

BROCK UNIVERSITY
Department of Biological Sciences

GUIDELINES FOR HONOURS THESIS PROJECTS
BIOL/BMED/BTEC¹ 4F90/4F91

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PART ONE

1. ADMISSION OF STUDENTS TO BIOL/BMED/BTEC¹ 4F90/4F91

- (a) All students registering for BIOL/BMED/BTEC 4F90 must **also register for** BIOL/BMED/ BTEC 4F91 at the same time. Admission to the course requires an override.
- (b) Admission of students to the BIOL/BMED/BTEC 4F90/4F91 program will normally require completion of 14.0 credits and a major average of 75% or greater. Those applying to the BTEC 4F90/4F91 program will normally require completion of 14.0 credits and a major average of 70% or greater. Students must first apply to Fourth Year by filling out the Year Four application (<https://brocku.ca/registrar/wp-content/uploads/sites/45/ApptoYear4Studies.pdf>) and will be notified by the Department if they are eligible for the 4F90/4F91 program. The Department will attempt to accommodate students who wish to enroll in the 4F90/4F91 program provided they meet the criteria above.

¹ This applies to BTEC 4F90/4F91 students whose Supervising Professor is in the BIOL Department. Regulations for students taking their Honours through the CHEM department are advised to check with the CHEM department for up-to-date regulations.

- (c) Year IV students who do not meet this standard may be admitted to the program at the discretion of the Program Coordinator and the supervising faculty member (i.e., the Supervisor), to the extent that space and facilities permit.
- (d) Every faculty member has the right to refuse supervision of a specific student. However, this must have some justifiable basis.
- (e) A Student in the 4F90/4F91 program shall not normally be paid to conduct thesis-based research by the Supervisor while enrolled in the course.
- (f) Faculty on sabbatical leave will not normally supervise BIOL/BMED/BTEC 4F90/91 students.

2. RESPONSIBILITIES OF THE SUPERVISOR AND COMMITTEES

The thesis program has been instituted primarily to provide Honours students with significant experience in the investigative process. Although it is undesirable to legislate formal regulations regarding the responsibilities of Supervisors and Committees vis-a-vis Students, some guidelines are appropriate.

Supervisor

- (a) Recognizing that research methodologies and approaches (e.g., field-work, laboratory work, theoretical, modelling, meta-analytical etc.) are unique to the Supervisor's research area, thesis projects should be illustrative of the entire research process, from the formulation of hypotheses through to the decision-making steps and the analysis and communication of results.
- (b) BSc projects are not the equivalent of MSc studies, and their principal goal is not the publication of a research paper. Consistent with the aim of the 4F90/4F91 program, they should be well defined and relatively limited in scope. Open-ended projects should not be encouraged, and every effort should be made to avoid studies that are unlikely to yield results within the time period available.
- (c) Since thesis students cannot ordinarily be expected to have the background knowledge necessary to formulate a research hypothesis and then to design the studies necessary to test it, supervisors should work closely with their students in this phase of the study, and also assist in the development of analytical, observational and related procedures. Previous experience suggests that most students have difficulty in setting up realistic experimental schedules. Supervisors should help with this, and students should ensure that such schedules are followed. Regular meetings between student and supervisor are advised.
- (d) Since most students require assistance in the organization of their reports, a schedule has been defined which provides time for the Student to prepare and submit more than one thesis draft. Supervisors should ensure that the drafts are of reasonable quality with respect to style, organization, etc., before being distributed to Committee members.
- (e) A most important part of the learning experience of these courses is data analysis, interpretation of results and integration of these into the current biological thought. Since this is the ultimate reason for doing research, it is very important that students be guided through this process by the Supervisor and shown how this is accomplished.
- (f) The duties of the Supervisor cease with the final submission of the thesis, when he/she reverts to being a Member of the Examining Committee.

Note: When BIOL/BMED/BTEC 4F90/4F91 is taken during any 8-month period, no thesis investigation will normally be initiated before commencement of the 8 month term. Students may carry out projects in the laboratories of faculty members for whom they have worked as summer research assistants but may not use, for a thesis, any data or material obtained directly from such an appointment, except under extenuating circumstances. Moreover, no Year II or Year III student may be hired as a research assistant with the understanding that he or she is then obligated to carry out a thesis project under the supervision of the faculty member concerned.

