Department of Natural Resource Sciences

Doctoral Comprehensive Examination

A comprehensive oral examination is a required element of the Ph.D. program and, except under exceptional circumstances, is held by the end of the **first term of the second year** of registration of a candidate in the Ph.D. program. Requests for a delay should be sent to the graduate program director (GPD).

1. Objectives

The purpose of the Comprehensive Examination is to allow students to demonstrate that they possess the qualities that will allow them to successfully work towards completion of a Ph.D. degree. These include in-depth understanding of the requisite contextual, theoretical, and practical knowledge in their research area, a clear understanding of the suitable methodological approaches for their research, and the ability to organize themselves, their ideas and their research plan in a realistic way. They must show an awareness of problems that might arise and be able to articulate appropriate strategies to overcome them. Students must be aware of how their research fits within their discipline and be able to explain how their research contributions can make a potential impact on the field.

The exam is concerned with knowledge at three levels:

1. Specific knowledge needed to plan and carry out the proposed research,
2. Broad scientific knowledge in the three core areas identified by the candidate and supervisory committee,
3. Understanding of the broader importance of the proposed work, in relation to what is known within the discipline and in allied fields of inquiry.

The candidate will demonstrate an ability to critically analyze the available facts, evidence, observations, and arguments. The candidate will show capacity to synthesize information from multiple sources, make judgements and present their opinions about knowledge at these three levels during the exam.

The research proposal presented at the Comprehensive Examination is not required to be the ultimate version of the Ph.D. thesis research. It is suitable to revise the research proposal following the Comprehensive Examination, as justified by research results obtained after the Comprehensive Examination, due to the acquisition of new knowledge or ongoing research developments in the candidate's field of study.

The Comprehensive Examination does not assess the candidate's progress towards the completion of their research objectives. The progress towards research objectives is evaluated in the Graduate Research Tracking forms by the Supervisory Committee.

2. Requirements

A research proposal of not more than ten pages (see Section 4), will be sent by the student to the examining committee **no less than two weeks prior to the exam**. The proposal should be a succinct summary of the conceptual foundation of the thesis, presented as a synthesis of relevant literature, the problems to be examined or questions to be answered and how they represent important gaps in knowledge and the proposed solutions and methodology to answer the research questions, based on suitable experimental or theoretical approaches. It should address any concerns raised by the Supervisory Committee in their review of proposal drafts, which will be discussed prior to this examination. Students should include evidence that supports their arguments related to the extent of the problem identified for their Ph.D. research. They can present factual observations to justify their proposed solutions, and these claims may be supported by the literature or from personal experience. Preliminary data that demonstrates the feasibility of the proposal is permissible but is not required. The format of the Ph.D. proposal is described in Annexe A.

Prior to the exam, the **candidate in consultation with their Supervisory Committee,** will identify three core areas of broader scientific knowledge on which the candidate wishes to be examined. These areas should represent related disciplines that the student will necessarily consult to position their work contextually and interpret their research findings. The core areas should be broad in scope, equivalent to the knowledge-base of a graduate-level or upper-level undergraduate course. To provide adequate time for the candidate to prepare for the exam, the Supervisory Committees should identify the three core areas in advance of the term when the examination will occur. The student should share these areas to be examined with the comprehensive examination committee at the time the committee is struck, a minimum of one month in advance of the proposed date for the exam (see Section 4). These three core areas are also to be explicitly stated on the cover page of the research proposal at the time that the proposal is submitted to the committee.

3. Examination Format and Assessment

The Comprehensive Examination Committee will consist of the supervisor, the co-supervisor or committee member, an internal Departmental examiner, an examiner external to the Department, and the Graduate Program Director or their designate who serves as Chair of the Comprehensive Examination Committee.

The quality of the proposal and respect of guidelines is evaluated by the members of the Comprehensive Examination committee.

The exam is to be held in-person, but members of the committee may attend via Zoom or other similar platforms as needed. The chair, the supervisor, and the student must attend in person. The supervisor is responsible for hosting the connection with any external participants attending remotely.

At the start of the exam, the chair will review the Comprehensive Examination procedures with the candidate and committee members. Then, the candidate will be asked to step out while the committee review the written proposal and plans the question periods to ensure each of the core areas are covered. The exam will begin with a twenty-minute oral presentation of the essential aspects of the research proposal by the candidate. Two rounds of questions will follow. Each examiner will first have 10

minutes to ask questions relating to the core areas of expertise, literature review and justification of the problem stated in the research proposal. In the second round of 10 minutes, the examiners will ask questions of the candidate's research questions, proposed methodologies and feasibility of their proposed work. Normally, the exam will be approximately two hours in duration.

Upon completion of the Comprehensive Examination, the candidate will receive a grade of Pass or Fail. If, in the committee's judgment, the candidate does not demonstrate the ability to conduct doctoral research, based on their knowledge at three levels (listed above), the candidate will receive a Fail grade. According to the McGill Ph.D. Comprehensives Policy, the candidate is given a second chance to pass the exam. The timeline for the completion of the second exam will be determined by the supervisory committee in consultation with the GPD. Even in the event of a Pass, the committee may recommend additional reading, revisions to the proposal or remedial coursework to overcome deficiencies in the candidate's knowledge at the three levels (described above). The Committee Chair will provide a written summary of the feedback to the candidate following the exam using the Department template.

