

Department of Biology

B.Sc. Honours Programme

Important note:

The Biology programme changed effective with the 2008/09 school year with the replacement of two Biochemistry courses (Chem 351/352) with one (Chem 353). If students started on the older program but did not complete chem 351/352, they can replace these with Chem 353 and an additional Biology elective. Honours students should check with their supervisor or the Chair of the Biology department if they have concerns.

Guidelines for Students

(Revised March. 2009)



BIOLOGY DEPARTMENT UNIVERSITY OF PRINCE EDWARD ISLAND

B.Sc. Honours in Biology - Information for the student

The B.Sc. Honours in Biology is designed to provide a well-balanced background for research within the science major, and consists of an **Independent Research Study** and a **High Standard of Academic Performance**. The program provides a further challenge to the above average student by requiring an extra work load and higher standards of performance than the B.Sc. Major, as well as proof of independent study and originality.

The Honours program is designed particularly for those who intend to continue studies at the post-graduate level, and many universities now require an Honours Degree as a prerequisite for admission to graduate studies in the sciences. However, it also provides a useful background for students who intend to pursue further education in a health-related field or enter a professional area in government, industry, education, or the public sector, where research experience would be an asset. It should be noted that research projects may also be carried out through the courses Biology 440 (*Senior Undergraduate Research Project*) or Biology 441 (*Directed studies in Biology*). Students who do not wish to pursue an Honours degree or do not qualify academically, may, upon consultation with the chair and an interested faculty member, register for either of these courses.

THE HONOURS PROGRAMME

The B.Sc. Honours in Biology **comprises 126 semester hours** of course credit (compared to 120 semester hours for the B.Sc. Major), high academic performance, and some additional Biology courses. The normal university requirements must be met in addition to those on the following pages, so students should consult the current university calendar for details on these requirements. **Students are strongly advised to monitor their degree audits to ensure they have the correct courses for graduation.**

The extra 6 semester hours in the Honours programme is for a research component, which should consist of approximately 4 months of research. That research period may or may not be continuous, but should be carried out during the summer and/or the academic year prior to the student's graduation. The specific timing for projects can differ because of the demands found in different areas of Biology. For example, some organism- or field-based studies require sampling or testing over several months to catch all parts of a life cycle, so students must be available for a longer period of time than in studies where the research component can be carried out continuously.

Notes:

1. Honours students are strongly advised to take an extra course in Statistics or Experimental Design as part of their electives. Courses that include a strong writing component are also recommended.
2. Honours students must complete more biology electives (including more at the 400 level of study) than required for the majors program. Consult a current calendar for details.
3. Honours students are expected to maintain a high academic standard throughout their program, and must achieve an average of at least 75% in all Biology courses and a 70% overall to graduate with the Honours Biology Degree.

ENTRANCE REQUIREMENTS

Admission:

Students wishing to enter the Honours programme need permission of the Biology Department, which is contingent on 1) academic performance, 2) the availability of space and resources to carry out the project, and 3) the student finding a supervisor within the Biology Department. Students who wish to work on Biologically-related projects with project supervisors external to the Biology Department (e.g. Family and Nutritional Sciences, AVC, and Agriculture and Agri-Food Canada) must still find a Biology faculty member to act as the thesis supervisor. Otherwise the project does not qualify as an Honours Programme within the Department of Biology.

It is the student's responsibility to contact potential supervisors in the Biology Department or willing to supervise their honours project or thesis before the student will be accepted into the programme.

Academic Performance: For admission to the Honours program or Honours Conversion program, students should have a combined minimum average of 75% in all previous courses taken in the second and third years of study; and a combined minimum average of 75% in all previous biology courses taken. Students should be entering their 4th year of study in the Biology department (or be returning following graduation), and should have completed their first and second year core biology courses.

Students interested in doing an Honours should consult with the Honours Coordinator or Department Chair as early as possible during their third year (see the Departmental website for contact information for these individuals), and **fill out and submit an application form by March 31 of the year before the honours research year.** The name of their advisor (including the Biology thesis advisor if the project is outside the department of Biology), the Project Title (or area of interest), and Contact Information for both the student and the advisor, must be included on the application.

Advisory committee: Each student who is accepted into the Honours program will work with an Advisory Committee that must be approved by the Department.

