

December 18, 2023

Guidelines and Instructions for the PGE Department's 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 2021 under the modality of 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 too.

Guidelines for the PGE Department's PhD Proposal Exam:

- (1) The PhD Proposal Exam should be taken no later than 28 months after a PhD student's first day of classes in person. This includes PhD students who already have a MSc degree when starting the PGE PhD program and PhD students following the Direct PhD coursework track (BSc degree to PhD degree with no MSc degree). The first-class day of a semester/session will be determined by the UT Austin academic calendar. 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. This deadline can only be waived under special and extenuating circumstances by majority vote of the PGE Graduate Studies Committee (GSC) and will be done on a case-by-case basis. Faculty advisors are responsible for understanding and notifying their PhD students of the guidelines in this document well ahead of the student's PhD Proposal Exam. The Graduate Coordinator will assist in reminding faculty and students of the approaching PhD proposal deadline.
- (2) The format of the PhD Proposal is described at the end of this document.
- (3) 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) In addition to the 5 members of the PhD Proposal Exam (one of them being from outside PGE and who is approved by the UT Graduate School to take this role), the GSC will designate a "referee" professor (any professor from PGE who has no conflict of interest with the proposed PhD research is eligible to take this role), who will attend the exam to oversee that all exam provisions are safeguarded and that the exam is performed according to expectations of fairness and equity. To avoid potential conflicts of interest, the "referee" professor will not serve on the eventual PhD Dissertation Committee after the student passes the PhD Proposal Exam. The "referee" professor will designate the Chair of the student's PhD Proposal Exam Committee among the 5 members of the student's committee but excluding the student's supervising professor(s). It is expected that the Chair of the committee will complete the official paperwork necessary to report the results from the exam to the GSC. Students should contact the Chair of PGE's GSC ahead of time to be assigned a "referee" professor for their PhD Proposal Exam.

- (5) The student should provide the GSC with (a) a final list of members of his/her PhD Proposal Exam 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 referee professor, and will communicate with members of the committee to remind them about their duties and deadlines.
- (6) The student should provide his/her PhD Proposal 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 Committee at least 3 days prior to the exam.
- (7) All 5 members of the PhD Proposal 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. Whenever a member of the PhD Proposal Committee does not provide feedback to the student in a timely manner, it will be assumed that such committee member finds the proposal of satisfactory quality. The "referee" professor 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 Committee. A decision on exam cancellation by the "referee" professor shall be notified to the student and the committee at least 96 hours before the scheduled exam time. This notification should also state the reason for cancellation.
- (8) All 5 members of the PhD Proposal Exam plus the "referee" professor 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.) 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.
- (9) 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 "referee" professor.
- (10) The duration of the exam should not exceed 2.0 hours total. The exam will begin with a 30-minute presentation by the student of his/her PhD Proposal. Only clarification questions can be asked by members of the student's committee during the student's presentation.

- (11) 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.
- (12) At the end of the exam, the student's 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 "referee" professor with two possible outcomes: (a) passing, or (b) not passing. Likewise, the remaining members of the committee will make suggestions/requests for additional courses to be taken or skills to be improved by the student during the course of his/her PhD research based on the student's performance during the exam. 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.
- (13) The student's supervising professor(s) can break a tie in the passing/not-passing vote by the remaining members of the PhD Exam Committee. This special situation will be overseen and conducted by the "referee" professor.
- (14) The final vote tally and suggestions by the PhD Exam Committee will be communicated to the supervising professor(s) and the GSC by the "referee" professor. A majority no-passing vote will cause the student to be required 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.
- (15) For those students who do not pass their PhD Proposal Defense 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 the PGE GSC will extend this deadline.
- (16) 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 Committee. This important step will be considered during the eventual PhD Dissertation defense.

Guidelines for Preparing a Dissertation 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 to 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. Font, type size, and margins should conform to the Dissertation format of the University.

The proposal should contain the following:

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

Using clear and precise language, summarize the background, objectives, and expectations of the proposed dissertation research. The summary should not exceed 400 words.

3. Description of Problem and State-of-the-Art

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 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. Review of Relevant Literature

This section should be brief and relevant to the objectives of the research. It is only necessary to undertake a brief critical review of the most relevant published literature in order to highlight how the research problem will contribute to the chosen field/discipline. The review should be designed to

construct a niche and not to be a chronological recital of who did what and when. Later on, the dissertation will undertake a more exhaustive literature review.

6. Method for Conducting the Research and Analyzing Data

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.

7. 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.

8. 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.

9. 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.

10. Appendices

Appendices are optional, do not count toward the grand total of 15 proposal pages, and are intended for students to summarize extra information or results that are important but not central to the proposal.

11. Equations

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

12. 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)	5	3	1
<i>General Writing</i>	Proposal includes all of the elements described in points 1-9 above. References, equations, figures and tables are properly formatted.	One of the following is true: 1. Proposal is missing one or two elements from points 1-9 above. 2. Formatting of one or two proposal elements in points	One or both of the following is true: 1. Proposal is missing more than 2 elements from points 1-9 above. 2. Formatting of more than 2 elements in

	Grammar is correct and writing is clear.	9-12 is not satisfactory. 3. Proposal should be proof-read for grammar and clear writing.	points 9-12 is not satisfactory. 3. Proposal should be proof-read for grammar and clear writing.
Proposal Evaluation (discuss during oral exam)	5	3	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 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 articulate among them.	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.