research-based doctoral degree. It provides essential coursework and other learning experiences that will prepare students to publish in top tier engineering education and education journals, compete for federal grants and contracts, and enter into multiple career paths. Students who are admitted to the EER Ph.D. program will be assigned an **EER Faculty Advisor** (who is a member of the EER Program Faculty) or two EER Faculty Co-Advisors (one of whom must be a member of the EER Program Faculty). The EER Faculty Advisor is intended to serve as the primary academic and research advisor. It is expected that the EER Faculty Advisor will serve in that capacity through the student's successful completion of the Ph.D. This assignment, however, is flexible, and mechanisms are in place to allow students to identify a different EER Faculty Advisor if appropriate or necessary.

4.1. MENTORING PLANS

Effective for all new students entering in 2023 or later, the EER Faculty Advisor and their students are required to co-create a written mentoring plan (using templates available from the MORE website: <https://rackham.umich.edu/faculty-and-staff/resources-for-directors/mentoring/>) and submit it to the EER Graduate Coordinator prior to the student's first annual progress report. The student and advisor pair are encouraged to attend related workshops offered by MORE to assist with drafting the mentoring plan. Then, each year in conjunction with the Annual Progress Review (see Section 6.2), the student and advisor are expected to revisit and discuss the mentoring plan.

4.2. PH.D. DEGREE COURSEWORK

The EER Ph.D. degree requires a minimum of 36 credit hours of graduate-level coursework. The courses that comprise these requirements are described in more detail in Section 7. The credit distribution for the Ph.D. is shown in Table 1. Three sample curricula for a student earning an EER Ph.D. are shown in the Appendix – Table 7 is for a Ph.D. student interested in a faculty career, Table 8 is for a Ph.D. student interested in a career in public policy, and Table 9 for a student earning both an EER Ph.D. and Chemical Engineering M.S.E. degree (see Section 4.7) for more information about pursuing a dual degree).

Table 1. Credit distribution for Ph.D. degree

Category	# courses	# credits
Engineering Education Core (EER 601 and EER 602)	2	6
Research Methods Core	4	12 – 20
Specialization Electives	3 or more	Up to 15
Immersive Learning Experience (EER 610)	1	3
Total	10 or more	36 (minimum)

Typically, students will enroll in 9-10 credits of coursework per term. Up to six credits of EER 690: *Graduate Independent/Directed Study* and up to three credits of EER 598: *Special Topics in Engineering Education Research* may be counted towards Specialization Electives. Besides EER 610 and EER 690, all courses used for the Ph.D. degree coursework requirements must be letter-graded and may not be marked as satisfactory/ unsatisfactory. **In addition, only course grades of B– or better will be counted towards the credit hour and coursework requirements.** Courses that **do not count** toward Ph.D. degree coursework requirements include the following: courses with number 990, 995; course with “doctoral,” “dissertation,” or “preliminary” in the title; ENGR 998: *Curricular Practical Training*; courses from the English Language Institute; courses with insufficiently advanced content and level; and courses which substantially duplicate the content and level of courses already completed.

4.3. COGNATE COURSE REQUIREMENT

Rackham requires Ph.D. students to complete at least three credits of coursework outside of their major research/interest area. Only letter-graded, graduate-level courses outside of the EER Program may be used to meet this cognate requirement. Students completing an EER graduate degree will automatically fulfill this requirement by satisfying the mandatory number of Specialization Electives.

4.4. PH.D. PLAN OF STUDY

Students will plan their program of study and select the courses for the Ph.D. in consultation with their EER Faculty Advisor and the EER Graduate Chair. Students are required to submit an initial Ph.D. Plan of Study (available at the EER website), approved and signed by the EER Graduate Chair, at the beginning of their first term (within a month after the beginning of the first term). Failing to do so will risk the ability to register the following term.

Students are also required to obtain pre-approval and signature from the EER Graduate Chair on a revised Ph.D. Plan of Study each time they wish to make changes to the initial plan, they must submit an updated plan of study when they qualify for candidacy, and they must obtain approval for a final Ph.D. Plan of Study in their last term. Failing to do so will risk the ability to graduate. It is highly recommended that students meet with the EER Graduate Chair to discuss the plan at the beginning of each year.

The final Ph.D. Plan of Study must satisfy all Rackham coursework requirements (including GPA, residency, and cognate requirements, see <https://rackham.umich.edu/policy/section4/>).

4.5. EMBEDDED M.S. EER DEGREE

Students who enter the EER Ph.D. Program are automatically enrolled in the EER M.S. program (described in Section 0). Students will complete all of the academic requirements for the master’s degree as they pursue the EER Ph.D., and they will be eligible to add the M.S. upon successful completion of the 30 credit hours of master’s degree coursework. To add the master’s degree, students must submit a final M.S. Plan of Study (approved and signed) to the EER Graduate Coordinator at the beginning of the term in which they will complete the master’s degree requirements.

4.6. PH.D. DEGREE RESEARCH REQUIREMENTS

Extensive engagement in research is an expectation throughout the EER doctoral experience, and all EER Ph.D. students are required to conduct independent research for their dissertation. The ongoing research apprenticeship ideally begins in the first or second term, as students begin work on directed research with their EER Faculty Advisor (EER 690: *Graduate Independent/Directed Study*). Typically, students should engage in research every term, will enroll in six or more credits of directed research (EER 690) within their first three terms, and will accrue approximately 48 credit hours of research experience during the course of their graduate career.

Up to six credits of EER 690 may be counted towards the Specialization Electives, and EER students are required to conduct advanced dissertation research beyond EER 690. After students have identified a dissertation research area, they should enroll in up to eight credits of EER 990: *Dissertation Research/Pre-Candidate*, under the supervision of their EER Faculty Advisor, every Fall and Winter term until candidacy. Upon achieving candidacy, students must

enroll in eight credits of EER 995: *Dissertation Research/Candidate*, under the supervision of their EER Faculty Advisor, every Fall and Winter term until defending their dissertation. Students should not enroll in EER 990 or EER 995 during the Spring/Summer term except when they are defending their dissertation during the summer months (see Section 5.2 for more details about course enrollment during candidacy).

4.7. DUAL DEGREE

Students earning an EER Ph.D. who add an embedded EER M.S. degree may also pursue a master's degree or certificate in another program, following Rackham guidelines for dual degree programs (<https://rackham.umich.edu/academic-policies/section6/>). The guidelines allow double counting of credits across two master's degrees or certificates and provide rules for how many credits can double count. ***Note – there is no double counting limitation if an EER Ph.D. student decides not to add the embedded EER master's degree and pursues a master's degree or certificate in another field.*** Table 9 in the Appendix shows a sample curriculum for an EER Ph.D. student earning both the embedded EER M.S. and Chemical Engineering M.S.E. degrees.

Credits for double counting may never be used for three or more master's degrees or certificates programs. If a student pursues a third degree or certificate, it must stand alone.

Please note that each degree program decides how many credits may be double counted, and some do not allow double counting at all. Students should review degree requirements for a different master's degree or certificate on the program's website. In addition, **students are highly encouraged to meet with graduate advising staff in the engineering department from which they will earn an M.S. degree before selecting classes for their second semester.**

4.8. OTHER PH.D. DEGREE REQUIREMENTS

Program for Education & Evaluation in Responsible Research & Scholarship (PEERRS)

As researchers in the College of Engineering, all EER graduate students are required to become certified in U-M's Program for Education & Evaluation in Responsible Research & Scholarship (PEERRS) within their first month. EER graduate students must access the MyLinc website (<https://maislinc.umich.edu/>) to complete two separate online PEERRS modules – *Responsible Conduct of Research & Scholarship Training (RCRS)* and *Human Subjects Research Protections* (note: effective Fall 2020, the single Responsible Conduct of Research Module was created to replace three previous PEERRS modules). Students should inform their EER Faculty Advisor and the EER Graduate Coordinator when this is complete.

Responsible Conduct of Research and Scholarship

Prior to achieving candidacy, Ph.D. students must complete the College of Engineering's Responsible Conduct of Research and Scholarship (RCRS) program, currently consisting of four distinct workshops. More information and a link to register for the free workshops is available at the RCRS website (<http://rcrs.engin.umich.edu>).

