

November 4, 2024

Guidelines and Instruction for PhD Proposal Defense Exams

A new format of the PhD Proposal Exam was approved by the PGE Faculty during the Spring 2021 semester. This new format applies only to PhD students who successfully passed their PhD Qualifying Exam (now known as PhD Qualifying-Course Exam) during or after Fall 2022 based on receiving a combined GPA of 3.33 for 3 of the approved PhD Signature Classes.

MSc students who took 3 of the PhD signature classes and passed them with the expected combined GPA automatically qualify to take the new PhD Research Proposal Exam once they change to the PhD program. All students who took the PhD written qualifying exam under the previous format (3 written exams during one week) will take the PhD Proposal Exam under the previous format as well.

Guidelines for the PhD Proposal Exam:

- (1) **Timeline.** The PhD Proposal Exam should be taken no later than 30 months after the student's first registration in the PhD program (students are admitted into the PhD program at admission time; hence, it may take several months to arrive at UT and register as a PhD aspirant.) It will be up to the student's supervising professor(s) to incentivize the student to take the PhD Proposal Exam as early as possible after having passed the PhD Qualifying Courses. This deadline can only be waived under special and extenuating circumstances by a majority vote of the PGE Graduate Studies Committee (GSC) and will be done on a case-by-case basis. Faculty advisors are responsible for notifying their PhD students of the guidelines included in this document well ahead of the student's PhD Proposal Exam.
- (2) **The PhD Proposal Format** is described at the end of this document.
- (3) **PhD Proposal Authorship.** The PhD Proposal should be written entirely by the student. The student's supervisor(s) can guide the student in the preparation of the proposal, but the final product should reflect the student's ability to formulate, investigate, and write a research proposal. The intention of this item is to evaluate the student's ability to write a coherent research proposal.
- (4) **The PhD Proposal Exam Committee** will consist of 5 members – 4 members from the PGE faculty, including the student's supervisor(s), and one external to PGE who should be approved by the UT Graduate School to take on this role (professors from other UT Austin engineering departments or from other UT Austin colleges are by default approved by the UT Graduate School; however, non-UT Austin members of the student's committee should be approved by the UT Graduate School during the review of the student's official PhD candidacy application). Additionally, the following steps should be followed in the establishment of the student's PhD Proposal Exam Committee:
 - i. The student should provide the GSC with (a) a final list of members of his/her PhD Proposal Exam Committee to the GSC, with the consent of his/her supervising professor(s), and (b) a date of the exam previously agreed upon by all members of his/her PhD Proposal Exam, at least 4 weeks before the exam. The GSC will then approve the committee member list, select a chair for the PhD Proposal Exam Committee in collaboration with the student, and communicate with members of the committee to remind them about their duties and deadlines.

- ii. The chair of the PhD Proposal Exam Committee should be any PGE professor who has no conflict of interest with the proposed PhD research and is eligible to take this role. The chair of the PhD Proposal Exam Committee will oversee that all exam provisions are safeguarded and that the exam is performed according to expectations of fairness and equity. Additionally, the chair of the PhD Proposal Exam Committee will complete the official paperwork necessary to report the exam results to the GSC.
- (5) **PhD Proposal Submission and Review.** The student should provide his/her PhD Proposal Exam Committee with his/her written PhD proposal at least 3 weeks prior to the date of the PhD Proposal Exam. Committee members will have 2 weeks to provide comments, edits, and feedback to the student concerning the proposal. These comments should only focus on the writing component of the proposal, as well as on the organization and coherence of the ideas and concepts; other aspects of a research proposal, such as its technical/scientific merits and timetable, should be discussed during the exam. The student will then incorporate the comments and edits received into the final version of the proposal and will submit it to all members of his/her PhD Proposal Exam Committee at least 3 days prior to the exam. Accordingly, the following is expected from members of the PhD Proposal Exam Committee:
 - i. All 5 members of the PhD Proposal Exam Committee should have read and approved the student's PhD proposal prior to conducting the exam (see the evaluation rubric at the end of this document). This requirement means that when the exam is taken, all members of the exam should have provided feedback to the student concerning the writing quality of the proposal and should have approved of any changes/additions to the original proposal based on feedback provided to the student. Therefore, the writing quality of the PhD proposal should not be considered as a subject of discussion during the PhD Proposal Exam.
 - ii. Whenever a member of the PhD Proposal Exam Committee does not provide feedback to the student in a timely manner it will be assumed that such committee member finds the proposal to be of satisfactory quality. The chair of the PhD Proposal Exam Committee will conduct and verify the latter steps and will cancel the exam if he/she finds that the writing quality of the proposal is not acceptable by notifying all members of the PhD Proposal Exam Committee.
- (6) **PhD Proposal Exam.** All 5 members of the PhD Proposal Exam Committee should be present during the entire duration of the exam. The only exception to this rule applies to members of the PhD Proposal Exam Committee who are external to PGE and who are not able to travel for the occasion. In the latter case, the student should secure an exam room ahead of time with robust video-conferencing facilities to allow the external member of their PhD Proposal Exam Committee to join the entirety of the exam remotely (with pre-verified software, microphone, and camera, e.g., Zoom, Microsoft Teams, etc.) Guidelines for the exam are as follows:
 - i. There should be no last-minute changes, and no professor should request a private one-on-one examination with the student because of last-minute changes to his/her schedule. Under special and extenuating circumstances (e.g., a professor member of the committee or family member being sick, or away on an important business trip, university-approved arrangements to work remotely, inclement weather, etc.), the GSC will allow the exam to take place virtually for that or all members of the committee.

