

## **Comprehensive Exam (Thesis Proposal)**

The comprehensive exam consists of the preparation and presentation of a dissertation research proposal.

*When should I take my comprehensive exam?* You must schedule your exam *within six months* of successful completion of the preliminary exam and *at least three semesters* prior to the dissertation defense. To satisfy University rules, you must also have completed 30 units of course credit (including credits transferred from another institution) prior to completing your thesis proposal.

*Who will administer the comprehensive exam?* For the comprehensive exam and your ensuing research, you will select a thesis committee with the guidance of your advisor. The thesis committee will consist of five graduate faculty able to contribute to the successful completion of the research. At least three members of the committee must be graduate faculty in the Civil, Environmental, and Architectural Engineering Department and at least one member must be from another department. The committee members must be able to attend a majority of the ensuing thesis committee meetings and the thesis defense.

To select your thesis committee, you should prepare a short (1 to 2 page, single-spaced) outline of your thesis proposal to discuss with potential committee members. You should initiate this process shortly after (with one month) you complete the preliminary exam. Once you have chosen your committee and presented your thesis proposal, you may alter the composition of your thesis committee only with the consent of your advisor, the committee member in question, the remainder of the thesis committee, and the Graduate Committee of the department.

*What is a thesis proposal?* The proposal is a paper that outlines the hypotheses and testing of your future research. It must include the following sections:

1. *Identification of Research Needs (5-8 pages)*. In this section, you must show the significance of your research topic. Answer the question, "Why should anyone care about this research?" Then, you must succinctly review the existing literature on your research topic and identify the research questions that remain to be answered. The literature review should not be simply a "listing" of relevant conclusions from previous research; instead, you must demonstrate that you are not only aware of the literature on your subject, but that you are also able to critically evaluate it and use it to identify future research needs.

2. *Preliminary Results (optional)*. You may include a brief description of preliminary results (if you have any) that have helped you identify future research needs in your proposal. Your results should be presented in the same manner as the literature reviewed in the previous section because your preliminary results are already part of the scientific knowledge leading you toward future work.

3. *Hypotheses (1 page)*. The hypotheses are the "scientific positions" you have taken on the basis of literature review and preliminary work. The hypotheses should be stated as scientific opinions on the unanswered questions raised in the previous section. As such, the hypotheses are the basis of your remaining research and the *most important component of your proposal*.

4. *Research Plan (8-10 pages)*. The plan for future research should comprise the bulk of your proposal. The research plan should be driven by the need to test the hypotheses to arrive at answers to the unanswered questions. The plan should be organized into a set of experiments with separate descriptions of materials, methods, data analysis, and expected results. You should anticipate potential experimental outcomes and describe how the experiments will test the hypotheses.

5. *Tentative Schedule and Budget (1 page)*. You should include a realistic schedule and budget for your research plan. Remember that the graduate school requires at least three semesters of residence prior to the defense of your thesis. The budget should include cost estimates for Salary, Equipment, Expendable Materials and Supplies, and Travel (for field sites).

6. *References*. A list of references cited in the text should be included with the following information: Authors, Publication Date, Title, and Source. Present the references in the format used by a journal of your choice. Be complete and accurate.

*What format should I use to prepare the thesis proposal?* The entire proposal is limited to 20 pages (double-spaced, 12-point Times Roman font, 1" margins) including tables, figures, schedule, budget, and references. Tables, figure captions, schedule, budget, and references should be single-spaced. The proposal should be well-written and neatly presented. Tables and figures should be integrated into the text. Ask your advisor or fellow students for a past proposal on which to model your proposal.

*How is the comprehensive exam administered?* You must defend your thesis proposal at a presentation attended by your thesis committee. You must first set a date for your proposal exam and then you must deliver the proposal to the members of the committee *at least 10 days* prior to that date. After your proposal is approved, you must also give a presentation on your proposed work at an open seminar as part of the Environmental Engineering Seminar Series.

*What should the presentation contain?* Your presentation should focus on the major hypotheses of the research and the means by which they will be tested. The presentation should be planned for a duration of 45 minutes. During and after the presentation, the thesis committee will ask questions about your proposed research. After the question period, the committee will privately discuss approval or disapproval of the proposal.

*How will my proposal be judged?* Approval of the proposal is based on the *originality* and *feasibility* of the proposed research and the *clarity of the hypothesis-experiment*

relationships. If the proposal is unconditionally approved, you may continue with your research. Your proposal may also be conditionally approved or disapproved. Depending on the consensus of the committee, you may be required to (1) make selected changes to your proposal as specified by committee members, or (2) completely revise and resubmit your proposal (with or without presenting it again). Revision requirements would include a time period within which the revisions must be completed. Until your revised proposal is approved by the committee, you should not initiate further research.