Conference Presentation(s)

At a minimum, all EER Ph.D. students, regardless of their career path, are required to author (or co-author) one conference paper and to present research findings at one international conference before graduation. Most students, and particularly those students preparing for faculty and other research-oriented careers, will author and co-author additional publications related to their research during the course of their program to prepare them for the job market. This requirement will be enforced by the EER Faculty Advisor.

5. PH.D. DEGREE MILESTONES AND TIMELINE

5.1. QUALIFYING EXAMINATION

The purpose of the Qualifying Examination is for the *Qualifying Examination Committee* to determine if a student is adequately prepared to pursue doctoral research under the direction of the EER Faculty Advisor. The Qualifying Examination requires students to synthesize and apply knowledge from their coursework and other relevant experiences as they plan an EER research project. Most students will focus the Qualifying Examination on research in which they are already engaged (e.g., a funded NSF project), and ideally, the Qualifying Examination will serve as preparation for the dissertation research. The Qualifying Examination consists of a *written research proposal* accompanied by an *oral examination*. In order to advance to successfully complete the Qualifying Examination, students must demonstrate the following:

- (a) **A suitable research topic and plan.** Students must present a *written research proposal*, which will be evaluated by the *Qualifying Examination Committee* and defended in an *oral examination*.
- (b) **Academic preparation.** Students must show that their completed (and planned) coursework provides sufficient breadth and depth of academic preparation to conduct the proposed research.
- (c) **Research ability.** Students must demonstrate that they have acquired skills and abilities required to complete the proposed research through coursework, directed study projects, conference presentations, and/or other research experiences.

Timeline for the Qualifying Examination

The Qualifying Examination will be offered each Fall and Winter term, and students are eligible to take the Qualifying Examination no earlier than the term during which they complete the master's degree coursework (typically their fourth term in the program). Thus, by the end of the term in which the Qualifying Examination is taken, students must have completed the following courses (minimum of 30 credit hours):

- The Engineering Education Core (EER 601 and EER 602);
- Three or four courses of the Research Methods Core; and
- Up to five Specialization Electives, which can include up to six credits of EER 690.

A timeline for the Qualifying Examination is outlined in Table 2. In the year leading up to the Qualifying Examination, students are expected to have regular conversations with their EER Faculty Advisor to plan and refine ideas for the Qualifying Examination. The deadline for students to pass the exam is the end of the third year.

Registering for the Qualifying Examination

By the date listed in Table 2, students must submit two PDF documents to their EER Faculty Advisor: (1) a *research outline* describing the tentative project (five-page maximum, double-spaced, including references) and (2) a *statement of preparation* (two-page maximum, double spaced). The *research outline* is similar to a white paper (e.g., the Project Summary page of a full proposal for National Science Foundation) that a researcher might send to a program manager at National Science Foundation prior to developing a full proposal. It should include a title for the proposed project, the date, and the student's name, and it should describe a research need in the field of EER and provide an overview of a research project proposed to address the need.

The *statement of preparation* should demonstrate that the student has both the appropriate background (e.g., related coursework, research experiences, and publications) and resources (e.g., access to faculty advisors and lab and computational facilities) to accomplish the proposed research. It should include details similar to those in National Science Foundation "Biographical Sketch" and "Facilities, Equipment, and Other Resources" documents.

The EER Faculty Advisor shall review the *research outline* and *statement of preparation*, provide feedback, and approve a final draft of the documents by the date listed in Table 2. Then, students register their intent to take the Qualifying Examination by submitting the *research outline* and *statement of preparation* (that have been approved by their EER Faculty Advisor) through the online portal. At the same time, the student may propose and justify

members for the Qualifying Examination Committee (note that not all requests can be accommodated). The deadline to register to take the Qualifying Examination is the date listed in Table 2.

Upon obtaining approval of the *research outline* and registering their intent to take the Qualifying Examination, students should prepare a complete research proposal for the Qualifying Examination at the end of the term.

Table 2. Timeline for the Qualifying Examination

	Winter term	Fall term
Student and EER Faculty Advisor plan and refine ideas	Year leading up to Qualifying Examination	
Student submits <i>research outline</i> and <i>statement of preparation</i> (two separate documents) to EER Faculty Advisor for feedback	January 15	September 15
EER Faculty Advisor approves <i>research outline</i> and <i>statement of preparation</i>	January 30	September 30
Student registers their intent to take the Qualifying Examination through the online portal	January 30	September 30
EER Graduate Chair forms Qualifying Examination Committee	February 28	October 31
Student schedules 2-hour <i>oral examination</i>	Mar 15–30	Nov 1–15
Student submits <i>written research proposal</i> and <i>statement of preparation</i> to Qualifying Examination Committee	Two weeks prior to <i>oral examination</i>	
Qualifying Examination Committee conducts <i>oral examination</i>	April 10–30	December 1–20
EER Graduate Program Office informs student of Qualifying Examination outcome	Three weeks after the <i>oral examination</i>	

Qualifying Examination Committee

The *Qualifying Examination Committee*, formed by the EER Graduate Chair, will consist of two EER faculty members (neither of whom may be the student's EER Faculty Advisor or Co-Advisor). The student may recommend a committee to the EER Graduate Chair, which the chair will take into consideration when forming the committee. The committee will be formed by the date listed in Table 2.

Written Research Proposal

Following approval of the *research outline* by their EER Faculty Advisor, students should develop a *written research proposal*, limited to 30 pages, double-spaced, 12-point font (including references; i.e., the entire document, with references, should not exceed 30 pages), with 1-inch margins and with citations and references that adhere to the American Psychological Association's Publication Manual. Preparing this comprehensive document while adhering to the page limit requirement provides an opportunity for students to practice making a research pitch within a bounded length. The National Science Foundation sets page limits on their various proposals, sometimes 15 pages, other times more or less, and if the submitted document is not within NSF's requirements, it is returned to the PI without review. Thus, the *written research proposal* will offer the opportunity to experience writing within these kinds of bounds.

The *written research proposal* should identify a research need and fully describe a proposed research project to address the need. It is recommended, but not required, that the project be related to the student's dissertation research. The *written research proposal* is similar to a National Science Foundation "Project Description," and it should include the following elements:

- A brief, descriptive title, the student's name, and the date of submission;
- A justification for the study, with citations to current and relevant literature, demonstrating that the research questions are important, they have not yet been answered sufficiently, and the expected answers are reasonable;
- A short set of clear research questions that can be answered with qualitative or quantitative data and (if applicable) a related set of propositions outlining the expected answers to the questions (e.g., hypotheses);
- Theoretical and/or conceptual frameworks that inform the proposed research study; and
- A detailed description of the research methods, with an articulation (supported by citations) of how the methods are guided by best practices, including:
 - A mapping to demonstrate alignment of research questions, data collection approaches, and analysis methods;
 - Information about data collection, including plans for recruitment, expected participant sample, approaches for data collection, existing or to-be-developed research instruments (including example items) to be used, and plans for piloting (if applicable);
 - Summary of data already collected;
 - Plans for analysis, including an overview of steps to synthesize, analyze, and interpret data; and
 - A two- to three-year timeline showing how this study might be completed.

If a student has conceived of and completed a research project, it may serve as the basis for the *written research proposal*. However, the student should include relevant future research to extend the project such that the timeline of the overall project is two to three years.

The student should meet with the EER Faculty Advisor to discuss overarching research ideas, to develop the *written research proposal*, and to ensure that the proposed research fits within the scope of a typical two- to three-year Ph.D. project. The EER Faculty Advisor may provide feedback to shape the document, but the *written research proposal* is expected to be original writing by the student.

Oral Examination

The *oral examination* should allow a student to demonstrate expertise and knowledge through an oral presentation and defense of the proposed research. The student should coordinate with their *Qualifying Examination Committee* to schedule a two-hour *oral examination* to occur between the dates listed in Table 2 and should inform the EER Graduate Coordinator of the date as soon as it is scheduled.

Two calendar weeks prior to the *oral examination*, the student must submit a PDF of both the *written research proposal* (30 page maximum, including references) and the *statement of preparation* (two page maximum) to their *Qualifying Examination Committee* and the EER Graduate Coordinator. The EER Graduate Coordinator will complete a conformity check for the documents, and the *Qualifying Examination Committee* will review the materials and conduct the *oral examination* to evaluate the student's research ability and potential.

