McMaster University | ENGINEERING

Department of Electrical and Computer Engineering
Information Technology Building (ITB), Room A111
1280 Main Street West
Hamilton, ON L8S 4L8
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PhD Comprehensive Examination in the ECE Department

The objectives of the examination are to ensure that the student can:

a. demonstrate his/her knowledge and skills necessary to pursue research at the PhD level, respond to questions related to them, solve problems when faced with an unfamiliar situation related to them and know how to apply them to practical problems.
b. understand a specific problem involving the integration of ideas with imagination and innovation, research on the state-of-the-art related to it, envision new ways to solve it, conduct preliminary theoretical analysis and/or experiments, write a formal report on the findings, present the findings in an effective manner and defend them in front of a committee of experts.

The comprehensive examination committee will consist of four faculty members including the thesis advisor and at least one regular ECE faculty member outside the supervisory committee who will act as the chair. The chair, who needs to be approved by the Department Chair, is responsible for all administrative aspects of the exam in ensuring that all proper procedures are upheld. The chair should also ensure that the student is examined rigorously, while also being treated fairly and with respect. All committee members, including the thesis advisor and the chair, will play an active role in the examination. Up to three supervisory committee members can be part of the examination committee. At most one adjunct faculty member can be part of the committee.

In order to achieve the above objectives, the examination will consist of two parts, respectively:

a. **Part A:** Oral examination on any two courses chosen by the examination committee out of those the student has already taken at McMaster or elsewhere at the graduate level with questions on theory and application. The committee may choose particular skills or topics within the combined scope of the graduate courses the student has already taken instead of two separate courses if they are deemed more appropriate to assess the student's ability to integrate ideas.
b. **Part B:** A report and a presentation on a specific problem involving the integration of ideas related, but not the same as the student's thesis topic, specified by the examination committee.

Per section 3.4.3 of the School of Graduate Studies Academic Calendar, the examination must be completed between the 12th and 20th month after the student begins doctoral-level work at McMaster University, with an upper limit of 24 months from the student's start date in the PhD program, but after the first supervisory committee meeting.

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The whole examination will last no more than two hours with at most 50 minutes for Part A, 60 minutes for Part B and 10 minutes for a break between the two parts.

Four weeks before the examination date, the department or chair of the committee will provide the student with the two courses or skills or topics, as selected by the supervisor and committee appropriate, for Part A and the problem involving integration of ideas for Part B.

For Part A, no questions will be given to the student prior to the examination. If specific courses are selected for Part A, the scope of the questions during the examination will be restricted to the syllabi of those courses and their application to the student's research area or to general engineering problems. If a skill or topic is suggested for Part A, its scope will be defined clearly along with at least one reference material.

The integration problem in Part B will generally be open-ended with scope for imagination and innovation. However, at least one reference material will be suggested as the starting point.

The student will submit to the examination committee a report on the problem involving integration of ideas in Part B at least one week prior to the examination. The double- spaced report should be no longer than 20 letter-sized pages in length when typeset in 12- point Times Roman fonts with 2.54 cm margin on all sides. All figures, tables and other supporting material excluding references must be within these 20 pages. The report should address in sufficient detail the motivation for the problem, include a thorough literature search on it, present the student's proposed solutions, any preliminary theoretical and/or experimental analysis, and conclusions. The student shall give an overview of the report in a 10–15-minute oral presentation at the start of Part B of the examination.

A pass/fail decision on the student's performance in each part of the examination will be made at the completion of that part by the chair of the exam but will not be conveyed to the student until the completion of both parts. If the student fails one or more parts of the examination, the student shall only be re-assessed on the areas that received a failing grade.

• Visit each member of your examining committee to understand what they expect from each question.
• A dry run is essential! This lets you get an idea of the timing, and gives you practice at presenting.
• Before you answer a question from the committee, do not guess or "bluff" your way through. Say you don't know. But, if you have a partial idea, say "I don't know for sure, but it may be something like…."

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• Usually if the student does not know the direct answer to a question, the examiner will lead the student through a series of simpler questions, with the idea of arriving at the desired response.

Revised: October 1, 2024