4. Scheduling the Comprehensive Examination

Below are listed the different steps to schedule a Comprehensive Examination in the Department of Natural Resource Sciences.

Step 1 – Hold a Supervisory Committee meeting during the term prior to the term when the Comprehensive Examination is to occur.

- Student should present a draft of their proposal to receive feedback.
- Student and committee members should discuss and decide the three core areas.
- Student and committee members identify members of the Comprehensive Examination committee that can assess the proposal and examine the areas of expertise.

Step 2 – Student will **register for the course NRSC 701** in the first term of their second year of full-time study in the Ph.D. program.

Step 3 – Comprehensive Examination Committee Members

The student and supervisor contact potential Comprehensive Examination committee members. It is the supervisor's responsibility to confirm the participation of committee members, but the student may assist with this task. The student provides the following information to the Graduate Program Coordinator, Simone Clamann (simone.clamann@mcgill.ca):

1) the list of committee members for the Comprehensive Examination,
2) a possible date for the examination,
3) a title for the proposal, and
4) three core areas to be examined

- **Supervisor**: The student's research supervisor.
- **Committee Member:** A member of the student's PhD advisory committee or co-supervisor. This person would normally hold a university tenure-track or tenured faculty position, or have an

appointment as adjunct professor; other persons (e.g. government scientists) may be considered at the discretion of the GPD but should have equivalent credentials to a tenure track academic.

- **Internal Examiner**: A person who holds a tenure-track or tenured position in the Department of Natural Resource Sciences, who is NOT a member of the student's Ph.D. advisory committee. The member is permitted to be from another Department at McGill.
- **External Examiner**: A person who holds a university tenure-track or tenured faculty position in a Department OTHER than Natural Resource Sciences and who is NOT a member of the student's PhD advisory committee. Members from other Universities are permitted.
- **NRS Chair or Chair designate**: The graduate program coordinator, Simone Clamann, will assign a Chair for the examination.

Step 4 – Student contacts committee members

The student should contact each committee member individually to discuss their expectations and to obtain guidance on the material to study for the Comprehensive Examination.

Step 5 – Proposal

The supervisor should review the proposal to ensure that the guidelines are respected (see annexe A).

Step 6 – Approval by Graduate Program Director

The Graduate Program Coordinator, Simone Clamann will prepare the memo and request approval from the GPD. Once approved, the student will be notified. The student can then send their proposal to the members of the examining committee, at least two weeks prior to the examination.

Step 7 – Room Booking

Simone Clamann will book a room for the examination. It is the responsibility of the **supervisor** to arrange for video-conferencing, if needed. Note that the Chair and supervisor must attend the exam in person.

Step 8 – Confirmation

The Graduate Program Coordinator, Simone Clamann, will send out an email to all members to confirm the examination, including guidelines for external examiner.

Annexe A - Format of the written Ph.D. Proposal and oral presentation

1. Length and format: The proposal must be **no more than ten pages in length**. The page count does not include the title page, the table of contents, references, figures, tables and other illustrations. The proposal must be formatted as follows: 2.54 cm (1 inch) margins, Times 12 pt font and single line spacing. Page numbers must be included.

2. Audience: The candidate's research proposal is meant to articulate their perspectives and opinions about a specific problem, and to present their proposed solutions, convincingly, to the Comprehensive Examination Committee. The candidate should prepare the narrative with a good literate style that is clear and easy to understand. The research proposal needs to be persuasive and accessible, so the audience can be convinced of the suitability of the proposed solutions and the feasibility of the proposed work to answer the candidate's research questions.

3. The proposal should include a literature review to explain and contextualize the problem and justify the research questions. The goals and objectives of the work should align with the proposed solutions and methodologies, including experimental design and data analysis. Feasibility of the proposed research is judged according to the demonstrated knowledge (at three levels, described at the beginning of this document), evidence supporting the proposed solution and the likelihood that anticipated outcomes can be achieved as per the proposed timeline.

4. Presentation: The candidate is encouraged to follow the style for research presentations that was introduced in the NRSC 751 seminar. Besides the 15-20 slides that may be presented as an overview of the research proposal, the candidate may anticipate questions on study design, sampling locations, experimental materials and so on. The candidate is permitted to prepare a few extra slides with illustrative materials (e.g., photographs, illustrations, videos, etc), which may be shown during the question period, as further support for their logical arguments related to the feasibility of the proposed research. However, the examiner has the right to ask the student to respond to questions spontaneously, without consulting their prepared extra slides.

The Cover Page must contain the following: the title of the proposed Ph.D. thesis research; the candidate's name; the candidate's supervisor and co-supervisor as applicable; the date that the proposal was submitted; and the three core areas of expertise. An example is given on the following page.

How to Submit a Proper Ph.D. Proposal

Sebastien P. Faucher, Ph.D. Candidate (Renewable Resources)

Department of Natural Resource Sciences

Supervisor: Dr. Brian Driscoll

May 16, 2022

Subject areas:

1. Bacterial Pathogenesis
2. Microbial Ecology
3. Bacterial Genetics