Environmental Engineering

UNIVERSITY OF COLORADO **BOULDER**

Environmental Engineering Program
Comprehensive Proposal for Ph.D. Candidates

Updated: August 2020

This form, which describes the procedure to be followed in order to take the comprehensive proposal, is for use by students enrolled in the Environmental Engineering Program (EVEN) and by students in the environmental engineering sub-plan (CVEN) within the Civil, Environmental, and Architectural Engineering (CEAE) Department at the University of Colorado Boulder. This exam is administered by the CEAE Department.

The comprehensive exam consists of the preparation and presentation of a dissertation research proposal. This purpose of this exam is to have a committee, consisting of your faculty advisor(s) and others, conduct a detailed review of your proposed Ph.D. research.

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 comprehensive proposal

For the comprehensive exam and your ensuing research, you will select a thesis committee with the guidance of your faculty advisor(s). 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 faculty (either program or affiliated) in the Environmental Engineering Program and at least one member must be from another department. This last person could also be from another institution, but the selected person must have a Ph.D. degree. Once you have chosen you committee and presented your comprehensive 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 EVEN program.

Once a committee is selected, the next steps are to schedule the exam and develop a comprehensive proposal. The exam should be scheduled by the student, at least a month in advance.

The student must also develop a proposal, which will outline the hypotheses and testing of your future research. The proposal needs to be detailed enough as to provide the committee the opportunity to conduct a detailed evaluation of your proposed research. The proposal 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. This section could also be part of the discussion of one or several of the hypotheses.

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.

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 faculty advisor or fellow students for a past proposal on which to model your proposal.

The proposal should be submitted to the committee for review 2-weeks before the scheduled exam date. If the proposal needs to be submitted after the 2-week deadline, the student must seek approval from the committee to do so. Keep in mind that most times the committee will agree to the extension of the deadline, but it is still good practice to ask for the extension.

You must defend your comprehensive proposal at a presentation attended by your thesis committee (keep in mind that this exam is closed to the public). You will also need to schedule the room for the exam, allowing for a total of 3 hours. 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. 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 no more than 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.

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.