



Department of Bioengineering

UNIVERSITY OF COLORADO
DENVER | ANSCHUTZ MEDICAL CAMPUS

PhD Comprehensive Examination

Exam Description

The exam consists of two components:

1. Written presentation of the student's research topic
2. Oral presentation of the student's research specific aims, progress in their research, and summary of didactic training (i.e. coursework taken, professional preparation)

These sections are described in more detail below. Students are highly encouraged to discuss these items with his/her research advisor(s) and thesis committee, which comprise the comprehensive exam review committee.

Part 1: Comprehensive Document

A comprehensive exam document should be prepared by each PhD candidate covering their research progress. It should be based on appropriate predoctoral research proposals (F31 or similar). This document will be between 8 and 12 pages in length and generally contains four sections:

1. Specific Aims (½-1 page) a brief summary narrative that introduces the overall problem, lists the major goals (i.e. specific aims) of their proposed research, and provides the overall research hypothesis that drives these goals.
2. Significance (≈2 pages): a summary of relevant background material, gathered primarily from peer-reviewed journal articles, which support the relevance of the research goals and hypothesis. This section may optionally address the research as it pertains to the candidate's career goals.
3. Innovation / Preliminary Data (≈2 pages) presentation of existing work toward the research goals, with descriptions of the novelty of the work; this should include relevant figures, tables, and other quantitative details. Essentially, this section should demonstrate that the goals are achievable and that the candidate has already made significant progress.
4. Approach (4-5 pages): a description of additional studies needed to attain the research goals, categorized by specific aim. This usually includes but is not limited to: descriptions of how the data will be measured and analyzed (statistical or otherwise); statements describing how the work will address the primary hypothesis; a statistical power analysis; review of anticipated problems and alternative approaches the candidate may consider during the course of research; and a timeline for completion of the research. The candidate may optionally address how each research task relates to their training.

These sections are based on an NIH F31, but should other funding agencies/program require different formats, these formats would be acceptable as a comprehensive document. The candidate's advisor should be consulted regarding document details beyond those provided above; the advisor may, at their discretion, provide the candidate with example documents conforming to this format. The candidate should work to optimize the document to the specified length. Ideally, this document will be submitted to the comprehensive committee as well as to extramural funding organizations (pre-doctoral awards). Minimally, it must be provided to the comprehensive committee two weeks prior to the exam.

Part 2: Oral Exam

The candidate will give a 1-hour public presentation (i.e. 30-40 slides) to their thesis committee and the campus at large that: summarizes their didactic training, which of course is now coming to an end the semester of this exam; reviews their current research progress; and proposes work required for the completion of the thesis. In detail:

1. Summary of Didactic Training (<5 slides): Brief review of classes the candidate has completed (or is currently taking) to fulfill their training plan; how these classes went; whether there were revisions to their original training plan; etc. The candidate may, at their discretion, briefly reference their didactic training in the remaining two presentation topics. If the candidate has successfully obtained a pre-doctoral award, they should briefly review their progress during this period.
2. Research Progress (15-25 slides): A review of their research work to date split up, if appropriate, by progress on individual research aims, i.e. how the work satisfies the research aims/hypotheses. The student should state which portions of the current work are in preparation or have been submitted as manuscripts, and provide status (“in revision”, “in press”, etc) for the latter.
3. Remaining Research (10-15 slides): A proposal of remaining research to be accomplished to satisfy the research aims and/or hypotheses. Here, the candidate should strive to provide specific, attainable goals – such as work to prepare and submit additional manuscripts and/or abstract submissions – and a timeline in which they expect these goals will be met.

During and after the presentation, candidates will be open to questions from their committee or the audience. At the end of the exam, public attendees (i.e. those not on the committee) will be asked to leave, and candidates should expect additional questions and/or feedback on their remaining research goals, and how attainable they are in the candidate’s proposed timeframe.

Exam Outcome

The Comprehensive Examination Committee will then make one of the following decisions:

1. Student has unconditionally passed the Comprehensive Examination.
2. Student has conditionally passed the Comprehensive Examination. Conditions that the student must fulfill must be provided to the student along with a date by which the student must do this.
3. Student has failed the Comprehensive Examination. The committee may recommend that the student stand for the Comprehensive Examination a second time (no student may take the Comprehensive Examination more than twice) or may recommend that the student discontinue further PhD study.

Examination Results

The following provides more information on exam outcomes:

PASS - this means that you have passed the Examination and may continue in the program as a candidate for the Ph.D. degree. You will need to pay attention to the rules regarding registration of thesis hours.

PASS WITH CONDITIONS - this means that you have passed, pending the completion of conditions imposed by your committee. You should start to register for thesis hours as if you had passed without conditions. The committee will notify you of the conditions which must be satisfied within a time frame not to exceed four (4) months. Failure to satisfy the conditions will result in a failure of the Examination.

FAIL - this means that you have failed the Examination. The Graduate School Rules stipulate that a student failing the Comprehensive Examination may, at the program’s discretion, retake the Examination once. The retake will be in the form designated by the committee and must be completed within twelve (12) months. A student who fails the retake of the exam is subject to immediate dismissal from the Graduate School.

Graduate School Rules and Policies

The department follows the Consolidated Graduate School Rules and Policies on the Comprehensive Examination. Please consult this publication and note the following requirements.

1. The comprehensive examination is typically scheduled at the end of the second year; **it must be completed no later than the end of the third year.**
2. The student must have at least a 3.0 cumulative GPA prior to taking the examination and the student must apply for admission to candidacy to the PhD at last two weeks prior to the examination.
3. All required non-thesis credit hours must be completed by or registered for during the term in which the examination is taken; and all transfer credits must be transferred prior to the term in which comprehensive examination is taken.
4. It is recommended that no more than 10 of the 30 thesis credit hours be completed prior to passing the comprehensive exam.
5. The comprehensive examination committee and the examination schedule must be approved by the program director. The examination committee shall consist of a minimum of three Graduate Faculty members, two of which must be Bioengineering core faculty. The chair of the committee must be a member of the degree-granting program. The student's dissertation advisor may not chair the examination committee.