I. Thesis Proposal Requirement

As a graduate student in the Department of Biology, you are required to write and defend a thesis proposal. This requirement has been formalized as a milestone credit. The thesis proposal is most helpful when it is completed in the first term, especially for MSc students, but it must be completed by the end of the second term of your graduate program at the latest.

If you would like to try to transfer from the MSc program to the PhD program without first completing the MSc degree, and you have the approval of your Graduate Supervisory Committee to attempt the transfer, then you must also defend a PhD thesis proposal by the end of the third term of your program. Your performance in the thesis proposal along with your performance in the first year of the MSc program form the basis for determining whether a transfer is warranted. Your Graduate Supervisory Committee, along with the Graduate Officers and an additional arms-length committee member, will base the decision on three criteria: excellent academic performance, a MSc research project of sufficient breadth and depth that it can be expanded into a PhD project and evidence that your analytical and writing skills are very strong.

II. Evaluation of the Thesis Proposal

The purpose of the thesis proposal is the clearly identify the scientific question(s) that will be the focus of your graduate research, explain why the question(s) are important, and describe how you will go about answering them. Your Graduate Supervisory Committee will evaluate the written proposal, which they should receive at least two weeks before your scheduled defense of it. The defense normally consists of a short (20 minute) oral presentation followed by questions from the committee. Spectators are not only permitted but invited to the defense and are entitled to ask reasonable questions after the committee has finished its questioning. The committee will take both your written and oral presentation as well as your responses to all questions into account in reaching its decision. The decision may be pass, fail, or deferred. A failure requires withdrawal from the program. A deferred decision requires a written explanation by the committee and a fixed date for a revised proposal and subsequent defense. Decisions cannot be deferred a second time.

At the defense you should show the committee that you have suitable knowledge of your field, grasp of the necessary methods, understanding of the scientific context of the work, and a credible plan for bringing the project to completion within the normal time limits for your program. The depth and sophistication of both knowledge and study design is naturally expected to differ between MSc and PhD proposals. Both should include clearly identified questions, or hypotheses, and an explanation of how the questions will be addressed. The committee will also probably expect to see a defined time line, showing the major milestones and planned completion dates for your project. Progress in your research to date is an additional consideration.
III. Thesis Proposal Format

A good model for the thesis proposal might include the following sections.

1. Introduction and review of prior knowledge. This would typically take the form of a concise literature review to show that you know the background for your work and to show the reader the context and importance of your questions. With limited space (see below) you have to be very judicious in selecting the references. You want the review to be up-to-date and representative of the field; it should not be limited to the writings of those associated with just one or two research groups.

2. Research progress to date. A separate section to describe your own contributions to date may be appropriate, particularly in the case of those attempting to transfer from MSc to PhD. In other cases, it may be necessary only to indicate how you have managed to progress relative to the time line for your project.


4. Proposed experiments (from “How to get and keep an NSERC research grant” by I.H. Witten and J.I. Glasgow of Queens University)

“A majority of your proposal should be devoted to a careful description of your research objectives and the methodology by which these objectives will be achieved. For the research plan, you should at least know how you are going to start out and have some ideas for future options. Be prepared to describe alternative scenarios for the later stages, which hinge on how the early research turns out. Be mindful of the need to evaluate your ideas, not just develop and implement them. If successful, what will be the effect of the research? Remember that your methodology must include a clear description of your overall experimental design and some indication of the statistical methods you will undertake to analyze your data.”

5. Milestones/Time line. Provide a term by term list of objectives for your planned graduate program, including coursework, important goals for your experiments, data analysis and writing and defense of the thesis.

The completed thesis proposal should be no longer than 12 pages of text, not including figures and references, double-spaced with 1 inch margins and size 12 font. Figures may be presented on additional pages only if they are informative and are mentioned in the text. References should be presented in full (no abbreviations other than initials and journal titles) in a format similar to a journal in your field of study. Deliver a copy to each committee member and one copy to the Biology Graduate Coordinator, who will handle the details of your defense, at least two weeks in advance of your scheduled defense.
IV. Research Ideas

The supervisor and supervisory committee should be important resources as you develop your research questions and the rest of the proposal. Your questions, and even the major methods, may already be largely formulated for you by your supervisor, or you may be expected to develop them mainly on your own. Generally, more responsibility for formulation of the main questions and the approach to their solution is expected from PhD candidates. In any case, you have the right to expect helpful discussion and guidance from your supervisor and the committee as you develop your proposal.

The following material is modified from “How to get and keep an NSERC research grant” by Witten and Glasgow, which was aimed at professional researchers who deal with the Natural Science and Engineering Research Council (NSERC) of Canada funding. There are important similarities between a good thesis proposal and a good NSERC proposal, and so the comments below may help you in designing your study and carrying out your research.

To do research well, you must formulate a question or hypothesis that forms the basis for your work. This should not be an isolated question, but one related to a particular field of inquiry and one designed to increase our understanding within that field. How do you generate specific, interesting and relevant research questions? Read current research papers and reviews in areas that are relevant to your field. Read more widely in general journals or in areas that overlap your field of research. Good ideas often come from reading, discussing and explaining what someone else is doing. Group discussions can be fertile breeding grounds for new ideas. Force yourself to understand new ideas, perhaps by presenting and explaining them to others, and ideas will strike you. When you think about these papers, it is worthwhile to capitalize on your own detached position to escape from the authors’ mindset and think more laterally.

By its very nature, research is unpredictable, and any avenue of inquiry – no matter how good the idea was originally – may turn out to be sterile, infeasible, or simply incorrect. Propose a mix of questions to work on – some short-term and obviously answerable, others long-term, more risky, but potentially more valuable. On the other hand, beware of promising to work on too many things, for your proposal will be criticized as being “unfocused”. Reviews of proposals sometimes state explicitly that the evaluation would have been higher if fewer ideas had been included. You can spoil a good proposal by adding more to it.

You have to evaluate your own ideas, assess their strengths and weaknesses, sharpen them, and present them clearly. When you specify a goal, how will you know if you reach it? Many research proposals state goals that are so vague they could never be reached. Thus, it is essential to formulate goals precisely and to be able to explain why they are worthwhile. If you do succeed, it is reasonable to ask what contributions will have been made to scientific knowledge or to practice. It is also essential to have some idea of what methods you will attempt to solve your proposed problem. You must plan something...
concrete. However, because research is unpredictable, it is also useful to think about alternative approaches to solving the problem of proving the hypothesis.

Your proposal will be evaluated by experienced researchers. They understand the difficulty of proposal writing and conducting research. They do not expect to glean every last detail of what you want to do by reading the proposal. However, they can tell a lot about you, and the way you think, from your writing. They expect you to have thought pretty hard about your ideas, and to have worked conscientiously to explain and present them as clearly and straightforwardly as possible. It is up to you to provide evidence for a positive decision.

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