

## School of Engineering's Doctoral Comprehensive Knowledge and Research Proposal Examination Procedures

PhD students in the School of Engineering are required to pass two examinations before advancing to the status of a “PhD candidate”:

1) A *comprehensive knowledge examination* used to evaluate the student’s fundamental knowledge necessary to successfully carry out research at the doctoral level.

2) A *research proposal examination* used to evaluate the student’s knowledge pertinent to the scope, objectives, methodology and resources required to carry out the proposed research.

As per the regulations of the College of Graduate Studies, both examinations must be completed within 36 months of the student’s enrolment in the PhD program. Upon successful completion of both examinations, the student will be admitted to candidacy.

These procedures will apply to all SoE PhD students effective September 2022 for any students who have not yet scheduled their comprehensive exams.

## 1) Comprehensive (Fundamental Knowledge) Examination

### **TIMING**

The comprehensive knowledge examination must take place within 18 months of the student's PhD program start date<sup>1</sup>. In certain circumstances (e.g. student leave of absence) a request for an extension may be made to the Associate Director of Graduate Studies. The examination may also be scheduled at the time of an annual review when all the committee members gather to review the student's progress.

The comprehensive knowledge examination and research proposal examination may not be scheduled for the same day. The comprehensive knowledge examination must occur first and the result of the comprehensive knowledge examination must be determined and approved by the Associate Director of Graduate Studies before the research proposal examination may be scheduled. If the result of the comprehensive knowledge examination is 'fail', the research proposal examination must be delayed until the student has successfully completed a retake of the comprehensive knowledge examination.

### **INITIATION**

Before a comprehensive examination can be scheduled, the student must have a supervisory committee. A supervisory committee consists of at least three faculty members:

- 1) the student's research supervisor
- 2) two additional supervisory committee members chosen in compliance with UBC Senate Policy O-9.

If the student has a supervisor and co-supervisor, College of Graduate Studies policy still requires two additional supervisory committee members chosen in compliance with UBC Senate Policy O-9. If the student has a supervisor and two co-supervisors, College of Graduate Studies policy requires three additional supervisory committee members, chosen in compliance with UBC Senate Policy O-9, to complete the supervisory committee.

In any case, the supervisory committee acts as the comprehensive examination committee and the number of supervisor/co-supervisors may never outnumber the other supervisory committee members.

The supervisory committee can be established at any time after the student joins UBC; however, the full supervisory committee must be established no later than 12 months after the student commences study at UBC.

The supervisory committee members will meet with the student, review the general scope of the doctoral research, and identify discipline-specific topics of relevance to the student's research. After a discussion with the student, a date for the comprehensive exam will be set.

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<sup>1</sup> For students who began their PhD program in September 2017, some flexibility regarding the 18 month deadline will be offered. Supervisors of these particular students must consult with the Associate Director of Graduate Studies regarding an extension to the 18 month deadline.

## **PROCEDURE**

At least one month before the proposed examination date, the supervisory committee members shall finalize the scope and depth of knowledge expected of the student during the comprehensive examination. Thereafter, the supervisor shall communicate (e-mail is recommended) to the student the instructions outlining the expectations for the examination, including the topics and an explanation of the depth of knowledge expected of the student. Also, the student must be informed of the resources available during the exam (for example, if the exam is a closed / open book exam, or a take home exam; computers / software requirements, etc.). If necessary, the student can meet with individual supervisory committee members to seek further clarification.

## **EXAMINATION**

Recognizing the diversity of engineering fields and the unique requirements for discipline-specific norms, it is up to the supervisory committee members to determine the format of the comprehensive examination. However, it is essential that the examination provides an opportunity for the student to demonstrate mastery of fundamental knowledge relevant to the research area, demonstrate critical thinking skills required to carry out independent research, and demonstrate an ability to communicate answers clearly.

The possible examination formats include:

Option #1: Proctored, written examination

Option #2: Oral examination

Option #3: Other (e.g., combined written and oral examination; computer simulation; take-home exam)

In case of Option #1 or #2, the examination should not take more than 3 hours to complete. In case of Option #3, the supervisor (after discussion with other supervisory committee members) must describe the selected format and obtain an approval from the School of Engineering Associate Director for Graduate Studies.

The comprehensive knowledge examination, in all formats, is a closed examination. Only the student and the examination committee are allowed to attend. Members of the public may not attend the exam, or participate in any way.

A neutral chair is required for, and will preside over, any oral examination.

After completion of the examination, the supervisory committee members rank the student's performance as

- 1) Pass
- or
- 2) Fail

Each committee member (including the supervisor and all co-supervisors) has one independent vote. The examination result will be 'fail' if half or more (greater than or equal to 50%) of the votes are 'fail'.

In the event of an oral examination, a secret ballot vote will be held and the chair will record the number of each type of vote on the "*PhD Comprehensive Knowledge Examination Report*". In the event of any other form of examination, the supervisor will record the number of each type of vote on the "*PhD Comprehensive Knowledge Examination Report*".