During the two-hour *oral examination*, the *Qualifying Examination Committee* will first meet privately to review the student's file, and then the student will make a brief, 20- to 30-minute presentation of the proposed research. Following the presentation, the committee may ask questions about the proposed research and about specific knowledge and skills gained through relevant academic coursework or research experiences. Then, the student will be dismissed while the *Qualifying Examination Committee* discusses the student's *written research proposal* and oral presentation and deliberates in private on the outcome of the Qualifying Examination. The committee will recommend one of the following four outcomes:

- **Pass:** The student's work shows preparation for designing a formal proposal in partnership with her/his advisor.
- **Pass with required revisions:** The student's work indicates near-preparation for designing a formal proposal in partnership with her/his advisor. The committee requires specific but not significant revisions to this work in order for the student to move to doctoral research.

- **Fail with option to re-take:** The student has not demonstrated satisfactory potential to perform doctoral research. However, the student may retake the Qualifying Examination at the next available opportunity (e.g., the following April for a student who attempts it in the fall term), with the same Qualifying Examination Committee (the EER Graduate Chair may name a different committee if needed). If the student does not successfully retake the Qualifying Examination during the next academic term, the grade becomes a Fail. A student may not earn a grade of Fail with option to re-take on the second attempt.
- **Fail:** The student has not demonstrated satisfactory potential to perform doctoral research and is not permitted to register for additional terms as a Pre-Candidate. However, a student who is eligible to receive an EER Master's Degree and who is missing specific courses may register for a maximum of one additional term to complete this degree. A student who fails the Qualifying Exam is dismissed without probation at the end of the term in which the Qualifying Examination is taken. In this case, the level of funding will continue through the term in which the Qualifying Examination is failed.

The *Qualifying Examination Committee* will communicate the recommended outcome to the EER Graduate Chair and will provide the student with notes about the exam within 48 hours of the *oral examination*, and the EER Graduate Program Office will inform the student of the outcome within three weeks of the *oral examination*.

5.2. CANDIDACY

Advancing to candidacy is a prestigious milestone towards the Ph.D. As stipulated by Rackham, students are expected to do so within three years of enrolling in the Ph.D. program. Deadlines for completing the requirements to advance to candidacy are found at the Rackham website (<https://rackham.umich.edu/navigating-your-degree/candidacy-deadlines>).

To advance to candidacy, a student must:

- 1) Complete all 30 credit hours of master's degree coursework for EER (note that credits elected for Visit/Audit status do not meet this requirement, nor do any EER 990 credits) and be in satisfactory academic standing;
- 2) Pass the EER Qualifying Examination;
- 3) Satisfy all Rackham candidacy requirements (including GPA, residency, etc. see <https://rackham.umich.edu/navigating-your-degree/candidacy-requirements/>); and
- 4) Complete the College of Engineering's Responsible Conduct of Research and Scholarship (RCRS) program.

A student who completes the 30 credits of master's degree coursework but does not pass the Qualifying Examination within the three-year time frame will be released from the program with an EER M.S. degree, unless Rackham has granted a petition request for additional time because of extenuating circumstances.

Candidacy is not automatic. Once all EER and Rackham requirements are satisfied, a student must apply for candidacy by submitting the appropriate forms to the EER Graduate Coordinator (eer-grad-coordinator@umich.edu). These forms include the Ph.D. Plan of Study approved by the EER Graduate Chair and the EER Faculty Advisor.

Course Enrollment during Candidacy

Upon achieving candidacy, students must maintain full-time enrollment by registering for eight credits of EER 995: *Dissertation Research/Candidate* under the supervision of their EER Faculty Advisor every Fall and Winter term until defending their dissertation. Students who are defending in the Spring or Summer half term must register for 8 credit hours of EER 995 during the full Spring/Summer term. No part-time enrollment is allowed.

In addition to EER 995: *Dissertation Research/Candidate*, candidates may elect one course (with any number of credit hours) or up to four credits of coursework per term without paying additional tuition. This coursework may be taken for credit or for Visit/Audit status. Students who do not elect coursework during one term of EER 995 enrollment may elect up to eight credits in the next term of EER 995 enrollment; however, no more than four credits

can be deferred in this manner (an additional course may not be taken in anticipation of taking none in a future term of EER 995 enrollment).

Thus, as doctoral students may have up to six remaining credits of coursework to complete after achieving candidacy, they may complete the coursework in two consecutive terms.

Candidates who choose to take more courses than those for which they are eligible with the candidacy tuition rate will be assessed additional tuition per credit hour. Students are responsible for covering the additional tuition costs accrued, even if they are being funded through a fellowship, GSI, or GSRA position.

5.3. DISSERTATION PROPOSAL EXAMINATION (DPE)

The DPE requires students to propose their dissertation research. This examination includes a written research proposal for the planned dissertation research and an oral defense. The oral defense should allow students to demonstrate their expertise and knowledge about the proposed research area. Unlike the Qualifying Examination, for which detailed requirements are outlined in Section 5.1, parameters for the dissertation proposal should be determined by the faculty advisor in consultation with the student and tentative members of the *Dissertation Committee* (the *Dissertation Committee* is described in a subsequent section). The dissertation proposal should identify a significant research need in the EER literature, articulate a series of relevant research questions, provide a detailed review of the literature, outline an original, advanced research project to address that question, and possibly include initial research results.

For guidance, we provide more information about the DPE. It includes a written research proposal for the planned dissertation research and an oral defense conducted by tentative members of the *Dissertation Committee*. The written proposal may comprise a draft of the first few dissertation chapters (e.g., research rationale and overview, literature review, early findings), a detailed description of the proposed research, and a timeline. As with other written products, the written research proposal should be provided to tentative members of the *Dissertation Committee* at least two weeks prior to the oral defense.

The oral exam, then, allows students to demonstrate their expertise and knowledge about the proposed research area. It is typically scheduled for two hours and allows time for the student to present their proposal and for the tentative *Dissertation Committee* to deliberate in private about the outcome of the DPE. The student is encouraged to inform the EER Graduate Coordinator about the date of the DPE oral examination.

The tentative *Dissertation Committee* may indicate that the dissertation proposal is approved as submitted by the student, may ask the student to make specific changes within a listed time frame (typically by sending a memo), or may make other requests. Within three business days of the oral examination, the student's EER Faculty Advisor should inform the student about next steps. The EER Faculty Advisor should submit the DPE form (available from the EER website), signed by the tentative *Dissertation Committee*, to the EER Graduate Coordinator after the dissertation proposal is approved, indicating that the student is ready to proceed with their dissertation. Then, the EER Graduate Coordinator **solicits approval from the EER Graduate Chair** and submits documentation to formalize the student's *Dissertation Committee* to Rackham.

Students are encouraged to plan a pre-DPE meeting with their tentative *Dissertation Committee* before the formal oral exam. This will allow the tentative committee members to assist the student in refining their dissertation proposal and scoping their DPE plans.

Dissertation Committee

The *Dissertation Committee* is responsible for reviewing the *written research proposal*, conducting the *oral examination*, and deliberating on the outcome of the DPE. The committee should be established by the student, in consultation with the EER Faculty Advisor and in compliance with Rackham's Guidelines for *Dissertation Committees* (<http://www.rackham.umich.edu/current-students/dissertation/committees>).

The *Dissertation Committee* should be chaired by the EER Faculty Advisor (or co-chaired by the EER Faculty Co-Advisors if applicable), and **it should comprise at least four members, three of whom have graduate faculty status as**

defined by Rackham. At a minimum, the committee must include two EER Program Faculty members, a cognate member who has graduate faculty status and who is not a member of the EER Program Faculty, and one additional member.

All members of the *Dissertation Committee* should bring important content and/or methodological expertise to the committee and should be willing to guide students as they progress through the dissertation process. Cognate members will typically be selected from a field that is substantially related to the research topic chosen by students (e.g., education, psychology, organizational theory and behavior).

The *Dissertation Committee* is formalized following successful completion of the DPE and must be approved by the EER Graduate Chair. If a member of the *Dissertation Committee* is no longer able to serve for some reason, or if there is some unpredictable and extenuating circumstance, the student may petition the EER Program to appoint a new member to the committee (see Section 3.10).

Timing for the DPE

Students should typically complete the DPE by the end of the third year in the program, and though there is no specified deadline imposed by Rackham, the EER Program encourages students to complete the DPE by the end of their fourth year in the program.

When they successfully complete their DPE, the EER Program completes required documentation to formalize the student's *Dissertation Committee*. Subsequently, students should meet informally (or formally at the discretion of the committee chair) with the *Dissertation Committee* at least once per year.