Committees:

Each student registered for the thesis program will be assigned one Committee that will act as both an Advisory Committee and an Examination Committee.

- (a) **Committee:** This committee will consist of the Supervisor of the project and one other faculty member of the Department preferably with some knowledge of the area in which the project is to be conducted. Faculty members from outside of Biological Sciences may be suggested when the topic area is within their realm of expertise. The faculty member who is not the project supervisor will act as Chair of the Committee. The Committee as such, or as individuals, should be available for consultation throughout the project. This arrangement will not preclude the Student's seeking advice from other faculty members. The Committee will hear the first and second seminars of each Student and mark the progress seminar and report as outlined in Section 4, will assist in problem organization, data evaluation, and will mark the final thesis, final seminar and final defence as outlined in Section 4.

The Chair of the Committee will preside over the final thesis presentation and defence. Following the defence, both Examiners will return their final grades to the Program Coordinator.

3. STARTING DATES

BIOL/BMED/BTEC 4F90 and BIOL/BMED/BTEC 4F91 may be started in fall (September to April cohort), winter (January to August cohort) or spring (May to December cohort). The same regulations apply whether a Student starts in the fall, winter or spring with the exceptions of deadline dates. Deadline dates for all three cohorts are listed in section 4.

For students in the January to August cohort, due to Ministry reporting requirements for end of academic year grades, a grade of IP (In Progress) will be submitted by the coordinator. These students are advised to speak to the Program Coordinator and Administrative Assistant about course registration.

4. SCHEDULE AND DEADLINES

Schedule:

- (a) Each member of the Department is expected to participate in the 4F90/4F91 Honours program.

Each Student participating in the program will be required to make their arrangements with a Supervisor, and to register these with the Program Coordinator no later than one week following the commencement of the term in which BIOL/BMED/BTEC 4F90/91 is started.

Two faculty members may co-supervise a 4F90/91 project if so desired.

- (b) Each student will be required to present three seminars during the course:
- (i) The initial planning seminar will be scheduled during the first month of the term that 4F90/91 commences. These seminars should deal largely with the nature of the problem and the proposed design of the study. The principal goal will be to provide for Committee input with respect to the final organization of the study. A 1 to 2 page written outline should be provided to the Committee at the start of the seminar. This planning seminar presentation will be no longer than 15 minutes and will be followed by a 5 to 10 minute discussion period.
 - (ii) The progress seminar will be scheduled after submission of the written progress report at the start of the second 4-month term (see Section 4, Deadlines for dates and Section 5 for content). Each student should present her/his findings to date. This progress seminar should focus on research progress or any data analysis progress to date, while providing sufficient background and introductory material to identify the research question and rationale. The committee may then make recommendations as to possible further experiments, data analysis, etc. The progress seminar will be no longer than 20 minutes, followed by a question and discussion period.
 - (iii) The final seminar will be scheduled within a two-week period after final submission of the thesis (see section 4, Deadlines for due dates and Section 5 for content). The student will be expected to outline the problem, its background, the design of the study and results obtained and discuss the conclusions. A defence of the thesis will follow in a closed session with the Examining Committee. The total session should not exceed 1.5 hours.

Note: Students are encouraged to attend Biological Sciences seminars held within the Department to gain knowledge and presentation skills. The Department of Biological Sciences hosts external seminar speakers regularly between September and April, and the University often hosts external seminar speakers or symposia.

- (c) Each Student will prepare two written reports for grading during the course:
- (i) The **progress report (as a Word document) will be emailed to the Program Coordinator at the end of the first term.** See section 4, Deadlines for due dates and section 5 for content requirements. The progress report is limited to 15 pages in length.
 - (ii) The **defence-ready thesis (as a Word document) will be emailed to the Program Coordinator at the end of the second term.** See section 4, Deadlines for due dates and section 5 for content requirements.