In an oral exam, the chair will submit the neutral chair's examination summary report to the SoE Associate Director of Graduate Studies or designate. In a written or take-home exam, the supervisor will submit the questions and answers to the Associate Director of Graduate Studies or designate. The "*PhD Comprehensive Knowledge Examination Report*" form must be signed by all supervisory committee members and the chair (if applicable) after completion of the examination and submitted by the supervisor to the SoE Associate Director of Graduate Studies or designate.

The supervisor will communicate to the student the outcome of the examination.

- ⇒ If the student fails the comprehensive examination, the student will receive detailed feedback from the supervisor and the supervisory committee members on the gaps in knowledge and any mandatory readings or coursework. Also, the supervisory committee must set milestones for completing any mandatory work and the re-take of the comprehensive knowledge examination.
- ⇒ The student is allowed to re-take the examination within 6 months. The same examination committee members will evaluate the student during the re-take. If agreed by all committee members, the format of the examination may be changed for the re-take.
- ⇒ If the student fails the comprehensive knowledge examination twice, he/she will be required to withdraw from the program. However, the student may appeal to the Associate Director of Graduate Studies for the opportunity to take the comprehensive knowledge examination for a third time. If the appeal is granted, this third comprehensive knowledge examination attempt must occur within 30 months of the student's program start date.

## 2) Research Proposal Examination

### **TIMING**

The research proposal examination must be completed no later than 36 months after the student joins the PhD program. The research proposal examination must take place after the comprehensive knowledge examination has been passed and approved by the Associate Director of Graduate Studies.

### **INITIATION**

The student and the supervisory committee members agree on a date for the research proposal examination. Similar to the comprehensive knowledge examination, the proposal examination may coincide with an annual review meeting.

Once a date is set, the supervisory committee informs the student of their expectations regarding the format of the research proposal document (verbally or in writing). It is recommended that the document not exceed 50 double spaced pages (excluding Appendices), and should typically include:

- Abstract
- Literature review
- Research methodology
- Timeline and milestones
- Statement of expected contributions
- Publications to-date

The supervisor may guide the student with preparing the research proposal. However, it is essential that the student demonstrates his/her written communication skills in preparing the research proposal.

### **PROCEDURE**

No less than two (2) weeks prior to the expected research proposal examination date, the student submits the research proposal document to the examination committee.

In all cases, the supervisory committee acts as the research proposal examination committee and the number of supervisor/co-supervisors may never outnumber the other supervisory committee members.

The examination committee reviews the proposal and informs the supervisor, who in turn informs the student in writing (e.g., by e-mail) whether the proposal is fit for examination.

- ⇒ If YES: The supervisor schedules and confirms the research proposal examination date.
- ⇒ If NO: The supervisory committee members meet with the student and discuss deficiencies in the research proposal and set a new date for proposal re-submission. The student will be required to re-write the proposal to address the deficiencies.

## **EXAMINATION**

An oral examination of the student's knowledge pertinent to the proposed research, will be carried out in the presence of the:

- i) Student
- ii) Supervisor and any co-supervisors
- iii) Supervisory committee members
- iv) Neutral chair (Associate Director - Graduate Studies or designate; does not vote; does not ask questions)

The examination will consist of two rounds of questioning to test the student's knowledge of the proposed research. Each examiner is allotted time to ask questions. The examination should not exceed 3 hours. In general, the examination is open to the public, except in situations where proprietary research is being proposed and the supervisor makes a request to the Associate Director of Graduate Studies for the examination to be closed to the public.

At the end of the examination, the examiners discuss (in camera) the performance of the student. A secret ballot vote will take place with the following options:

- 1) Pass
- 2) Pass with modifications to the proposal
- 3) Fail

Each committee member (including the supervisor and all co-supervisors) has one independent vote.

In case of a non-unanimous vote, a second secret ballot vote will take place after the examination committee discusses the student's performance. The neutral chair will include in his/her notes the rationale for the various assessments. After two rounds of voting, the neutral chair will record the number of each type of vote on the "*Research Proposal Examination Form*". The examination result will be 'fail' if a majority (greater than 50%) of the votes are 'fail'. If the sum total of pass and pass with modification votes equals the number of fail votes, the result of the examination will be 'fail'.

- ⇒ If the result of the examination is "Pass with modifications to the proposal", these modifications must be completed and approved by the supervisor before advancement to candidacy can be recommended to the College of Graduate Studies.
- ⇒ If the student receives a "Fail", he/she can re-take the research proposal examination within 6 months.
- ⇒ If the student receives a "Fail" twice, the student will be required to withdraw from the program. However, the student may appeal to the Associate Director of Graduate Studies for the opportunity to take the research proposal examination for a third time. If the appeal is granted, this third research proposal examination attempt must occur within 48 months of the student's program start date.

⇒ If a student does not successfully complete the research proposal examination within 36 months of their PhD program start date, a Request for Extension to Time Allowed for Advancement to Candidacy will need to be made to the College of Graduate Studies.

Once the student has passed the comprehensive knowledge examination and the research proposal examination, the supervisor will submit forms recommending the student's advancement to candidacy.