5.4. FINAL ORAL DEFENSE

Each Ph.D. candidate must prepare a written dissertation, giving evidence of their abilities to (1) conduct original, advanced research, (2) present the results of that research in well-written form, and (3) defend the work orally in an open examination. The dissertation is the most important aspect of the Ph.D. program experience. Students should prepare a rough draft of the dissertation and provide it to all members of the *Dissertation Committee*, collecting their comments, before preparing a final draft.

A final and complete copy of the written dissertation must be submitted as a PDF to all members of the *Dissertation Committee* and to the EER Graduate Coordinator at least 14 business days before the scheduled date of the *final oral defense* to allow sufficient time for a written evaluation. The committee members will then review the written dissertation and, if all members deem it acceptable, the *final oral defense* will be held (Note, the *final oral defense* may not be scheduled sooner than six months following successful completion of the DPE). The *final oral defense* will be a public seminar presented by the candidate, with an open question period, followed by a question period with just the *Dissertation Committee* on the candidate's research.

Following the *final oral defense*, the *Dissertation Committee* may require minor edits to the dissertation, and after the committee approves the final draft of the dissertation, it must be formatted to meet Rackham's standards. Students are also required to set up a pre-defense meeting and a post-defense meeting with Rackham to complete the doctoral degree requirements (<https://rackham.umich.edu/navigating-your-degree/completing-doctoral-degree-requirements/>).

Rackham requires students to enroll in 8 hours of EER 995: *Dissertation Research/Candidate* during the term of the *final oral defense*, and students must defend and complete all Rackham degree requirements before the final doctoral degree deadline for the term.

Rackham allows a grace period of several additional weeks beyond the end of each term for Ph.D. students to complete all of the doctoral degree requirements (<https://rackham.umich.edu/policy/section4/>). The grace period enables students to complete their work without needing to register for the new term. However, the degree is still awarded at the end of the new term.

Timing for the Final Oral Defense

Students should typically defend their dissertation by the end of the fifth year in the program, and the Rackham deadline for doing so is by the end of year seven. Note that students who do not defend their dissertation by the end of the fifth year may lose financial support.

5.5. TIMELINE FOR THE EER PH.D.

The Ph.D. coursework and research activities are unique to each student. Therefore, the Ph.D. degree timeline is subject to flexibility in timing. A representative timeline for the EER Ph.D. is shown in Table 3, and four sample curricula (one for an EER M.S. student, one for an EER Ph.D. student interested in a faculty career, one for an EER Ph.D. student interested in a career in national policy, and one for a student earning both the EER Ph.D. degree and a master's degree in Chemical Engineering) are included in the appendix. Note that students are also expected to participate in EER community activities every term, and they are encouraged to complete a Rackham Professional Development Certificate.

Table 3. Representative Timeline for EER Ph.D.

Year: Term	Coursework	Research Activities	Milestones
Year 1: Fall	Enroll in 2 or 3 courses	Begin research with EER Faculty Advisor	
Year 1: Winter	Enroll in 2 or 3 courses	Continue research with EER Faculty Advisor	
Year 1: Sp/Su		Continue research with EER Faculty Advisor	
Year 2: Fall	Enroll in 2 or 3 courses	Continue research with EER Faculty Advisor	Complete RCRS program
Year 2: Winter	Enroll in 2 or 3 courses	Conduct research for Qualifying Exam	Pass Qualifying Exam Earn M.S. degree
Year 2: Sp/Su		Begin research for DPE	Advance to Candidacy
Year 3: Fall	Enroll in up to 1 course	Continue research for DPE	Form <i>Dissertation Committee</i>
Year 3: Winter	Complete Immersive Learning Experience	Continue research for DPE	Pass DPE
Year 3: Sp/Su		Begin dissertation research	Present research at conference
Year 4: Fall	Enroll in up to 1 course	Continue dissertation research	Update <i>Dissertation Committee</i>
Year 4: Winter	Enroll in EER 610	Continue dissertation research	Update <i>Dissertation Committee</i>
Year 4: Sp/Su		Continue dissertation research	Publish journal paper
Year 5: Fall	Enroll in up to 1 course	Continue dissertation research	Update <i>Dissertation Committee</i>
Year 5: Winter	Enroll in up to 1 course	Continue dissertation research	Pass Oral Defense Make required dissertation revisions Graduate with Ph.D.

The deadline for achieving key milestones is as follows:

- Students typically pass the Qualifying Examination and advance to Candidacy by the end of Year 2 – the deadline for this is the end of Year 3.
- Students typically complete their practicum during Year 3 and enroll in EER 610: *Immersive Learning Experience* by the end of Year 4.

- Students typically pass the DPE by the end of Year 3 – this must be completed at least six months before the *final oral defense*.
- Students typically complete the Ph.D. degree by the end of Year 5 – the deadline for this is the end of Year 7 (students who take longer than five years may lose financial support).

A student may be granted four additional months (one term) to complete each milestone with approval from both the EER Graduate Chair and the EER Faculty Advisor. A student who takes more than seven years to earn the Ph.D. degree must submit a petition to Rackham requesting an extension.

6. ACADEMIC PROBATION AND DISMISSAL

6.1. SATISFACTORY ACADEMIC PROGRESS

Guaranteed financial support and continued enrollment are contingent upon students maintaining satisfactory progress in the following ways:

- Maintain a cumulative GPA of 3.0 or higher on a 4.0 scale,
- Pass the Qualifying Examination by the end of Year 3,
- Complete the DPE by the end of Year 4,
- Maintain adequate progress toward completion of the dissertation, and
- Follow university standards of professional conduct.

6.2. PROGRESS REPORTS

To document progress towards the Ph.D., all students are required to submit a Progress Report online (deptapps.engin.umich.edu/progeval/student/index?dept=216004) by February 1 each year. Each EER Faculty Advisor will review their students' reports and submit their evaluations online by February 15, and each student will be required to review the evaluation and confirm that the report has been read and understood by February 28. Failure to submit the Progress Report may result in the student being placed on probation (as determined by the *Academic Probation Committee*, Section 6.4).

Progress reports will indicate one of three possible outcomes: (1) satisfactory progress, (2) progress that is of concern, or (3) unsatisfactory progress. If progress is of concern, the student will be required to submit a follow up progress report within two months.

Within one month of the progress report deadline, the EER Program Faculty will meet to review the progress of all students in the EER Program. During the meeting, they will discuss each student's progress report, their CV, and the feedback submitted by the student's EER Faculty Advisor. After the meeting, the EER Graduate Chair will provide a letter for each student that outlines the overall comments of the EER faculty.

The student, EER Graduate Chair, or EER Faculty Advisor may also initiate an evaluation at any time by submitting a Progress Report.

6.3. UNSATISFACTORY PROGRESS

Receiving an "unsatisfactory progress" report may lead to the student being placed on probation (Section 6.4), the termination of the guarantee of financial support, and/or dismissal from the Ph.D. program. A student with an unsatisfactory progress report may not advance to candidacy, may not be granted a degree or certificate, and may only change programs or transfer credits with permission of the admitting program.

6.4. ACADEMIC PROBATION

When a student is found to have made “unsatisfactory progress,” the EER Program Faculty will meet to determine whether the student is to be placed on probation. The terms of probation will be individually designed by the EER Graduate Chair[‡] and the EER Program Faculty, based on the situation, and the terms will be outlined in the Letter of Probation. The EER Graduate Chair will notify the student and Rackham in writing (i.e., through the “Letter of Probation”) before the probationary period begins, explaining: the reasons and conditions of probation; the start and end dates of the probationary period (note, the duration of the probationary period may be no less than two months); terms of funding support; conditions, if any, for returning to satisfactory standing; and options for appeal. “Academic Probation” will be noted on the transcript. The EER Graduate Chair will enforce the terms of probation.

A student who has been placed on probation may withdraw or may request a leave of absence (due to medical, personal, or other reasons independent of the probation, as described in Section 3.3) from Rackham, during which time the student will be separated from the university. The withdrawal or leave will stop the clock on the probationary period, which resumes when the student returns to active status or is reinstated. Probation will remain in effect until the conditions are remedied or the student is dismissed.

