SC/BIOL 4000 8.0/3.0 - BIOLOGY HONOURS THESIS
INFORMATION PACKAGE - Fall/Winter 2012-2013

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COURSE OBJECTIVES

The Honours Thesis courses are designed to provide you with research experience in the Biological Sciences and give you the opportunity to enhance your critical, analytical and communication skills.

TYPES OF HONOURS THESIS COURSES:

The **3.0 credit course** is an in-depth critical literature review and/or research proposal that demonstrates the student's knowledge and understanding of a topic. The best thesis will thoroughly review the literature in a particular field or area of interest, identify gaps or inconsistencies, and develop a specific hypothesis, argument or model. The thesis should also demonstrate that you can select and organize appropriate literature to support a hypothesis, argument or model and in many cases propose an experiment to test the hypothesis (with clearly articulated possible outcomes and limitations). Note that the 3.0 credit thesis is not a glorified essay and should be more than the type of literature review that would form part of another course – it must show evidence of critical thinking skills and an understanding of the scientific method. The 3.0 credit course is completed in a single term (Fall, Winter or Summer).

The **8.0 credit course** is a hands-on original research project (lab- or field-based) that includes both a practical and written component. The research project involves a significant investment of time and energy in the laboratory or field, equivalent to 8 credits of academic work. The written component should clearly describe the background relevant to the research project, the question or questions being asked in the research project (including specific aims or objectives), the methodology used, the results obtained and it should situate the work in the general context of the research area. The 8.0 credit thesis should demonstrate your ability to interpret data from an original research project that combines experimentation and/or observation to investigate a biological question. The 8.0 credit course must be completed over two consecutive terms (i.e., Fall-Winter, Winter- Summer, or Summer-Fall).

ELIGIBILITY AND ENROLLING

The courses are open to eligible Honours Biology students in their final year, with a BIOL GPA of at least 6.0. Students in the Honours Specialized Biology program (no stream) should have completed BIOL 3100 2.0. **Eligibility must be determined by the Biology Undergraduate Program Director (UGPD), who will indicate you are eligible by signing the attached registration form.** The form should be signed by the student, supervisor and advisor prior to submitting to the Biology UGPD. Each thesis requires input from three faculty members: the supervisor, the advisor and the course director. The role of each of these faculty members is described below.

To enroll:

1. Obtain an information package with registration form from the UG office (108 FS).
2. Find a supervisor and fill out the form in consultation with the supervisor. You will need to have an advisor and a thesis topic listed on the form.
3. Bring registration form to UG office to be signed by the UGPD.
4. Bring the signed registration form to Mrs. Audrey Johnson (247 FS).

CHOOSING A SUPERVISOR AND ADVISOR

The Honours Thesis supervisor will be a faculty member in the Department of Biology who has agreed to direct, oversee and evaluate your thesis work. Most students use a combination of their experience in SC/BIOL 3100 2.0 and other courses, as well as listings of faculty interests on the departmental web site or in the undergraduate handbook to identify a faculty member working in an area that interests them. Please note that many faculty are now receiving requests for honours placements several semesters in advance and it is advisable to start looking for a supervisor as soon as possible. **It is your responsibility to ensure you are eligible for BIOL 4000 and to find a supervisor.** If this course is a degree requirement and you are unable to secure a supervisor after an extensive search, please contact the course director.

The supervisor and advisor will be members of the Department of Biology at York University. Occasionally, a faculty member from another department at York University may serve as supervisor or advisor as long as that individual is a member of the Graduate Program in Biology. In all cases, a member of the Department of Biology must be on your examining committee. Normally the advisor is chosen by or in consultation with your supervisor.

CHOOSING A TOPIC

The thesis topic should reflect the biological interests of both you and your supervisor and should be selected early on by mutual agreement. For the 3.0 credit thesis, there is usually a greater range of biological topics to choose from and you are likely to have more independence in choosing the topic because it does not require laboratory or grant support to complete.

SUPERVISION, COURSE WORK AND EXAMINATION

Your thesis work is directed by your research supervisor and evaluated by your supervisor, advisor and course director.