- ii. During the exam, the student's supervising professor(s) will not be allowed to ask questions, answer questions, or make clarification remarks unless requested by the chair of the PhD Proposal Exam Committee.
 - iii. The duration of the exam should not exceed 2.0 hours total. The exam will begin with a 30-minute presentation by the student on his/her PhD Proposal. Only clarification questions can be asked by members of the student's PhD Proposal Exam Committee during the student's presentation.
 - iv. Questions during the PhD Proposal Exam should be approximately 50% about the physics/engineering/math background and 50% about the student's proposal. It is here emphasized that the oral questions concerning physics/engineering/math background are not intended to replicate questions already included in the student's three PhD signature classes; they are intended to probe the student's understanding of the basic concepts underlying his/her PhD research proposal. Likewise, it is expected that some of the background questions will consider fundamental concepts in petrophysics, transport processes, mathematics, thermodynamics, and geomechanics, among others.
 - v. At the end of the exam, the student and their supervising professor(s) will leave the room, and discussions and deliberations will be conducted by the remaining members of the committee concerning the student's performance and the robustness and feasibility of his/her proposal. A confidential vote will be conducted by the chair of the PhD Proposal Exam Committee with two possible outcomes: (a) passing, or (b) not passing. Likewise, the remaining members of the committee will make suggestions for additional courses to be taken or skills to be improved by the student during the course of his/her PhD research. Suggestions will also be made about the feasibility, goals, objectives, and timeline of the proposal. The committee will rank the student's performance in the areas of (a) academic background and knowledge and (b) communication skills.
 - vi. The student's supervising professor(s) can break a tie in the passing/not-passing vote by the remaining members of the PhD Proposal Exam Committee. This special situation will be overseen and conducted by the chair of the PhD Proposal Exam Committee.
 - vii. The final vote tally and suggestions by the PhD Proposal Exam Committee will be communicated to the supervising professor(s) and the GSC by the chair of the PhD Proposal Exam Committee. A majority no-passing vote will require the student to retake the PhD Proposal Exam within the ensuing 12 months. Not passing the exam during the second attempt will cause the student to be dismissed from the PhD program.
- (7) For those students who do not pass their PhD Proposal Exam on the first try, it is expected that they will retake the exam so that the 30-month period (see item 1) is honored in the process. Only under special and extenuating circumstances will the PGE GSC will extend this deadline.
- (8) PhD students who successfully pass the PhD Proposal Exam are expected to e-mail one-page yearly updates of their research progress to all members of their PhD Proposal Exam Committee. This important step will be considered during the eventual PhD Dissertation defense.

Guidelines for Preparing a PhD Proposal:

The goals of a written research dissertation proposal are to help a student to:

- Visualize the dissertation research from the beginning to the end, which enables the candidate to conduct his/her research in a timely fashion and encourages an integrated approach to the research.
- Read and understand the relevant literature and prevent them from attempting to “reinvent the wheel.”
- Develop a road map and a game plan for the research such that the expectations and goals are realistic within the time frame available to approach the project.
- Develop an unofficial “contract” with the supervisory committee. This “contract” could help protect a student’s interests should their supervisor is no longer available to supervise him/her due to extenuating circumstances. Because there is a formal PhD proposal that was approved by the committee, the research can proceed as described under a new advisor without the need to start from scratch.
- Think through the critical components involved in the research and streamline the dissertation research.
- Look for and isolate potential problems early in the research. If such problems turn out to be insurmountable, a student can drop the topic before investing too much time and resources in it.
- Use his/her time more efficiently and effectively, thereby expediting the dissertation process.