Length of the Probationary Period

The probationary period may be no shorter than two months of the fall or winter term, and it will normally conclude at the end of that term. For a student placed on probation within two months of the end of the fall term, the probationary period will extend into the winter term for a total of at least two months. For a student placed on probation within two months of the end of the winter term, the probationary period may include the spring or summer half terms or the following fall term, for a total of at least two months. A student may be placed on probation starting in the spring or summer half term for a minimum of two months, and does not need to be enrolled during these half terms.

Funding Students on Probation

The level of funding prior to probation should be continued through the probationary period. Thus, a student with guaranteed financial support will continue to be funded while on probation (i.e., the student will continue to receive tuition and fees, stipend, and insurance benefits). Funding for the probationary period shall be arranged by the EER Faculty Advisor in discussion with the EER Graduate Chair.

6.5. DISMISSAL

At the end of the probationary period, and upon the recommendation of the EER Graduate Chair and the consent of Rackham, a student may either be returned to satisfactory academic standing or be dismissed from the program. Dismissal will occur by decision of the EER Program Faculty. The EER Graduate Chair will notify the student and Rackham in writing of the dismissal decision. A student with guaranteed financial support will continue to be funded until the end of the term in which dismissal occurs.

6.6. OPTION TO APPEAL PROBATION OR DISMISSAL DECISION

Decisions about probation and dismissal will be made collectively by the EER Program Faculty after careful deliberation. A student or the EER Faculty Advisor may appeal a probation or dismissal decision by providing additional written materials not considered in the original case within two weeks of being informed of the decision. The EER Program Faculty will review the materials to either confirm or overturn the probation or dismissal decision. A student may use Rackham’s Academic Dispute Resolution process only for procedural issues of fair and equal treatment under the policy of the program and not to appeal the academic reasons for the decision.

[‡] If the EER Graduate Chair is also the student’s EER Faculty Advisor, the EER Program Faculty will elect an acting EER Graduate Chair who will serve that role through the duration of the case.

6.7. PROFESSIONAL CONDUCT

A student who fails to meet standards of academic or professional integrity or who has been found responsible for violations of other University standards of conduct may be placed on probation or dismissed in accordance with separate procedures described in Rackham Academic and Professional Integrity Policy.

7. EER COURSE INFORMATION

To complete a graduate degree in EER, students must complete courses from the Engineering Education Core and the Research Methods Core, as well as Specialization Electives and, for the Ph.D., the Immersive Learning Experience. Information about the courses is included in this section. As required by Rackham, all courses counting towards the degree must be graduate-level courses (<https://rackham.umich.edu/academic-policies/section3/>).

7.1. ENGINEERING EDUCATION CORE

The purpose of the Engineering Education Core is to provide a bridge into this interdisciplinary program by integrating engineering and education concepts, providing breadth and depth of knowledge, and providing the foundation for an area of specialization. The Engineering Education Core comprises the following two courses (6 credit hours):

- EER 601: *Foundations of Engineering Education Research* (3 credits, graded A-E, to be offered each year) Introduction to the field of EER, the conduct of educational research and its application to engineering education; current literature in EER; the use of theoretical and conceptual frameworks to guide EER; and professional development opportunities in EER.
- EER 602: *Theoretical and Conceptual Frameworks in Engineering Education Research* (3 credits, graded A-E, to be offered each year) In-depth examination of relevant theories from education, psychology, and other disciplines; focus on how the theories apply to EER and can guide research and advance knowledge and practice.

7.2. IMMERSIVE LEARNING EXPERIENCE (EER 610)

A key element of the EER Ph.D. degree is the required Immersive Learning Experience:

- EER 610: *Practicum – Immersive Learning Experience* (3 credits, graded S/U, to be offered each year); prerequisites: EER 601 and EER 602
Enables students to develop a robust skill set in applying knowledge acquired from coursework to practical needs or real-world problems in engineering education. Two basic types of Immersive Learning Experiences are possible: (1) teaching apprenticeships and (2) internships.

There are two basic types of practicums for the Immersive Learning Experience (ILE): teaching apprenticeships and internships. Students preparing for faculty positions or other professional staff positions in academia will typically pursue the teaching apprenticeship, while those seeking post-graduate positions in administrative, policy, or outreach settings will typically complete an internship as the practicum portion of their ILE. This will enable students to develop a robust skill set in applying knowledge acquired from coursework to practical needs or real-world problems in engineering education, and it will connect students to academic and non-academic role models who serve as mentors during this practicum experience.

Regardless of the type of practicum experience a student elects, the student must identify an *EER Experience Advisor* – a member of the EER Program faculty[§] who agrees to help oversee the ILE. The *EER Experience Advisor* may or may not be the same person as the EER Faculty Advisor.

[§] If there is sufficient justification, the student may petition the EER Program to request that someone who is not a member of the EER Program faculty serve as the *EER Experience Advisor* (see Section 3.10).

Teaching apprenticeships will provide a more complete teaching experience than what is typically afforded through a GSI appointment, as students who complete a teaching apprenticeship will collaborate with an engineering faculty member to plan and facilitate a substantive portion of an engineering course. The engineering faculty member who is the course instructor must agree to serve as a teaching mentor, ensuring that the student assumes significant responsibility for some curriculum design, lesson-planning, instruction, assessment, and grading. If the course instructor is a member of the EER Program Faculty, that person will also serve as the *EER Experience Advisor*. Otherwise, the student must identify an *EER Experience Advisor* who will co-advise the ILE with the course instructor.

Internships will provide on-the-job professional experience, and they will be offered in on-campus or off-campus settings. For example: students who are engaged in research related to outreach programming might work in the College of Engineering's Office of Culture, Community & Equity (OCCE) or the Museum of Science and Industry in Chicago to develop or evaluate educational programming; students interested in educational evaluation and assessment might work in the School of Education's Center for Educational Design, Evaluation, and Research (CEDER) to gain hands-on experience in evaluating STEM education programs; and students who endeavor to have a career in a public policy setting might pursue a summer internship at the National Science Foundation or the White House Office of Science and Technology Policy (OSTP). The EER faculty will work to cultivate a network of professionals who could supervise internships for EER doctoral students, but students are ultimately responsible for securing the internship. For this type of ILE, the student should identify an *EER Experience Advisor* who has related expertise and/or experience and who will partner with the internship supervisor to co-advise the ILE experience.

The practicum portion of the ILE should entail a minimum of 320 hours (e.g., full time for 8 weeks or 20 hours/week over 16 weeks). At least two weeks prior to the start of the experience, the student must acquire approval for the ILE by submitting the following three items to the google form available at the EER website:

(1) **A two-page ILE proposal:**

- For a teaching apprenticeship, the two-page proposal (double-spaced) should describe:
 - The course name and number, the semester, and the expected number of enrolled students;
 - The parts of the curriculum for which the student will be responsible;
 - The approximate number of lectures the student will design and deliver and the assignments the student will develop for the course;
 - A plan for assessing success of the activity; e.g., a question on the midterm or final exam, or grade on the assignment(s).
- For an internship, the two-page (double-spaced) proposal should describe:
 - Where the internship will take place;
 - The name, title, and contact of the internship supervisor;
 - The student's role during the internship;
 - The aspects of EER the student will emphasize during the internship (e.g., developing and evaluating an educational intervention, working in educational evaluation and assessment, or exploring public policy issues in higher education);
 - The main goals and deliverables for the project.

(2) **A letter of support** from the course instructor or internship supervisor (the *EER Graduate Coordinator* will provide templates for the letter of support), as follows:

- For a teaching apprenticeship, the letter of support should describe the course instructor's willingness to: (1) mentor the student by meeting with the student at least twice before the student's portion of the course to review plans, observing the student in action during their portion of the course, and meeting with the student after their portion of the course to provide feedback, (2) partner with the *EER Experience Advisor* (if the course instructor is not a member of the EER Program Faculty) to co-advise the student, and (3) complete a short, one-page survey to evaluate the student at the conclusion of the course.
- For an internship, the letter of support should highlight the importance of the proposed project to the organization and describe the internship supervisor's willingness to: (1) mentor the student by seeking opportunities for the student to meet stakeholders, reviewing the student's work, and providing

- feedback during the internship, (2) partner with the *EER Experience Advisor* to co-advise the student, and (3) complete a short, one-page survey to evaluate the student at the conclusion of the internship.
- (3) **Confirmation** that the *EER Experience Advisor* is willing to meet virtually with the student at least twice during the practicum portion of the ILE to ensure that the student is having a successful experience.