Your **supervisor** is your primary contact for your thesis work, and you should work closely with her/him to produce the highest quality thesis. For the 8.0 credit thesis you are also likely to work closely with one or more graduate students or postdoctoral fellows. It is extremely important that you have a discussion with your supervisor early on regarding expectations (amount of time to be spent on research, frequency of meetings, attendance at lab meetings, preparation of thesis, review and editing of the thesis, etc.). For the 8.0 credit thesis, students should spend about 10-12 hours per week (possibly more depending on the nature of the research) in the lab/field for two terms. The 3.0 credit thesis will likely require an equivalent amount of time and considerable self-directed work.

The **advisor** is a member of the examining committee and participates in the evaluation of the written

thesis and presentation at the end of the program. The advisor has general expertise in the area of your thesis topic and you should feel free to seek his/her advice during the course.

Students should start work on their thesis as soon as possible after enrolling and should take the opportunity to obtain feedback on draft versions of their written work from their supervisor and/or advisor whenever possible. If you have any questions or concerns, please speak with your supervisor, advisor or course director.

The **course director** oversees the entire Honours Thesis course and ensures that standards are maintained across the department and that evaluations are equitable for all students. If you have concerns about your thesis that cannot be addressed by your supervisor, contact the course director.

Both the 3.0 credit and 8.0 credit Honours thesis require evidence that you can read the literature critically and with understanding, write clearly and concisely (with correct and appropriate grammar, spelling and referencing of materials), prepare accurate and clear figures/tables, and communicate your findings orally in a clear and engaging fashion. Honours students are required to report their findings in writing in the form of a thesis. The thesis format is described below.

The final mark for the course is based on the written thesis (60%) and an oral examination which is more commonly referred to as the "defence" (40%). This examination is conducted by the Course Director, the Supervisor and the Adviser and consists of a 15 minute presentation by the student followed by approximately 45 minutes of questions by the examining committee to determine your level of understanding and knowledge of the research topic, methods and basic background information. In the unusual case where an Adviser cannot be present, the Supervisor will arrange for another suitably qualified faculty member to be present.

MEETINGS

There are no formal lectures scheduled for BIOL 4000 8.0 and BIOL 4000 3.0. There is an information session for all students in September (for students starting in the fall semester) and another in January (for students starting in the winter semester).

DATES AND DEADLINES

The BIOL 4000 3.0 thesis must be completed in one term. BIOL 4000 8.0 requires enrollment over two consecutive terms. Courses may be started in any one of the Fall, Winter and Summer terms. The final version of the thesis (as a hard copy, NOT via email) MUST be handed in to the supervisor, advisor and course director by 5 pm on the last day of classes in the term in which you are defending.

Deadline for submitting the written thesis – last day of classes

3 credit students:	Fall term: Mon. Dec. 3, 2012
	Winter term: Mon. April 8, 2013
8 credit students:	Summer-Fall term: Mon. Dec. 3, 2012
	Fall-Winter term: Mon. April 8, 2013

A thesis that is handed in late will be penalized at a rate of 5% per day (on the written thesis grade).

SCHEDULING YOUR ORAL EXAMINATION

Oral examinations (defences) are held during the University examination period (December 5-21, 2012; April 10-26, 2013). The date and time for each oral examination is determined by mutual agreement between the student and the examining committee to avoid conflicts with other final examinations. As soon as you know your exam schedule, you should speak with your supervisor and advisor and find 3 separate one-hour time slots that are acceptable to you, your supervisor and your advisor. Please submit these 3 dates to Mrs. Audrey Johnson (247 FS) who will then schedule your oral examination in consultation with the course director. Please plan this early and note that the most favoured date (last day of exams) may not be available.

Requests for deferred status, i.e., for defences outside of the regular examination period due to illness, compassionate consideration, etc., may be submitted to the course director. The supervisor or advisor cannot approve a delayed defence without the permission of the course director.

THESIS OUTLINE

There are no specific guidelines concerning the length of a thesis, but students are reminded that an accurate and concise thesis usually indicates a better understanding of the topic. While there is no specific length, most honours theses range between 20 – 40 pages, double-spaced, excluding references, figures, etc. The organization of the 8.0 credit research thesis typically follows that of a scientific research paper, as outlined below. The organization of the 3.0 credit thesis can follow a number of styles (see the example below). Some 3.0 credit theses are in the format of a research proposal. Use these proposed outlines as guides; discuss with your supervisor.