Deadlines:

- (a) Under no circumstances should theses be submitted for examination without prior submission of draft(s) to the Supervisor.
- (b) Submission of the first draft to the Supervisor will be at least **three weeks before** submission of the defence-ready thesis. This should allow sufficient time for revisions and final editing.
- (c) **Due Dates**

- (i) **September – April cohort**
 Planning seminar: Prior to September 30
 Progress Report: December 10 by 5 pm, emailed to the Program Coordinator
 Progress Seminar: Before Friday of the first full week of term in January
 Draft Thesis: March 11, emailed to the Supervisor
 Defence-ready Thesis: April 1 by 5 pm, emailed to the Program Coordinator
 Final Seminar and Defence: Prior to April 14 (usually before exams start)
 Submission of Final version of Thesis: No later than one week after the final date of scheduled exams
- (ii) **January – August cohort**
 Planning seminar: Prior to January 31
 Progress Report: April 10 by 5 pm, emailed to the Program Coordinator
 Progress Seminar: Before Friday of the first full week of term in May
 Draft Thesis: July 11, emailed to the Supervisor
 Defence-ready Thesis: August 1 by 5 pm, emailed to the Program Coordinator
 Final Seminar and Defence: Prior to August 14
 Submission of Final version of Thesis: No later than one week after the final date of scheduled exams
- (iii) **May – December cohort**
 Planning seminar: Prior to May 31
 Progress Report: August 10 by 5 pm, emailed to the Program Coordinator
 Progress Seminar: Before Friday of the first full week of term in September
 Draft Thesis: November 10, emailed to the Supervisor
 Defence-ready Thesis: December 1 by 5 pm, emailed to the Program Coordinator
 Final Seminar and Defence: Prior to December 14 (usually before exams start)
 Submission of Final version of Thesis: No later than one week after the final date of scheduled exams
- (d) For all cohorts, **emailed** submission of the Defence-ready Thesis for examination (as a Word document) will occur **prior to 5 p.m. on the due date** or if a weekend, on the following Monday as announced by the Program Coordinator. No further revisions will be permitted prior to grading of the thesis by the Examining Committee. Failure to submit the thesis on the deadline date will carry the **penalty** of a reduced grade unless there are documented medical or comparable reasons justifying late submission or unless, **under rare exceptional circumstances**, the Chair of the Department, in consultation with the Program Coordinator, exercises their discretionary powers. There are no predetermined penalties. Penalties are determined by faculty of the Departmental Committee as a whole on an individual, case-by-case basis. The final seminar and oral defence will be scheduled by the Student within two weeks of the thesis submission (i.e., between the last day of classes and the end of the University's examination period).

5. EVALUATION

- (a) **Progress Report:** The progress report worth 15% of the grade for 4F91 must be emailed as a Word document to the Program Coordinator by December 10 (for projects started in September), April 10 (for projects started in January) or August 10 (for projects started in May). The progress report file will then be distributed by the Program Coordinator to the Committee for grading. Should any of these dates fall on a weekend, then the deadline will be the following Monday. The progress report will only include an introduction and literature survey along with literature cited. The report is to be

written in a concise manner and should be no longer than 15 pages of double-spaced text.

- (b) **Progress Seminar:** By the Friday of the first week in the following term, the student will give a seminar reviewing progress to date for the laboratory research component. This is worth 15% of the grade for 4F90. (The seminar should be completed by the first Friday of January for the September to April cohort, first Friday of May for the January to August cohort, first Friday of September for the May to December cohort.) The progress seminar is limited to 20 minutes with a discussion period to follow. The total time, including seminar and discussion should not normally exceed 1 hour.
- (c) **Defence-ready Thesis:** The defence-ready thesis must be emailed as a Word document to the Program Coordinator for examination (see Section 6 and Part 2 for details of thesis format). This file must be submitted on April 1 (for the September to April cohort), August 1 (for the January to August cohort) or December 1 (for the May to December cohort). All members of the Committee will grade the thesis for Scientific Merit (50% of 4F90) and Library Research and Communication (50% of 4F91). These marks will be submitted to the Program Coordinator before the seminars and defences take place.
- (d) **Final Seminar Presentation:** The final seminar of 20 minutes in length, followed by a question period, will be held within a two-week period following submission of the final thesis (see 5c, above). Grades worth 15% of 4F90 (Scientific merit) and 20% of 4F91 (Communication) will be assigned to the seminar.
- (e) **Closed Oral Defence:** The closed oral defence in which the Student and Examining Committee meet for not more than one hour will be held after the seminar presentation. Questioning by committee members will normally pertain to the thesis topic but students should anticipate questions on the theoretical basis and appropriateness of methodology used and also on the broad ramifications and significance of their topic. Grades worth 20% of 4F90 (Scientific merit) and 15% of 4F91 (Communication) will be assigned to the defence.