Students will typically complete the practicum portion of the ILE during the third year in the program. Throughout the practicum experience, students will read relevant materials and the *EER Graduate Coordinator* will provide reflection prompts related to the student's work. Then, students will enroll in EER 610: *Practicum – Immersive Learning Experience* one or two semesters after completing the ILE (completing this milestone by the end Year 4). As part of EER 610, students will meet with others who completed the practicum portion of the ILE in the preceding year to review their experiences, discuss the reflections, and consider ways the practicum may have related to their career. As well, as part of the course, students will prepare a brief formal report and provide an oral presentation to the EER community at an annual program for faculty and EER graduate students. Although EER 610 is a 3-credit course, the time commitment during the semester is considerably less than a normal course as much of the credit reflects the student's work during the practicum portion of the ILE. The *EER 610 course instructor* will conduct the course, review the report and presentation, and assign course grades for the students.

International students who complete the practicum portion of their ILE during Spring/Summer are encouraged to enroll in ENGR 998: *Curricular Practical Training* the immediately preceding Winter term to satisfy the optional internship CPT course requirement. International students who complete the practicum portion of the ILE in Fall should enroll in ENGR 998 concurrently. International students who have achieved candidacy status should speak with their faculty advisor for guidance in describing how the practicum is integral to their dissertation. More information about ENGR 998 is available from the Engineering Career Resource Center (<https://career.engin.umich.edu/students/international-students/>).

7.3. OTHER EER COURSES

- EER 598: *Special Topics in Engineering Education Research* (1-4 credits, graded A – E)
Topics of current interest in engineering education research. Lectures, seminar or laboratory. Can be taken more than once for credit, and up to three credits of ENGR 598 may count towards Specialization Electives.
- EER 690: *Graduate Independent/Directed Study* (1-4 credits, Satisfactory/Unsatisfactory)
Opportunity for graduate students to work on research projects under the supervision of an engineering education research faculty member. Project report submitted at end of term; may be elected for 1-4 credits (approximately 4 hours/week for each credit). Up to six credits of EER 690 may count towards Specialization Electives.
Note: the topic of the research is flexible, to be agreed upon by the EER faculty instructor.
- EER 990: *Dissertation Research/Pre-Candidate* (1-8 credits, Satisfactory/Unsatisfactory)
Election for dissertation work by doctoral student not yet admitted to status as candidate, typically after all coursework is complete. The defense of the dissertation, that is, the *final oral examination*, must be held under a full-term candidacy enrollment.
- EER 995: *Dissertation Research/Candidate* (4-8 credits, Satisfactory/Unsatisfactory)
Election for dissertation work by a doctoral student who has been admitted to candidate status. The defense of the dissertation, that is, the *U-M*, must be held under a full-term candidacy enrollment.

7.4. RESEARCH METHODS CORE

The application of educational research methods to the engineering context requires students to adopt a new learning paradigm, and the purpose of the Research Methods Core is to provide both broad and deep knowledge of EER approaches and guide students in the development of their research theses. As such, in consultation with the EER Faculty Advisor, EER Ph.D. students must select and complete four research methods courses that align with the area of research interest. Students completing the EER M.S. degree must complete three courses from the Research Methods Core. Multiple courses exist across the university to fulfill this requirement.

Introductory coursework: To learn about a broad range of data types and research methods utilized in engineering education research, all EER Ph.D. and M.S. *students must complete an introduction to qualitative research (EDUC 792 or the equivalent) and an introduction to quantitative research (EDUC 793 or equivalent)*. Students who wish to complete introductory coursework that is different from but equivalent to EDUC 792 or 793 may petition the EER Program to request approval before enrolling in the course (see Section 3.10).

Advanced coursework: To learn about more focused research methods, students must complete advanced coursework in both qualitative and quantitative research methods. Courses that have been approved for the advanced coursework requirement are listed below. Students may petition to request that other courses be allowed to satisfy the advanced coursework requirement. However, because courses that are not on the list below may or may not be approved, students should petition the EER Program to request approval before enrolling in the course (see Section 3.10).

Please note: (1) students should always discuss their course selections with their faculty advisor, and (2) students should be aware that some courses on this list, especially those marked with **, may have additional prerequisites.

Courses that satisfy the **advanced qualitative research methods** requirement include:

- EDUC 603: *Design-Based Research*
- EDUC 732: *Critical Race Methodologies*
- EDUC 749: *Discourse Analysis*
- EDUC 891: *Qualitative Methods Workshop*
- **SOC 523: *Qualitative Research Methods II*
- SOC 532: *Comparative & Historical Methods I*
- SOC 595: *Advanced Interviewing*

Courses that satisfy the **advanced quantitative research methods** requirement include:

- EDUC 707/PSYCH 707: *Psychometric Theory*
- EDUC 712/PUBPOL 712: *Causal Inference in Education Policy Research – Preschool, Elementary, and Secondary*
- EDUC 714/PUBPOL 713: *Causal Inference in Education Research and Policy - Postsecondary*
- EDUC 795: *Quantitative Methods for Non-Experimental Research Methods*
- EDUC 803/PSYCH 804: *Structural Equation Modeling*
- **PSYCH 614: *Advanced Statistical Methods II*
- PSYCH 711: *Questionnaire Design and Evaluation*
- SOC 612/PSYCH 687: *Applied Sampling*
- SW 671: *Quantitative Methodologies for Socially Just Inquiry*
- SW 864: *Multilevel and Longitudinal Modeling*

Because of an agreement between the College of Engineering and the School of Education, students in the EER graduate program are eligible for overrides to EDUC 792, 793, and 795. To request an override for these three courses offered in the Fall or Winter term, students should inform the EER Graduate Coordinator by email during the registration backpacking periods. Students will be notified about the status of their override request by April 17 (for Fall) or November 15 (for Winter). Email notices will remind students about this process as the registration backpacking time approaches. Please note that we do not have similar agreements like this with other programs/departments at this time.

** Courses offered by other departments/programs (e.g., Education, Psychology, Sociology, Social Work, etc.), including these and others, may have additional prerequisites and/or other enrollment challenges, such as limited capacity. Students are encouraged to plan ahead and identify courses with their EER Faculty Advisor and/or EER Program staff.

7.5. SPECIALIZATION ELECTIVES

The purpose of the Specialization Electives requirement is for students to develop depth of knowledge in one area of EER. Thus, students should propose a coherent set of Specialization Elective courses to support their dissertation research. At least two of these courses should be from outside the EER Program to satisfy the cognate requirement.

The Specialization Elective courses include, but are not limited to, existing courses offered in the College of Engineering, the School of Education, and across the university. Students may elect to use up to three credits of EER 598: *Special Topics in EER* and up to six credits of EER 690: *Graduate Independent/Directed Study* towards their Specialization Electives.

8. M.S. DEGREE IN EER

The goal of the EER M.S. Program is to provide foundational knowledge of EER topics, theories, and research methods as well as a specialization appropriate to students' intended career path. Students may earn the EER M.S. degree in one of two ways. First, it can be earned as an embedded master's degree during the EER doctoral program. Students admitted to the Ph.D. program will be eligible to add the master's degree after successful completion of the 30 credit hours of master's degree coursework (typically within two years). Second, students may apply for and be admitted to the EER Program to earn a stand-alone EER M.S. degree. In either case, students must satisfy the EER Graduate requirements outlined in this manual, as well as those outlined in the Rackham Academic Policies.

8.1. M.S. COURSEWORK

The EER M.S. degree requires a minimum of 30 credit hours of graduate-level coursework. A sample curriculum for a student earning the M.S. EER degree is shown in the Appendix (Table 6). The courses that comprise these requirements are described in more detail in Section 7. The credit distribution for the M.S. is shown in Table 4.

Table 4. Credit distribution for EER M.S. degree

Category	# courses	# credits
Engineering Education Core (EER 601 and EER 602)	2	6
Courses from the Research Methods Core	3	9 – 15
Specialization Electives	3 or more	Up to 15
Total	8 or more	30 (minimum)

Typically, students will enroll in 9-10 credits of coursework per term. Up to six credits of EER 690: *Graduate Independent/Directed Study* and up to three credits of EER 598: *Special Topics in Engineering Education Research* may be counted towards Specialization Electives. Besides EER 690, all courses used for the master's degree coursework requirements must be letter-graded and may not be marked as satisfactory/ unsatisfactory. **In addition, only course grades of B– or better will be counted towards the credit hour and coursework requirements.** Courses that **do not count** toward master's degree coursework requirements include the following: courses with number 990, 995; course with “doctoral,” “dissertation,” or “preliminary” in the title; ENGR 998: *Curricular Practical Training*; courses from the English Language Institute; courses with insufficiently advanced content and level; and courses which substantially duplicate the content and level of courses already completed.