Committee Structure: The Advisory Committee will normally include two full-time faculty members from the UPEI Biology Department. If the project supervisor is from a different agency or UPEI department, the committee must include a Biology "thesis advisor", and will normally include one additional member from Biology (either full-time or adjunct faculty).

- The project supervisor is the chair of the Advisory Committee. The committee may add other members, from within or external to the University, if it is necessary or useful from a scientific or academic perspective, but additional committee members must be approved by the Honours Coordinator.
- The thesis advisor (i.e. Biology Dept. faculty member serving on external projects) should be familiar with the area of study for the project, and will provide advice on the logistics and timing of the honours programme in Biology.
- The Honours Coordinator or Department Chair will act in an *ex officio* capacity on all Advisory Committees.

The Advisory Committee is established to provide advice, consultation and guidance to the student throughout the project, and to evaluate all aspects of the project (written proposal, progress report, thesis, defence etc.). The student should

- (1) feel comfortable approaching all members
- (2) be prepared to meet with the committee at regular intervals throughout the year to discuss the progress of the research and
- (3) be **informed explicitly of the committee expectations** at the beginning of the project.

Students that are interested in applying to do their Honours should consult with potential supervisors as early as possible in their third year of study. Potential supervisors will then have a chance to consider possible projects and funding, and advise students about the preparation they may need for the project.

Funding, Space, Equipment, and Materials

Following acceptance to the Honours programme, the student will be assigned a space by the Biology Department where the research is to be done.

Important Note: Acceptance by the Department into the Honours Program does not guarantee funding for the project, and in some cases, the project may not go ahead if funding is not obtained

Funding may come from grant support to the major advisor, or from a specific proposal for the research to an external agency. Therefore, students with a particular project in mind should contact their preferred advisor at the earliest possible date to ensure funding. Deadlines for most research grant proposals are in the autumn of the year prior to receiving the money.

Depending upon the type of project and the level of funding available, students may be hired by their professor as a research assistant and carry out their honours research in addition to other duties assigned by their supervisor/employer. **Acceptance to the Honours Programme, however, does not guarantee employment in their supervisor's laboratory.**

Ordinary facilities, materials and supplies, will be supplied by the Department (i.e. common glassware, chemicals, microscopy needs). Extra-ordinary facilities, materials, supplies, software and expenses must be covered through other sources, such as research grants, etc. In certain situations, the major advisor will not have access to such funds, and in this case, the student may apply to **The Geoff Hogan Biology Honours Research Fund** for funds to carry out the research.

Possible Sources of Funding Support for the Honours

1. Major Advisor's Research Grant

- Faculty apply for grants to carry out research in their field of interest. Students interested in that field can contact a specific faculty member to explore possible research projects related to, and funded by, their research grant. This type of funding will include research costs, and may also include a summer stipend or summer-student job opportunity.

2. Summer Undergraduate NSERC Award

- Students with high academic standing and good potential research abilities are encouraged to apply for a summer NSERC. These pay up to 75% of a summer research stipend to conduct research that may or may not be used toward an honours degree. Note however that the major advisor must provide the remaining stipend & all research costs, so these can only be held in conjunction with a major advisor who holds an NSERC research grant, and who agrees to support the project. Application forms may be obtained from the NSERC website (www.nserc.ca), usually right after Christmas.

3. Health Research Institute summer scholarships

- These are competitive scholarships, which function in a similar fashion to the summer NSERC programme, to provide funds for students to work on research projects. The projects, however are restricted to research in the health sciences. Check with your prof, or look at the UPEI main website for the notices for these scholarships, usually shortly after Christmas.

4. Geoff Hogan Honours Biology Research Fund

- Students wishing to do Honours research, and having difficulty obtaining funding, may apply to the Geoff Hogan fund, which provides support for research costs such as equipment and travel expenses. The deadline for this award is usually in late April or May of the year students plan to carry out their honours research.

