# SC/BIOL 4000 8.0/3.0 - BIOLOGY HONOURS THESIS
# 2017-2018 INFORMATION PACKAGE

Course Directors: Dr. Vivian Saridakis or Dr. Robert Tsushima (detailed list below)


Dr. Vivian Saridakis
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BIOL 4000 **3.0** Summer 2017
BIOL 4000 **8.0** Summer 2017 – Fall 2017
BIOL 4000 **8.0** Fall 2017 – Winter 2018
BIOL 4000 **8.0** Winter 2018 – Summer 2018

Dr. Robert Tsushima
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BIOL 4000 **3.0** Winter 2018
BIOL 4000 **3.0** Fall 2017


**COURSE EMAIL**: biol4000@yorku.ca
**COURSE MOODLE**: moodle.yorku.ca

**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 biological topic. The thesis reviews the literature in a particular field or area of interest, identifies gaps or inconsistencies, and develops a specific hypothesis, argument or model. Students are encouraged to propose an experimental strategy to test the hypothesis (with clearly articulated possible outcomes and limitations). The thesis involves considerable self-directed work and must reflect critical thinking and analytical skills and an understanding of the scientific method. A strong thesis is built on a critical review and interpretation of the literature, good organization and presentation of ideas, and on clear, effective communication. The course concludes with an oral defense of the thesis. Typically students spend 4-6 hours/week preparing the thesis. (Some weeks you will need to put in more hours.) The 3.0 credit course is completed in a **single term** (Fall, Winter or Summer) under the supervision of a faculty member in Biology. There are no formal lectures.

The **8.0 credit course** is a hands-on original, independent research project (laboratory- or field-based) that includes a practical and written component as well as an oral thesis defense. This course provides 4th year undergraduate students with research experience in the Biological Sciences and provides an opportunity to enhance and apply critical thinking, analytical and communication skills. The written component includes a description of the background relevant to the research project, the question(s) being addressed, specific aims, the methodology used, the results obtained, conclusions and a critical discussion and interpretation of the findings and their significance. Students are required to write clearly and concisely (with correct and appropriate grammar, spelling, citations and references), and to prepare accurate and clear figures/tables. The research project involves a significant investment of time and effort in the laboratory or field. Typically students spend 10-12 hours/week (although this is likely to depend on the nature and stage of the work). The 8.0 credit course is completed over **two consecutive terms** (i.e., Fall-Winter, Winter-Summer, or Summer-Fall) under the supervision of a faculty member in Biology. There are no formal lectures in this course.

**ELIGIBILITY**

Students in the **Specialized Honours Program** (Biology, Biomedical Science, Biotechnology) need to satisfy their degree requirements by completing BIOL 4000 3.0 or BIOL 4000 8.0.

BIOL 3100 2.0 is a prerequisite course for all students enroling in BIOL 4000 3.0 or BIOL 4000 8.0. **There will be no exceptions.**

The 3.0 and 8.0 credit courses are open to eligible Honours Biology students in their final year, with a BIOL GPA of at least 6.0. Students must have completed 84 credits prior to enrolling in BIOL 4000.

**Eligibility is determined by the Biology Undergraduate Program Director (UPD) who will confirm eligibility by signing the registration form.**

**ENROLMENT**

Once you have found a supervisor, fill out the registration form in consultation with the supervisor. The form can be found under the **registration form** tab at http://science.yorku.ca/biology/undergraduate-program/courses/.
You will need to include the name of an advisor and a thesis topic on the form.

**SUPERVISOR, ADVISOR AND COURSE DIRECTOR**

Each thesis requires input from three faculty members: the supervisor, the advisor and the course director. The thesis work is directed by the research supervisor and evaluated by the supervisor, advisor and course director. The Honours Thesis supervisor will be a faculty member in the Department of Biology who has agreed to direct, oversee and evaluate the thesis. Most students use a combination of their experience in SC/BIOL 3100 2.0 and other courses, as well as the listing of faculty interests on the departmental web site to identify a faculty member working in an area that interests them. Many faculty members receive requests for honours placements several semesters in advance and it is advisable to start looking for a supervisor as soon as possible (at least 6-9 months prior to anticipated start date).

The supervisor and advisor will be full-time 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**. When a faculty member who is not a member of the Biology Department (but is a member of the Graduate Program in Biology) serves as the supervisor, then the advisor must be a member of the Biology Department. Normally the advisor is selected by the student and supervisor in consultation.