8.0 Research Thesis	3.0 Thesis
Title Page	Title Page
Abstract	Abstract
Introduction	Introduction
Materials & Methods	Review of Literature
Results	Evaluation of Literature
Discussion	Summary
Conclusions	[Proposed Research]
Acknowledgements	Acknowledgements
References	References

The following guidelines are adapted from Information for Authors, Cell (www.cell.com).

Summary (Abstract)

The Summary consists of a single paragraph of fewer than 150 words. It should clearly convey the conceptual advance and significance of the work to a broad readership. In particular, the abstract should contain a brief background of the question, a description of the results without extensive experimental detail, and a summary of the significance of the findings. References should not be cited in the Summary.

Introduction

The Introduction should be succinct, with no subheadings, and should present the background information necessary to provide a biological context for the results. The Introduction should identify the biological problems and questions being addressed in the thesis and state the purpose of the work. The introduction should situate your project within the context of what is already known in the field and should make reference to pertinent literature and previous related findings.

Experimental Procedures (Materials & Methods)

The Experimental Procedures should, at minimum, include enough detail to allow the reader to understand the general experimental design and to be able to assess the data presented in the figures. Unpublished protocols and procedures may need to be described in detail. Tables may be used to list materials used in the study (oligonucleotides, strains, etc.); these tables should have a title. This section should also include a description of any statistical methods employed in the study.

Results

This section should be divided with subheadings.

Discussion (Conclusions or Summary)

The Discussion should explain the significance of the results and place them into a broader context. It should not be redundant with the Results section. This section may contain subheadings. This section should refer back to the Introduction, showing how the completed work relates to the original objectives.

Acknowledgments

This section may acknowledge contributions from non-authors.

References

References should include only articles that are published or in press. This section should be accurate and in the style of one of the leading journals in the field.

The following style for references is shown as an example:

- **Article in a periodical:** Sondheimer, N., and Lindquist, S. (2000). Rnq1: an epigenetic modifier of protein function in yeast. Mol. Cell *5*, 163–172.
- **Article in a book:** King, S.M. (2003). Dynein motors: Structure, mechanochemistry and regulation. In Molecular Motors, M. Schliwa, ed. (Weinheim, Germany: Wiley-VCH Verlag GmbH), pp. 45–78.
- **An entire book:** Cowan, W.M., Jessell, T.M., and Zipursky, S.L. (1997). Molecular and Cellular Approaches to Neural Development (New York: Oxford University Press).

It is recommended that you discuss reference format with your supervisor. Incorporation of work from recent references should be considered mandatory for both types of thesis, unless the topic is primarily historical in its focus. References should be to primary, peer-reviewed literature and recent review articles (excessive use of review articles is not recommended). Textbooks, popular science magazines and websites such as Wikipedia, etc. are almost always unacceptable as appropriate references for an honours thesis. There are several software packages that are available to help with referencing such as

Refworks or Endnote. You should have carefully read and understood every reference you cite.

For 3.0 credit students, proposed research should explore gaps or contradictions in the literature (discussed in your Literature Review). At least one testable hypothesis should be proposed, and the proposal would include planned experiments that would be used to test the hypothesis.

ORAL PRESENTATION

The 15 minute presentation should provide the examiners with sufficient background information to understand the research question(s) you are addressing in your work. Students should outline the main points of the thesis and discuss the significance of their findings. Remember that the examiners have read your thesis and that you do not need to present all the data in your thesis. A PowerPoint presentation is highly recommended. Keep fonts legible and colours simple on the slides, and do not cram the slides with information. Speak slowly and clearly and look at your audience as you are speaking. Practice your presentation in front of friends and then practice some more and be certain to stay within the 15-minute time limit. Use a pointer to guide your audience to specific areas of the slide. Wear comfortable (but appropriate) clothing. You do not need to dress up for the presentation but by all means wear clothing that adds to your confidence.