HONOURS COURSES AT A GLANCE

(consult your supervisor if there is confusion about the old and new programme; also check the calendar)

	Number of Courses
1. Biology Core Courses.	10
Biol. 111/112 or 131/132	
Biol. 202	
Biol. 204	
Biol. 206	
Biol. 221	
Biol. 222	
Biol. 223	
Biol. 326	
Biol. 331	
2. Biology Electives	7
5 at 200 level or above	
2 at 400 level	
3. Biology 490 (Honours Research & Thesis)	4
4. Science Requirements between 8 and 11	
Math 112 (or 151/152) and 221	
Chem 111, 112, 243 (or 241/242), 353 (or 351/352)	
Phys. 111 and 112 (or 122)	
5. Other Electives up to 13, depending on core choices	
Students are advised to broaden their academic base subject to the Academic Regulation concerning Electives .	
Note: Honours students are advised to take an extra course (or courses) in Statistics as part of their electives, as well as courses in writing or a second language	
Total	42 courses (126 credits)

HONOURS PROGRAMME COMPONENTS

Grade breakdown:

1. formal written research proposal: due approx 1 mo.	10%
2. informal group discussion of research goals – Occurs in early fall – mandatory attendance	0%
3. written progress report: due in January	10%
4. formal thesis presentation	10%
5. project work, written thesis, oral exam (defence) with committee on thesis (breakdown of these marks should be established at the first committee meeting)	70%

**Note: consult the timetable on the website for the due dates for these components

1. Written Research Proposal (10%)

The Honours student must submit a formal research proposal to be evaluated by each member of the committee. The deadline for submission of proposals is 1 month after registering, but the research committee should meet to evaluate the research plan prior to any research being initiated. The length and content of the formal proposal should be discussed with the committee, but is generally about 8-10 pages in length, and must be written in a style consistent with scientific writing (follow the CBE (Council of Biology Editors) style guide for writing and reference citation).

The proposal must be written in future tense (i.e. “The work will be done” rather than “the work was done”) even if the majority of the research has already been carried out. References will be cited in Author/Year format (see the CBE guide or the Guidelines for Thesis Preparation on the Biology Dept. Website), and **most if not all references should be from primary sources (journal articles, rather than unpublished reports)**. Web sites should be avoided unless they are credible sources, are dated, and are clearly identified in the text as web sources.

The formal proposal should include the following:

1. Title of the project (Title page, with project title and author)
2. Brief introduction, including the specific objective(s) of the study (about 1 page). Note, if objectives and/or hypotheses are given after the Literature Review, they don't need to be included here as well.
3. Literature review: a review (in essay format) of the relevant background information, including the rationale and biological relevance of the project (4-6 pages, depending on the field of study). Most of the cited material should be from primary research (published, peer-reviewed research papers).
4. An outline of the methods that will be used to conduct the research. This should include details on field sampling, lab protocols, etc., and also include a section on how the data will be interpreted or analysed (2-3 pages).
5. Timetable: A table detailing all the major components of the study, and the dates on which they should be completed, e.g., each component of the data collection, such as sampling trips or experiments, processing of the data, analysis of the data, writing the introduction, methods, etc. (1 page).
6. Literature Cited: the list of relevant literature cited in the rest of the paper. Note that technical reports, web pages, and other unpublished sources are not acceptable references if published peer-reviewed sources are available.

Note: these apply to the formal written proposal. If possible, the proposal should be written before the research begins, and students beginning their honours research in September are encouraged to begin work on the proposal as soon as they can. However, if the research must begin before the proposal is completed, a research plan should be prepared, and discussed with the members of the committee. The advisory committee will convene a meeting to accept the research plan, and discuss the requirements for the project (space, equipment, material) and the timetable.

2. Informal group discussion (0%):

All Honours Students are required to summarize their research early in the term in a 4-5 minute presentation to their fellow students and to the Biology faculty. This is an informal session, and is simply intended to share your project details so all students and faculty are aware of the research going on in the department. There are no visual aids for this session; it is just a brief synopsis of your project and its major goals. This component of the research proposal will not be marked, but is mandatory.

Some hints for this section:

- start out by introducing yourself and your supervisor.
- you can list your project title next, or paraphrase it to make it easier to understand for someone not in the same field of study.
- give a very brief synopsis of what you've accomplished so far, and how. For example, in a field project, you might describe how you sampled, and what kind of data you have gathered.
- wind it up with information on what you may have discovered so far, or what you believe the importance of your study will be.

3. Progress Report (10%) (see schedule for due date)

All Honours students will provide a written progress report to their committee members concerning the progress made on their project. The length and format of the report may vary depending on the type of project. Therefore, these details should be worked out for each project by the committee members, in consultation with the student. Students should meet with their committee members before Christmas to discuss the progress report.