8.2. M.S. PLAN OF STUDY

The M.S. Plan of Study outlines which courses students propose to satisfy the specific master's degree requirements. Students are required to submit an initial M.S. Plan of Study, approved and signed by the EER Graduate Chair, at the beginning of their first term (within a month after the beginning of the first term). Failing to do so will risk the ability to register the following term.

Students are also required to obtain pre-approval and signature from the EER Graduate Chair on a revised M.S. Plan of Study each time they wish to make changes to it, and they must obtain approval for a final M.S. Plan of Study in

their last term. Failing to do so will risk the ability to graduate. It is highly recommended that students meet with the EER Graduate Chair to discuss the plan at the beginning of each term.

Note: Students are responsible for submitting to the EER Graduate Coordinator an updated, final M.S. Plan of Study, **signed by the EER Graduate Chair**, when applying for graduation. Failure to submit the final M.S. Plan of Study could delay graduation.

9. EER CERTIFICATE

Students earning a Ph.D. in a traditional engineering discipline at U-M may apply to earn the Rackham Certificate in EER to learn and practice the skills needed to be proficient in the field of EER. The certificate requires at least nine credit hours of coursework (with a B average) and a related engineering education research project. Students are responsible for ensuring that the coursework also complies with Rackham's policies (<https://rackham.umich.edu/policy/section7/>).

9.1. APPLICATION TO THE EER CERTIFICATE

U-M engineering graduate students who have completed at least one term in a Rackham program and who are in satisfactory academic standing are invited to apply online (<https://eer.engin.umich.edu/graduate-certificate/>) at any time. The following materials must be submitted at the time of applying:

- Statement of interest describing the reasons for pursuing the certificate;
- "Certificate Plan of Study" listing the courses expected for the certificate, the timeline for enrolling in them, and a title and summary of the proposed project;
- Letter of advisor's support (not required for students whose research advisor is one of the EER Core Faculty); and
- Current transcript.

The student's application will be reviewed by the EER Graduate Chair, and if acceptable, the Certificate Plan of Study will be approved. Deviations to the plan of study must be approved by the Graduate Chair. Students should apply for the Rackham Certificate in EER **prior** to completing requirements to ensure approval of the plan of study.

9.2. CERTIFICATE REQUIREMENTS

Effective Fall 2019, the EER Certificate requires students to complete both courses of the Engineering Education Core (EER 601 and EER 602), at least one course from the Research Methods Core aligned with the required project, and an EER project. The EER project comprises either (1) an approved EER project equivalent to a 3-credit class (a paid or unpaid research experience); or (2) an additional 3-credit course that has, as part of its requirements, a substantial EER project (this could be an independent study). The EER project should demonstrate the student's ability to engage in an engineering education research project. As such, it should (1) pose a significant and relevant research question(s), (2) synthesize scholarship in the area, (3) link the study to appropriate theory, (4) apply proven research methods aligned to the research question(s) to study the data, (5) present a clear interpretation of the main findings, and (6) describe the resulting implications of the work. A variety of written products, including a journal manuscript, an appropriate conference paper, or a chapter of the student's dissertation could satisfy these requirements. Students pursuing the certificate are encouraged to consult relevant resources about EER and to meet with EER Program Faculty as they plan and conduct their research.

The set of courses comprising the Certificate Plan of Study must be approved prior to completing them. The credit distribution for the EER Certificate is shown in Table 5. **Only course grades of B– or better will be counted towards the credit hour and coursework requirements.**

Table 5. Credit distribution for EER Certificate

Category	# courses	# credits
Engineering Education Core (EER 601 and EER 602)	2	6
Courses from the Research Methods Core	1	3-5
Approved EER project	n/a	~ 3
Total	3	9 (minimum)

Upon completing the approved requirements and no later than the end of the term they expect to graduate, students should submit their final EER project to the EER Graduate Chair. The EER Graduate Coordinator will confirm that the required coursework has been completed, will seek approval for the EER project from the EER Graduate Chair, and will submit the required paperwork to Rackham.

10. ADDITIONAL RESOURCES

The Rackham Graduate School Student Handbook and the Engineering College Bulletin are among the numerous U-M publications available online. The Rackham Handbook gives details about the graduate degree requirements imposed by the Graduate School, and should be consulted by all graduate students. Some important topics include the continuous enrollment policy and fees. A list of website includes:

- Rackham Graduate School: <http://www.rackham.umich.edu>
- College of Engineering: <http://www.engin.umich.edu/college/>
- U-M Wolverine Access: <https://wolverineaccess.umich.edu/>
- U-M Registrar: <http://ro.umich.edu>
- Student Financial Services: <http://www.finance.umich.edu/finops/student>
- U-M International Center: internationalcenter.umich.edu
- EER Program: <https://eer.engin.umich.edu>
- College of Engineering Honor Code: <https://elc.engin.umich.edu/about/>
- Student Rights and Responsibilities: <https://oscr.umich.edu/article/statement-student-rights-and-responsibilities>

APPENDIX

SAMPLE CURRICULA

Table 6. Student # 1: Earning a master's degree in EER

	Term	Coursework
Year 1	Fall 11 credits	EDUC 760: <i>Access and Equity</i> (3 cr) EDUC 793: <i>Quantitative Methods 1</i> (5 cr) EER 601: <i>Foundations of EER</i> (3 cr)
	Winter 11 credits	EDUC 791: <i>Foundations of Teaching & Learning</i> (3 cr) EDUC 795: <i>Quantitative Methods 2</i> (5 cr) EER 602: <i>Introduction to Theoretical Frameworks</i> (3 cr)
	Sp/Su	
Year 2	Fall 9 credits	EDUC 792: <i>Qualitative Methods 1</i> (5 cr) EDUC 709: <i>Motivation in the Classroom</i> (3 cr) EER 598: <i>Special Topics in EER</i> (1 cr)

Table 7. Student #2: Earning an EER Ph.D. and interested in a faculty career

	Term	Coursework	Other Suggested Activities
Year 1	Fall 10 credits*	EDUC 793: <i>Quantitative Methods 1 (5 cr)</i> EER 598: <i>Special Topics in EER (1 cr)</i> EER 602: <i>Introduction to Theoretical Frameworks (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (1 cr)</i>	Begin research with EER Faculty Advisor Meet with EER Program Faculty
	Winter 10 credits*	EDUC 795: <i>Quantitative Methods 2 (5 cr)</i> EER 598: <i>Special Topics in EER (1 cr)</i> EER 601: <i>Foundations of EER (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (1 cr)</i>	Continue research with EER Faculty Advisor
	Sp/Su		Continue research with EER Faculty Advisor
Year 2	Fall 8 credits*	EDUC 792: <i>Qualitative Methods 1 (5 cr)</i> EDUC 709: <i>Motivation in the Classroom (3 cr)</i>	Continue research with EER Faculty Advisor Begin formulating independent research ideas Serve as GSI for ENGR 100
	Winter 4 credits*	EER 598: <i>Special Topics in EER (1 cr)</i> EER 990: <i>Dissertation Research/Pre-Candidate (5 cr)</i> PSYC 708: <i>Cognition & Instruction in the Classroom (3 cr)</i>	Prepare written report for Qualifying Exam Earn M.S. degree Pass Qualifying Exam
	Sp/Su		Begin research for DPE Advance to Candidacy Present at ASEE conference
Year 3	Fall 3 credits*	EDUC 760: <i>Access and Equity (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue research for DPE Prepare to present dissertation proposal Complete teaching apprenticeship
	Winter 3 credits*	EER 610: <i>Immersive Learning Experience (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Complete Rackham's DEI Certificate Continue research for DPE Defend dissertation proposal
	Sp/Su		Begin Ph.D. research Present at ASEE conference
Year 4	Fall 3 credits*	ENGR 580: <i>Teaching Engineering (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue Ph.D. research Update <i>Dissertation Committee</i>
	Winter 3 credits*	PSYCH 692: <i>Qualitative Research Methods (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue Ph.D. research Update <i>Dissertation Committee</i>
	Sp/Su		Continue Ph.D. research Publish journal paper
Year 5	Fall 3 credits*	EDUC 791: <i>Foundations of Teaching & Learning (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue Ph.D. research Update <i>Dissertation Committee</i>
	Winter 3 credits*	EDUC 561: <i>Intro to Higher Education (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Pass Oral Defense

* Only credits towards Ph.D. coursework requirements are counted here (e.g., EER 690 in excess of 6 credits, EER 990, and EER 995 are not counted).