The **supervisor** is the primary contact for the thesis work, and students should work closely with the supervisor to produce the highest quality thesis. For the 8.0 credit thesis, students are also likely to work closely with one or more graduate students, postdoctoral fellows or laboratory technicians. It is 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.). It is advisable to set clear milestones to measure

progress towards completion of the thesis. 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.

The **advisor** is a member of the examining committee and participates in the evaluation of the written thesis and oral presentation. The advisor has general expertise in the area of the thesis topic and students should feel free to seek the advice of the advisor during the course.

The **course director** oversees the entire Honours Thesis course, 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 or advisor, please contact the course director.

**CHOOSING A TOPIC**

The thesis topic should reflect the biological interests of both student and 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 students are likely to have more independence in choosing the topic because it does not require laboratory space, resources or grant support to complete.

**EVALUATION**

The final grade for the course is based on an assessment of the written thesis (60%) and its oral defence (40%) by the examining committee comprised of the supervisor, advisor and course director. A one hour oral examination will be scheduled during the final examination period of the term and will involve a 15-20 minute slide presentation followed by questions from the examining committee. The final grade is based on: (i) scientific content, organization and presentation of the written work, (ii) the clarity and quality of the student's oral and slide presentation, and (iii) the level of the student's understanding and knowledge of the research topic, background information, methods, and limitations as determined during the oral defence. The examining committee will contribute equally to the awarding of these marks. In the unusual case where an Adviser cannot be present, the Supervisor will arrange for another suitably qualified faculty member to be present.

**LECTURES**

There are no formal lectures scheduled for BIOL 4000 8.0 and BIOL 4000 3.0.

**DATES AND DEADLINES**

Courses may be started in any one of the Fall, Winter and Summer terms. The final version of the thesis must be sent to BIOL4000@yorku.ca by 4 pm EST on the last day of classes in the term in which you are defending.

Submission deadlines for the written thesis:

3 credit students: Summer term: Monday, July 31, 2017
Fall term: Monday, December 4, 2017
Winter term: Thursday, April 5, 2018

8 credit students: Winter 2017 – Summer 2017 term: Monday, July 31, 2017
Summer 2017 – Fall 2017 term: Monday, December 4, 2017
Fall 2017 – Winter 2018 term: Thursday, April 5, 2018

A thesis that is handed in late will be penalized at a rate of 5% per day. The 5% will be deducted from the final grade.

**SCHEDULING THE ORAL EXAMINATION**

Oral examinations (defences) are held during the University examination period (August 2-11, 2017; December 6-21, 2017; April 9-23, 2018). The date and time for each oral examination is determined by mutual agreement between the student and the examining committee. As soon as you know your exam schedule, you should speak with your supervisor and advisor to find 3 separate time slots (at least one-hour long) that work for you, your supervisor and your advisor. Please submit these 3 dates to the Administrative Assistant (Pamela Fernandes) in the Biology Office by email (pamf@yorku.ca). Ms. Fernandes will confirm the date of the examination and notify you.

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 GUIDELINES**

While there is no specific length, most Honours theses range between 25-35 pages (including data, tables and figures; excluding references and appendices). Text should be double-spaced (excluding references, figure legends, tables) and left justified with 1.0" margin all around. Use a 12 point font. Print on one side of the page. **Pages must be numbered.**

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. 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 |
| Acknowledgements | Acknowledgements |
| Abstract | Abstract |
| Introduction | Introduction |
| Materials & Methods | Critical Review and Evaluation of Literature |

| | |
|---|---|
| Results | Discussion (and Conclusions) |
| Discussion (and Conclusions) | Proposed Research [optional] |
| References | References |

Acknowledgments

This section may acknowledge contributions from non-authors including students, postdoctoral fellows and technicians in the laboratory.

Abstract (Summary) 2.5 marks

The Abstract consists of a **single paragraph of about 200 words**. It should describe the new knowledge obtained and significance of the work to a **broad readership**. 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 Abstract and abbreviations should not be used.

Introduction (<15 pages including figures) 10 marks

The Introduction 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. **The Introduction may contain subheadings. The introduction needs to be informative to a broad readership and keep in mind that not all members of the examination committee will be experts in your topic.** Avoid jargon and define all abbreviations the first time they are used. Figures are essential.

Experimental Procedures (Materials & Methods) 5 marks

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 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 20 marks

This section should be divided with subheadings. **Please include figures and/or tables within the results section and not appended at the end of the thesis.** Figures may appear on a single page or in-line with the text. Figures should follow the page or paragraph in which they are first referred.