Marks assigned to the seminar and the defence are to be submitted to the Program Coordinator, immediately following termination of the final defence of the thesis. The marks assigned by individual committee members will have equal weight.

Final Mark Allocation:

	4F90 (Scientific merit)	4F91 (Library research and Communication)
Progress report	0	15%
Progress seminar	15%	0
Thesis	50%	50%
Seminar	15%	20%
Defence	<u>20%</u>	<u>15%</u>
	100%	100%

- (f) For purposes of transmission to the Registrar, two final grades will be assigned, one for BIOL/BMED/BTEC 4F90 and one for BIOL/BMED/BTEC 4F91 based on the marking scheme in section 5(e).

- (g) The mark assigned for BIOL/BMED/BTEC 4F90 will reflect the scientific merit of the thesis and should be based on the results, an understanding of those results in the thesis and the defence of the thesis during the examination.

The mark assigned for BIOL/BMED/BTEC 4F91 will reflect the communicative abilities of the Student and the thoroughness of the library research. This will be based in part on the thesis and in part on the seminar presentation.

- (h) The Program Coordinator will collate all assigned marks, weight, and calculate the average marks for each subsection and for each of the two courses. In cases of **extreme** discrepancies in assigned marks, the Program Coordinator will attempt to arrive at some acceptable consensus.

All grades, including the individual mark assignments of committee members, must be returned to the Program Coordinator of the course.

- (i) Final grades will not be transmitted to the Registrar until: (i) a final electronic version of the thesis has been submitted to the Administrative Assistant of the Department and CC-ed to the Program Coordinator (see 5j, below); and (ii) all data have been turned over to the Supervisor.
- (j) Disposition of theses: After the thesis has been corrected to the satisfaction of the Supervisor, a final electronic version of the thesis will be prepared by the Student. Multiple files will **not** be accepted.

6. THESIS FORMAT

A short thesis outline is available at the end of this document (see Part Two). It is suggested that all theses follow a format similar to the following:

- (a) Title Page
- (b) Acknowledgments
- (c) Abstract
- (d) Introduction and Literature Review (combined or separate sections): concisely outline the problem, the goal of the study and the approach used
- (e) Materials and Methods
- (f) Results
- (g) Discussion
- (h) Summary and Conclusions
- (i) Literature Cited
- (j) Appendices

The final thesis should not be longer than 50 pages. At the discretion of the supervisor, additional data may be included in appendices but will not be marked by the thesis committee.

7. BUDGET AND SUPPLIES

- (a) A budget will be allocated for 4F90/91 projects by the Chair of the Department of Biological Sciences, provided sufficient funds are available.
- (b) Students will be held accountable and responsible for all equipment and unused supplies, and these are to be returned in clean condition prior to the thesis defence.
- (c) In general, the teaching laboratories will have priority in questions of equipment use.
- (d) The following items constitute reasonable charges against project budgets: apparatus, glassware, chemicals, specimen costs, laboratory consumables, mileage costs associated with field studies, photographic and drawing supplies used by the Student in thesis preparation, reasonable inter-library loan costs.

8. KEYS/SWIPE-CARD ACCESS

Laboratory keys will be issued to the Student by the Supervisor. For students requiring swipe-card access to labs, the Supervisor will make the necessary arrangements. Final grades for each Student will not be transmitted to the Registrar until keys have been returned to the Supervisor. Exceptions may be made for students who continue to work in the same laboratory as graduate students, student assistants, or research assistants.

9. APPEALS

It is recognized that under some circumstances students may wish to appeal a final grade. In such instances, the Chair of the Department will appoint an *ad hoc* committee to deal with the appeal.

10. INTELLECTUAL PROPERTY

All students must be apprised of Brock University's policy on Ownership of Student-created Intellectual Property. Both the Student and their Supervisor must complete the Intellectual Property Agreement form and return it to the Office of Research Services. All students are required to deposit the raw data with their supervisor at the same time final thesis submission.

PART TWO

BROCK UNIVERSITY

Department of Biological Sciences

INSTRUCTIONS FOR THE PREPARATION AND SUBMISSION OF BSc (HONOURS) THESES

A Student submitting a BSc (Honours) thesis for degree credit must ultimately submit a single electronic .pdf or .docx file of the thesis to both the Administrative Assistant of the Department AND the Program Coordinator before the degree will be conferred. The thesis shall be a report of research work carried out during the candidate's final year. The following regulations are provided for the guidance of students and faculty.