The research proposal must be no more than 15 double-spaced pages, exclusive of appendices, references, and the cover page. The font, type size, and margins should conform to UT Austin’s Dissertation format.

The proposal should include the following items/sections:

1. Cover Page

The cover should contain (1) a tentative dissertation title, (2) the student’s name, (3) the names of the PhD Committee members, and (4) date.

2. Executive Summary

3. Using clear and precise language, summarize the background, objectives, and expectations of the proposed dissertation research. The summary should not exceed 400 words. Background, Literature Review, and Problem Statement

This section should briefly describe the problem to be solved, presumably of interest to people working in the chosen field. Give enough background so that the reader can appreciate that there is indeed a problem that merits a solution or further investigation in the context of the state-of-the-art. The discussion of the state-of-the-art should be centered around a brief literature review relevant to the proposed research and does not have to be an exhaustive discussion of all published work on the topic. The section should end with a succinct problem statement. The supervisor may have already identified some aspects of the problem statement; however, the proposal should reflect the student’s problem, not the supervisor’s problem.

4. Research Hypotheses, Questions, and/or Objectives

State in clear and precise language the hypotheses or objectives of the research. The objectives of the research should not be confused with the research tasks required to achieve these objectives and should be listed numerically.

5. Statement of Proposed Tasks

State clearly the various research tasks that, if successfully completed, will enable the student to achieve the research objectives. The tasks should be listed numerically and should include how data/measurements will be analyzed.

6. Preliminary Results

In this section or in an appendix, tasks already completed should be listed and discussed. The appendices can be of any length, but they should be well-written. It is not necessary to include any preliminary results in the proposal, but tasks that have been completed must be listed.

7. Expected Timetable

Describe the expected timetable for completion of the research and defense. Even though tentative, the timetable is intended to provide a general idea of how sequentially or in parallel the various tasks of the research will be accomplished leading toward the PhD defense.

8. References and Citations

The references and citations should conform to the Dissertation format of the University. It is strongly suggested that the referencing be automated using Endnote, Zotero, Mendeley, or similar software reference/citation managers.

9. Equations

All equations should be carefully annotated and numbered, and all symbols and/or variables should be described in the text.

10. Figures and Tables

All figures and tables should have a descriptive caption that explains what is being shown (figures) and/or summarized (tables). The figures and tables should be legible and easy to read and understand and should be cited in the text. Measurement units should be uniformly and consistently used throughout the proposal.

Rubric for the Evaluation of the PhD Proposal Defense Exam

Writing Evaluation (return 1 week before oral exam)	3	2	1
<i>General Writing</i>	Proposal includes all of the elements described in points 1-8 above. References, equations, figures, and tables are properly formatted. Grammar is correct and writing is clear.	One of the following is true: 1. Proposal is missing one or two elements from points 1-8 above. 2. Formatting of one or two proposal elements in points 9-11 is not satisfactory. 3. Proposal should be proofread for grammar and clear writing.	One or both of the following is true: 1. Proposal is missing more than 2 elements from points 1-8 above. 2. Formatting of more than 2 elements in points 9-11 is not satisfactory. 3. Proposal should be proofread for grammar and clear writing.

Proposal Evaluation (discuss during oral exam)	3	2	1
<i>Description of Problem and Research Hypotheses/Objectives</i>	A relevant problem has been described, and hypotheses and/or objectives are clearly stated.	One of the following is true: 1. The research problem is not clear or it is not clear why it is new. 2. Hypotheses and/or objectives are not clear or cannot be tested/delivered as stated.	One or both of the following is true: 1. Neither the problem is clear nor can hypotheses and/or objectives be tested/delivered. 2. This problem has already been solved (references are provided separately).
<i>Review of Relevant Literature</i>	Key literature has been reviewed to the best of the reviewers' knowledge.	One of the following is true: 1. There is an entire segment/research area of literature omitted. 2. Some of the key references are outdated.	One or both of the following is true: 1. There are two or more research areas relevant to the proposal that have not been referenced. 2. Most of the stated literature is out of date.
<i>Methods and expected timeline</i>	The tasks outlined in the Methods section are clear, and the proposed methods for solving them appear robust. It is clear from the expected timeline how tasks are articulated.	One of the following is true: 1. Some of the methods stated are not appropriate for solving the research tasks. 2. The tasks do not articulate well per the stated timeline.	Most methods stated are not appropriate for the proposed research tasks.