ACADEMIC HONESTY AND PLAGIARISM

Cheating, plagiarism and improper research practices represent major academic offences and carry serious penalties, ranging from a failing grade on the work in question to expulsion from the university. You should be familiar with Senate Policy on Academic Honesty.

http://www.yorku.ca/secretariat/policies/document.php?document=69

It is your responsibility to know what constitutes plagiarism and to ensure that the work you submit is your own. You may be required to submit your thesis to "TurnItIn" (some supervisors already require this) or to make available all your original notes and early drafts of your thesis. We strongly advise that you use "TurnItIn" for your own benefit and check your own work to improve your writing.

Always write "*de novo*" and say what you have to say in your own words, "from scratch". Do not cut and paste someone else's writing into your work with the intention of rewording it so it looks like your own writing. It is often useful to close a reference text (such as a review or research paper) after you have finished reading and before you start writing. This will ensure that your work is original. Additional resources are available in the Biology Undergraduate Handbook, and online:

http://www.yorku.ca/academicintegrity/students/index.htm

As this course emulates real science, a signed ethics statement (included in this information package) is to be included with each submitted thesis.

Ethics in the BIOL 4000 Honours Thesis
(taken, in part, from the requirements for authors submitting manuscripts to the journal, FEBS Letters).

There are fundamental principles underlying scholarly work produced for this course. The Honours Thesis should:

- be the authors own original work
- reflect the authors own research and analysis and do so in a truthful and complete manner
- properly credit the meaningful contributions of co-authors and co-researchers
- be appropriately placed in the context of prior and existing research

Honours thesis students should note the following:

(i) Relevant prior and existing research and methodologies will be properly identified and referenced using standard bibliographic and scientific conventions.

(ii) All reporting, writing and editing that make up the content of the thesis shall be the original work of the author and shall not plagiarize the work of others.

(iii) Plagiarism can mean the literal copying of the entirety of another's article or paper or other text.

(iv) Plagiarism can also mean the literal copying of large portions of another's work or even the substantive "paraphrasing" of another's work (e.g. using the same set of sentences from a published text in your work, but changing the order in your text or copying paragraphs from other papers but changing some of the nouns, adjective or verbs to those of your choice while the basic format and content of the paragraph remains the same as the original, etc.).

(v) Short quotes from the work of others may occasionally be used in the preparation of scholarly or professional manuscripts, but all such quotes should be properly referenced with full bibliographic details of the quoted work, as it is important to place the reported research or conclusions in a scholarly context.

(vi) Note that to quote or copy text or illustrations beyond a "short quote" will require the author to obtain permission from the rights holder.

(vii) Co-contributors should be properly and appropriately identified

(viii) All participants in a research project that is the subject of a paper who made a substantive contribution to the research and the analysis presented in the paper should be identified or credited.

(ix) Other participants with less responsibility - for example, those who merely assisted in carrying out the research - should be identified and acknowledged for their contributions.

(x) Research and testing methodologies should be consistent with guidelines of research institutions, relevant societies, or funding agencies, especially those that may involve the treatment, consent, or privacy of research or testing subjects.

All students are required to sign a copy of this page stating that they have read and understood these expectations and submit the signed copy along with their final version of their thesis.

Student Name_____ Signature _____

Student #_____ Date_____

Course Director Signature _____

Date_____

This form should be submitted with the thesis, and will be kept on file by the Course Director.

SC/BIOL 4000 HONOURS THESIS REGISTRATION FORM

Name _____Student # _____

Email _____Phone _____

Term _____Expected Completion Date _____

Supervisor _____Advisor* _____

Title and outline of project:

Supervisor's Signature _____ Advisor's Signature _____

Student's Signature _____Date _____

** The selection of the advisor by the student and supervisor needs to be approved by the course director.*

When the above portion has been completed, please bring this form to the UG office (108 FS) to be approved by the Undergraduate Program Director (Dr. Paula Wilson).

Approval of UGPD _____Date _____

When form is signed by UGPD, please bring to the Course Director's Office (FS 247) and leave with Mrs. Audrey Johnson. Please direct any questions to the Course Director (Dr. S. Benchimol).