Discussion (<10 pages) 20 marks

For the 8.0 credit research thesis, students should reflect on the data they have collected, provide a critical interpretation of the data and draw conclusions from the data in the Discussion section. The significance of the results should be explained and placed within a broader context. The limitations of the study may be discussed. This section may contain subheadings and should not be redundant with the Results section. This section should refer back to the Introduction, showing how the completed work relates to the original objectives.

References 2.5 marks

Please include citations in the text and list all references cited in the References section at the end of the thesis. **Students should have read and understood every reference they cite.** Do not rely on abstracts alone when reading or citing papers. 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. Students should discuss the reference format with their supervisor. References should be to primary, peer-reviewed literature and recent review articles (excessive use of review articles is not recommended). The following style for references is shown as an example:

- **Article in a periodical:** Wu, B., and White, K.A. (2007). Uncoupling RNA virus replication from transcription via the polymerase: functional and evolutionary insights. EMBO J. *26,* 5120-5130.
- **Article in a book:** Brown, L., and Benchimol, S. (2005). Regulation of the p53 response by cellular growth and survival factors. In: 25 Years of p53 Research, P. Hainaut and K.G. Wiman, eds. (The Netherlands: Springer), pp. 115-140.
- **An entire book:** Myers, J., and Bazely, D.R. (2003). Ecology and Control of Introduced Plants: Evaluating and responding to invasive plants. Ecology, Biodiversity and Conservation Series, (Cambridge University Press).

In most cases, popular science magazines and websites such as Wikipedia, etc. are unacceptable as references for an Honours thesis. Government, educational or health institutions may provide online and/or published information that can be cited as shown below:

- Canadian Cancer Society's Advisory Committee on Cancer Statistics. *Canadian Cancer Statistics 2013*. Toronto, ON: Canadian Cancer Society; 2013.
- American Cancer Society: Cancer Facts and Figures 2013. Atlanta, Ga: American Cancer Society, 2013. Available online http://www.cancer.org/acs/groups/content/@epidemiologysurveilance/documents/document/acspc-036845.pdf

There are several software packages that are available to help with referencing such as RefWorks, Mendeley and Zotero. York University Libraries provides support to Mendeley and Zotero.

**TURNITIN**

Each student must submit the introduction of their honours thesis to turnitin using moodle.yorku.ca.

**STUDENT PRESENTATION**

The 15-20 minute presentation should provide the examiners with sufficient background information to understand the research question(s) that is addressed in the thesis and the methodology. Students should outline the main points of the thesis, present some (not necessarily all) of the key findings and discuss the significance of their work. Keep in mind that the examiners have read your thesis.

A PowerPoint slide presentation is highly recommended. Well-designed slides are easy to read and

communicate ideas and facts to the viewer effectively. Keep fonts legible and colours simple on the slides, and do not cram the slides with information. Each slide should make just one or two points. Use a clean modern sans serif font like Helvetica, Arial, Calibri, Tahoma or Verdana. Regardless of what font you choose, make sure the text can be read from the back of the room. Avoid dissolves, spins and other distracting transitions between slides (unless they serve a purpose). Figures and other visuals must be of the highest quality (sharp, clear, no pixels, no distortion). Each slide needs to have a title; data slides should have an informative caption that describes the experiment and/or the result. Please provide conclusions and insights from the data. Speak slowly and clearly and look at your audience as you are speaking. **Please do not read from your notes and do not read word-for-word the information on the slides.** The slides serve to reinforce what you are saying. Use the mouse pointer or the old fashioned wooden pointer to guide your audience to specific areas of the slide and to draw attention to specific elements of the presentation (laser pointers are not visible on plasma screens). Practice your presentation in front of friends and then practice some more and be certain to stay within the 15-20 minute time limit. Wear comfortable (but appropriate) clothing.
You do not need to dress up for the presentation but by all means wear clothing that builds confidence.

**ACADEMIC HONESTY AND PLAGIARISM**

The Honours Thesis consists of original scholarly work by the student. It reflects the student's own research and analysis in a truthful and complete manner. Relevant prior and existing research and methodologies must be identified and referenced using standard bibliographic and scientific conventions. Co-contributors and other research participants who have made a contribution to the research project/Honours Thesis should be credited or acknowledged. Cheating, plagiarism and improper research practices, including data fabrication, 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

Always write in your own words. 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 helpful to make notes in point form as you read. After closing a reference text (such as a review or research paper), you can use your notes to write and organize your paper. This will ensure that your work is original.

Additional resources are available at: http://www.yorku.ca/academicintegrity/students/index.htm