

PhD Qualifying Exam Requirements

Environmental Engineering Specialization

Civil, Environmental and Sustainable Engineering (CESE) Graduate Program

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Overview

- 1.** A student intending to proceed to PhD candidacy shall take the qualifying exam within the first three academic semesters (i.e., fall and spring semesters) after starting PhD studies. Exact dates will depend on the availability of faculty to serve on the PhD qualifying exam.
- 2.** The student should select 3 peer-reviewed journal articles related to his/her research topic after discussing appropriate journals and topics with his/her PhD advisor. The advisor selects one paper from the list. The student should avoid papers written by themselves or their advisor.
- 3.** The student writes a 7-page, single-spaced *critique* of the paper (references are not included in this page count). The critique should begin with a concise summary that provides the salient information in the paper. The summary should communicate the contents of the paper such that a panel member who has not read the paper can understand what was done. The content summary should make clear the novel contribution of the paper. The critique should include a discussion of positive and negative aspects of the paper based on underlying science and engineering principles. Knowledge from related literature must be used to support the critical review. This normally requires that the student does considerable background literature review beyond reading the paper. *The critique should focus on the paper and is not a critical review of a topic area.* The critique should demonstrate the ability of the student to prioritize knowledge, understand appropriate methods and controls, identify omissions and limitations, and convey why the paper is important to the field and how the paper contributes to the broad knowledge in the peer-reviewed literature.
- 4.** The student has 2 weeks to complete the critique after the paper is selected. The student submits the critical review to the panel of 3 faculty members (see **item 5** below). By default, the student shall send the critique to the 3-faculty panel 2 weeks prior to the scheduled oral defense. The student is responsible for scheduling the panel and the schedule should be set prior to initiating the paper critique.

5. The panel is nominated by the student's PhD advisor, see recommended steps below. The student's PhD dissertation advisor asks one member of the 3-faculty panel to be chair of the qualifying exam committee. The student's advisor cannot serve on this panel but can be present as an observer during the oral defense. The oral defense should include a brief summary of the critical review (20–30 min), followed by no more than 60 min of questions from the 3-faculty panel. Panelist questions should probe the student's mastery of fundamental and applied concepts, intellectual capability, ability to think critically, and ability to communicate ideas. In addition, the student should expect questions regarding areas of future work the article might lead to and/or questions on how the work could have been done differently or better.

6. At the conclusion of the oral defense, the 3-faculty panel will determine if the student passed or failed the qualifying exam, based on the criteria indicated in **item 5** above. The panel may identify a deficiency and recommend additional classes or other remedial activities that the student needs to take, if appropriate. The student's advisor may be present during these deliberations. The result will be transmitted to the student after the panel has deliberated and then provided to the student's PhD dissertation advisor. Students must pass the exam within no more than 2 attempts.

Recommended steps for creating the 3-faculty panel for the qualifying exam

- i. Student enters Graduate Supervisory Committee (GSC) members on iPOS to reflect the anticipated 3-faculty panel for the qualifying exam. Specifically, the student enters their PhD dissertation advisor as chair (who does not participate in the qualifying exam) and 3 tenure/tenure-track faculty members from Environmental Engineering who constitute the 3-faculty panel for the qualifying exam. See **item v** below.
- ii. The student's PhD dissertation advisor asks one member of the 3-faculty panel to be chair of the qualifying exam committee.
- iii. The chair of the qualifying exam committee communicates the outcome of the exam to the PhD dissertation advisor and any remedial actions. The 3-faculty panel and PhD dissertation advisor must sign the qualifying exam form entitled "Report of Doctoral Qualifying/Comprehensive Written Examination." The 3-faculty panel sign in Part III and the PhD dissertation advisor signs in Part IV. The PhD dissertation advisor shall sign the form upon the student passing the exam or completing the remedial requirements set forth by the 3-faculty panel.
- iv. After passing the qualifying exam, the student should update their iPOS to reflect the GSC members who will serve on their PhD dissertation committee. The GSC committee members may or may not change after passing the qualifying exam. For example, it is common to have dissertation committee members outside of Environmental Engineering or even experts from outside of ASU. The next step in the process is for the student to defend their dissertation proposal (form entitled Report of Dissertation Proposal/Prospectus).
- v. Faculty members who currently are eligible to serve on the 3-faculty panel for the qualifying exam are: Morteza Abbaszadegan, Treavor Boyer, Otakuye Conroy-Ben, Anca Delgado, Peter Fox, Matt Fraser, Sergio Garcia-Segura, Rolf Halden, Kerry Hamilton, Rosa Krajmalnik-Brown, Rebecca Muenich, Francois Perreault, Bruce Rittmann, César Torres, and Paul Westerhoff.

Guidelines for preparing the critical review document

It is essential to note the scope of the journal and the instructions to authors as outlined by the journal. All reputable journals have a complete guidelines and instruction for manuscript preparation. Make sure to understand the topic, think critically, evaluate the overall goals and objectives, and examine results, discussion, and conclusion of the selected article.

Steps for writing

Comment on the appropriateness of the paper's title, abstract, keywords, background information, and literature review.

Provide a substantive critique including strength and weakness of the following sections:

- Experimental plan and study design
- Analytical work and analysis including sample collection and overall approach
- Results section and appropriateness of discussion
- Relevance of the work on knowledge gap and to current state of the science
- Provide your overall assessment of the paper.

Useful links for students and faculty

<https://ssebe.engineering.asu.edu/advising/graduate/> has FAQs for graduate students.

FAQ #12 is link to important graduate student forms:

- CEE 590/790 Reading and Conference request form
- Report of Final Comprehensive Exam – Masters (*This is sent to the committee via DocuSign when the student schedules their master's thesis defense with the Graduate College. See additional information below.*)
- Report of Comprehensive Qualifying Exam – PhD
- Report of Dissertation Proposal/Prospectus
- Report for Doctoral Dissertation Defense (*This is sent to the committee via DocuSign when the student schedules their doctoral dissertation defense with the Graduate College. See additional information below.*)

Important note

Finally, it is Graduate College policy that all defenses must be advertised and open to the public. Because of this, defenses must be scheduled at least 10 working days in advance from their intended defense date. When a student schedules their defense in the iPOS system this allows the Graduate College and home academic unit to advertise the defense. This is a firm policy enforced by the Graduate College. If a student holds a defense and it is not scheduled and approved within the iPOS system it does not meet the requirements for graduation. Students must submit a copy of their thesis or dissertation document to the Graduate College for format review 10 days prior to their defense. The Graduate College can cancel the defense if this is not done.