GENERAL INFORMATION

1. **Defence-ready thesis.** The electronic thesis should be formatted as a Word document, with the page size being Letter Size (21.59 cm x 27.94 cm), except for drawings and maps, on which no restriction is placed. A margin of 2.54 cm on all sides is acceptable.
2. **Faculty approval and disposition of the thesis after the thesis defence.** After the thesis has been approved by the examining committee and corrections (approved by the Supervisor) have been made, the Student must submit a **single file** containing the corrected thesis to the following three people: the Administrative Assistant of the Department, the Program Coordinator AND the Supervisor **no later than seven days** after the final date of scheduled exams. This electronic file must be corrected of any errors noted by the examiners and must contain all charts, maps, figures, tables, and appendices as finally approved. Any student who does not submit the final electronic version on time will receive an "Incomplete" grade for 4F90 and 4F91. Students will also be required to return all keys that were signed out and provide all data to the Supervisor. Grades will not be submitted to the Office of the Registrar until the final electronic version of the thesis has been submitted, all keys have been returned and all data have been given to the Supervisor.
3. **Rights to lend and reproduce the thesis.** Unless there is a specific arrangement to the contrary, the university will allow the thesis to be consulted or borrowed or to be used in whole or in part in electronic form.

DOCUMENT LAYOUT

1. The title page should bear the title of the thesis and the candidate's name as registered at Brock.
3. All costs of preparing the thesis are the responsibility of the Student.
4. All typing must be double-spaced; figure captions, tables, and references may be single-spaced.
5. Pages should be numbered in one continuous sequence in Arabic numerals from one onwards. This sequence should include everything in the thesis.
6. Ideally, each Table and Figure should be on its own page.

FORMAT

A. Preliminary Pages

1. **Title page.** The form of the title page must follow the sample shown at the end of these instructions. It must state the full title of the thesis, the candidate's name in full, the degree expected, the title of the department and the year of submission.
2. **Abstract.** The abstract should be a summary of the thesis outlining the problem, the methods of investigation, the main results and the general conclusions. It should not normally exceed 300 words.
3. **Acknowledgments.** This section should be a brief acknowledgment of assistance given to the candidate during the research and writing.
4. **Table of Contents.** This should set forth all the principal topics or subdivisions of the thesis.
5. **List of Tables.**
6. **List of Figures.** This should include separate lists of all figures, plates, and maps.

B. Text

Although the following sections may not be applicable to all theses, they are offered as a guide.

1. **Introduction and Literature Review (combined or separate sections).** The introduction to a thesis should normally present the purpose, methods and scope of the study together with a survey of the literature pertaining to the subject of the investigation.
2. **Methods.** This section should present a detailed account of all methods used in the investigation.
3. **Results.** All results to be presented in the thesis must be given in this section together with any explanations that are necessary.
4. Each **Figure number and legend** should appear on the same page as the Figure and be placed under the Figure at the bottom of the page. Tables should have **Table number and title** placed above the Table at the top of the page.
5. **Discussion and Conclusions.** A discussion of the results obtained in the investigation and a summary of the candidate's conclusions should be given in one final section, or may be presented in two separate sections.
6. **Footnotes.** The extensive use of footnotes is not acceptable, but where such additions to the text are considered necessary, they should be placed at the bottom of the appropriate page. A consistent style for footnotes, approved by the major department, must be followed throughout the thesis.

C. Literature Cited

The **Literature Cited** is a very important part of a thesis and care should be given to its preparation. The general form of each citation and the method of abbreviating names of periodicals should be the same as that used in an appropriate journal recommended by the Supervisor.

D. Appendices

Appendix pages are numbered in chronological sequence following the last page of the Literature Cited section of the thesis. Appendices can be used to present material accessory to the argument of the text. These may be of such nature as not to form integral parts of the text. Material such as extensive tables, mathematical developments, and additional experiments may well form appendices. Each topic shall form a separate appendix, which must be identified by an upper case Roman letter. References used in appendices will not be included in the list of references, but should appear as a separate section at the end of the Appendix.

(SAMPLE TITLE PAGE)

Nest Site Selection in Common Terns

Miriam Helen Richards

Department of Biological Sciences

(Submitted in partial fulfillment of the requirements
for the degree of Bachelor of Science - Honours)

Brock University

St. Catharines, Ontario

December 1982