

PhD Examination Milestones

This document defines expectations of student achievements at various stages in the PhD program.

1. **Research Proposal** – Within the first two years after admission to the doctoral program, the student must present a research proposal to the advisory committee. The research proposal serves as a qualifying examination in petroleum engineering. The qualifying examination is a comprehensive oral examination based on the student's proposal of the dissertation research project. To pass the examination, the candidate will:
 1. Define the problem, including formulating a hypothesis and a test for that hypothesis
 2. State the engineering, science, economic, and/or social motivations for a solution
 3. Read, understand, and summarize the most important previous work in the area
 4. Place the proposed research into a meaningful context with petroleum engineering
 5. Formulate a credible approach for carrying out the research and identify tools (analytical, numerical, laboratory instrumentation, and equipment)
 6. Demonstrate competence or potential to carry out the approach, including sufficient knowledge of and proficiency in other areas of petroleum engineering, geosciences, engineering sciences, basic sciences, and mathematics
 7. Provide a sufficiently detailed plan for the research, including a timeline
 8. Submit a written research proposal to the committee at least a week before the examination. The written proposal (not more than 15 pages excluding references) includes items discussed in 1.1-1.7. Along with a record of discussion related to the proposal, the written proposal is a working plan for the research, agreed upon by the student and the dissertation committee.
 9. Demonstrate a commitment to clear communication
 10. Announce the examination to all department faculty and graduate students one week in advance
2. **General Examination** – The student must pass a general examination administered by the examining committee. The examining committee must be approved by the Graduate School. The timing of the general examination is:
 - a. Generally within three years after admission to the doctoral program
 - b. No later than four years after admission to the doctoral program
 - c. No later than two semesters prior to graduation.

The general examination is a rigorous, comprehensive oral examination that includes assessment of the progress made by the student in the dissertation research and overall proficiency in petroleum engineering to ensure that the student can proceed successfully to a doctoral degree. To pass the general examination, a student must demonstrate progress in all areas examined at the proposal.

Specifically, the candidate will:

1. State the problem clearly and convincingly, in a style suitable for including in the dissertation. Clearly identify the elements of the problem and approach that are creative, challenging, or original.

2. Review relevant literature completely and informatively, in a style suitable for including in the dissertation
 3. Demonstrate expertise in the area of petroleum engineering science and technology related to the dissertation
 4. Demonstrate proficiency in other areas of petroleum engineering
 5. Perform significant, but possibly incomplete, original research that promises to contribute relevant new knowledge within petroleum engineering
 6. Present a detailed plan, including timeline, for completion of the dissertation
 7. Prepare a quality document for the examination including some preliminary results, with proper use of figures, tables, references, mathematical notation, grammar, spelling, etc., and submit the document to the dissertation committee at least one week before the examination. The document should generally follow format guidelines for a dissertation, and is expected to be less than 50 pages long (including appendices and excluding references).
 8. Communicate clearly, including answering questions well
 9. Announce the examination to all department faculty and graduate students one week in advance
3. **Final Examination** – The final examination focuses on the dissertation, to ensure that the work is of sufficient scope, difficulty, originality, and creativity to merit a PhD. In addition to the requirements of a general examination, the candidate will:
1. Complete a significant amount of original research that contributes relevant knowledge in petroleum engineering. Publications in conference proceedings and/or refereed journals are strong, independent evidence that a significant, original, and relevant contribution has been made
 2. Compare, benchmark, verify, calibrate, and/or validate original results against alternative and existing solutions, techniques, and datasets
 3. Demonstrate mastery of the research tools used
 4. Prepare a properly formatted dissertation and presentation and submit the dissertation to the committee at least two weeks before the examination
 5. Communicate clearly, including answering questions well

Announce the examination to all department faculty and graduate students one week in advance