Table 8. Student #3: Earning an EER Ph.D. and interested in a career in public policy

	Term	Coursework	Other Suggested Activities
Year 1	Fall 10 credits*	EER 598: <i>Special Topics in EER (1 cr)</i> EER 601: <i>Foundations of EER (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (3 cr)</i> SOC 522: <i>Qualitative Research Methods I (3 cr)</i>	Begin research with EER Faculty Advisor Meet with EER Program Faculty
	Winter 10 credits*	EER 598: <i>Special Topics in EER (1 cr)</i> EER 602: <i>Introduction to Theoretical Frameworks (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (3 cr)</i> SOC 523: <i>Qualitative Research Methods II (3 cr)</i>	Continue research with EER Faculty Advisor Engage in advocacy work (e.g., write to local leaders to address educational disparities)
	Sp/Su		Continue research with EER Faculty Advisor
Year 2	Fall 10 credits*	EDUC 793: <i>Quantitative Research Methods 1 (5 cr)</i> EDUC 760: <i>Access and Equity (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (2 cr)</i>	Continue research with EER Faculty Advisor Begin formulating independent research ideas
	Winter 4 credits*	PUBPOL 713: <i>Causal Inference in Education Research (3 cr)</i> EER 598: <i>Special Topics in EER (1 cr)</i> EER 990: <i>Dissertation Research/Pre-Candidate (5 cr)</i>	Prepare written report for Qualifying Exam Earn M.S. degree Pass Qualifying Exam
	Sp/Su		Advance to Candidacy Complete summer internship at NSF
Year 3	Fall 3 credits*	EER 610: <i>Immersive Learning Experience (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Begin research for DPE Complete Rackham's DEI Certificate
	Winter 3 credits*	EDUC 661: <i>History of Postsecondary Education (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue research for DPE Prepare to present dissertation proposal
	Sp/Su		Defend dissertation proposal Present at AERA meeting
Year 4	Fall 3 credits*	PubPol 510: <i>Political Environment of Policymaking (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Begin Ph.D. research
	Winter 3 credits*	PubPol 650: <i>Intro to Science & Technology Policy (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue Ph.D. research Update <i>Dissertation Committee</i>
	Sp/Su		Continue Ph.D. research Publish journal paper
Year 5	Fall 3 credits*	EER 995: <i>Dissertation Research/Candidate (8 cr)</i> SI 549: <i>Transformative Learning & Teaching Technology (3 cr)</i>	Complete Ford School's STPP Certificate
	Winter 0 credits*	EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Pass Oral Defense

* Only credits towards Ph.D. coursework requirements are counted here (e.g., EER 690 in excess of 6 credits, EER 990, and EER 995 are not counted).

**Table 9. Student #4: Earning EER Ph.D., embedded EER M.S., and Chemical Engineering M.S.E. degrees
(and following Rackham guidelines for dual degree programs)**

	Term	Coursework	Other Suggested Activities
Year 1	Fall 10 credits*	EDUC 793: <i>Quantitative Methods 1 (5 cr)</i> EER 601: <i>Foundations of EER (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (2 cr)</i>	Begin research with EER Faculty Advisor Meet with EER Program Faculty
	Winter 11 credits*	CHE 528: <i>Chemical Reactor Engineering (3 cr)</i> EDUC 795: <i>Quantitative Methods 2 (5 cr)</i> EER 602: <i>Introduction to Theoretical Frameworks (3 cr)</i>	Continue research with EER Faculty Advisor
	Sp/Su		Continue research with EER Faculty Advisor
Year 2	Fall 11 credits*	CHE 505: <i>Applied Math for Chemical Engineers (3 cr)</i> CHE 527: <i>Fluid Flow (3 cr)</i> EDUC 792: <i>Qualitative Methods 1 (5 cr)</i>	Continue research with EER Faculty Advisor Begin formulating independent research ideas
	Winter 9 credits*	CHE 542: <i>Heat and Mass Transport (3 cr)</i> EDUC 749: <i>Introduction to Discourse Analysis (3 cr)</i> EER 690: <i>Graduate Independent/Directed Study (3 cr)</i>	Prepare written report for Qualifying Exam Pass Qualifying Exam
	Sp/Su		Advance to Candidacy Complete summer internship at NSF
Year 3	Fall 3 credits*	CHE 538: <i>Statistical Thermodynamics (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Begin research for DPE Complete Rackham's DEI Certificate
	Winter 4 credits*	CHE 510: <i>Mathematical Methods in Chemical Eng (3 cr)</i> EER 598: <i>Special Topics in EER (1 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue research for DPE Prepare to present dissertation proposal
	Sp/Su		Defend dissertation proposal Present at AERA meeting
Year 4	Fall 3 credits*	CHE 512: <i>Physical Polymers (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Begin Ph.D. research Serve as GSI for CHE 230 Earn embedded EER M.S. degree
	Winter 3 credits*	EER 610: <i>Immersive Learning Experience (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Continue Ph.D. research Update <i>Dissertation Committee</i>
	Sp/Su		Continue Ph.D. research Publish journal paper
Year 5	Fall 3 credits*	ENGR 580: <i>Teaching Engineering (3 cr)</i> EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Complete Chemical Engineering M.S.E. degree
	Winter 0 credits*	EER 995: <i>Dissertation Research/Candidate (8 cr)</i>	Pass Oral Defense

* Only credits towards Ph.D. coursework requirements are counted here (e.g., EER 690 in excess of 6 credits, EER 990, and EER 995 are not counted).

Table 10. Example Dual Degree Election Form for Student #4



RACKHAM
GRADUATE SCHOOL
UNIVERSITY OF MICHIGAN

STUDENT SERVICES: ACADEMIC RECORDS & DISSERTATIONS
 915 E. Washington Street • 0120 Rackham Building • Ann Arbor, MI 48109-1070
 734.763.0171 • Fax: 734.936.3335
 Email: oard.questions@umich.edu • rackham.umich.edu

DUAL/JOINT DEGREE ELECTION FORM

Rackham use only
6010

Approved: _____

Student Name: Student #4

Student E-mail: _____

Date: _____

Student U-M ID: _____

Date: _____
 (MM) (DD) (YY)

EER Embedded MS and PHD

Name of First Degree (e.g., Mechanical Engineering MSE)
36

Minimum Credit Hours Required: _____ Term/Year Expected/Granted: _____
 (list courses below)

Course Prefix e.g., RACKHAM	Number 998	Hours 1	Term/Year FA 10
(D) EER	601	3	FA YR 1
EER	690	2	FA YR 1
EDUC	793	5	FA YR 1
(D) EER	602	3	WN YR 1
EDUC	795	5	WN YR 1
EDUC	792	5	FA YR 2
(D) EDUC	749	3	WN YR 2
EER	690	3	WN YR 2
EER	598	1	WN YR 3
EER	610	3	WN YR 4
XXX	Elective	3	FA YR 5

Total Hours Applied to Above Degree: 36

Grad Dept Chair Signature: _____

Name Printed: _____

Date: _____
 (MM) (DD) (YY)

CHE MSE

Name of Second Degree (e.g., Mathematics MS)
30

Minimum Credit Hours Required: _____ Term/Year Expected/Granted: _____
 (list courses below)

Course Prefix e.g., RACKHAM	Number 998	Hours 1	Term/Year FA 10
CHE	528	3	WN YR 1
CHE	527	3	FA YR 2
CHE	505	3	FA YR 2
CHE	542	3	WN YR 2
CHE	538	3	FA YR 3
CHE	Elective	3	WN YR 3
CHE	Elective	3	FA YR 4

Total Hours Applied to Above Degree: 21

Grad Dept Chair Signature: _____

Name Printed: _____

Date: _____
 (MM) (DD) (YY)

7.19