Suggested format for the progress report:

1. A brief summary of the original objectives of the project;
2. If the objectives have been changed or modified during the course of the project, there should be a brief summary of the changes, and the reasons for them.
3. There should be a summary of the results to this point. If any analysis has been completed, some of the results (e.g. graphs or figures) can be included, with a brief section on what they mean and how they relate to the objectives.
4. The timetable from the Research Proposal should be updated and modified as necessary, and included here, with dates given for the remaining components of the project.

Note: It is important to emphasize that the relative stage of each project will vary, as will the expectations of committee members in different fields of study. Some students will have collected all of their data and may be completing the analysis, while others may be still carrying out experiments. The objective of this report is not to present your final results, but rather to provide your committee members with an overview of how the project is progressing, some of the problems that have been encountered, and how these problems have been addressed. This is also an opportunity for students to practise their scientific writing, and receive feedback from the committee on the writing style.

AUUBC: Atlantic Undergraduate Biology Conference

This conference occurs each year in February or March, and each university in the region can send four research students to present their research. Two students can give oral presentations and two can give poster presentations. Students interested in presenting their work should contact the honours co-ordinator as soon as possible after their progress meeting. This is an excellent opportunity to see what other students are doing in the region, and to get experience presenting research.

4. Formal project presentations (10%).

Students will provide a formal 20 minute oral summary (15 minutes plus 5 minutes for questions) of their project to the department at the end of the spring semester, usually during the Honours Presentation Day. This will be evaluated and marked by the committee. Students should work with their supervisors, beginning 2 to 3 weeks before the presentation day, to prepare and practise their talk.

5. Project work, Thesis and Defense (70%)

This component of the honours programme evaluation considers the work that went into the project, the written thesis and the oral exam (defense) on the project. For the project work, committee members will consider the quality and independence of the work, as well as the motivation and dedication to the project. The thesis will be marked on the quality of the research presented, as well as the writing and the organization.

Each project will vary, so each committee should establish the mark breakdown for this part of the project at the start of the project. For example, 35% of this component could be on the project work, 50% on the thesis document, and 15% on the defence. The main thing is to establish these values early on.

A thesis consisting of about 30-70 double-spaced typed pages (including table of contents, all tables and figures, Literature Cited, and appendices) will be prepared on the research project. Students should consult with their supervisors about a writing schedule, bearing in mind that several drafts may be necessary before submission to the committee. Committee members may agree to consult on early drafts of some sections of the thesis, but remember that the committee should not be asked to correct early grammar or style concerns. Students should work with their project supervisors to develop a clear draft of the thesis before passing it to their committee.

A copy of the thesis that is **ready for marking** will be submitted to the advisory committee on the due date published in the annual schedule (see Department Website or Honours Co-ordinator). In most cases, this will be a 2nd or 3rd draft (with early drafts having been reviewed by the supervisor), and should be free of grammatical or organizational errors.

The advisory committee will read the submitted thesis, and meet with the student for the thesis defence within the time schedule set out in the annual schedule (see department website).

Thesis Defence:

The thesis will be subject of a private oral defence before the Advisory Committee, consisting of a 30-60 minute period of time during which the student will answer questions from each member of the Advisory Committee. Following the oral examination, the committee will assign a grade for the thesis and a grade for the project work, and will provide the student with a list of corrections that must be made before the thesis will be accepted by the department.

Corrections:

Students will complete the corrections, and show their corrected thesis to the supervisor, so that the supervisor can write a memo attesting that the requested corrections have been made. Students will then submit the corrected thesis and the supervisor's letter to the Honours Co-ordinator, who will check to see that the formatting is correct. **Submission of a corrected thesis is a requirement for graduation;** see the annual schedule from the Website for the deadline. If the document does not meet the necessary format, it may delay acceptance of the thesis, and even graduation.

Thesis Format:

For specific details regarding thesis format, all students should consult the pamphlet, "**Guidelines for Thesis Preparation**", available on the Biology Department Website.

The thesis must be typed, double-spaced, with laser printer quality print, on good quality white paper (8.5" x 11") and follow the format given in the "Guidelines for thesis preparation".

Note: Students must make every effort to ensure that the material in the thesis is correct and complete, since it will be bound and placed into the Departmental and UPEI libraries as a reference for future studies.

PERFORMANCE

To graduate with a B.Sc. Honours in Biology, students must complete 126 semester hours of credit (42 courses, including 12 semester hours for the research and thesis course), attain a **minimum average of 75% in all biology courses combined** (as calculated by the Office of the Registrar), and achieve a **minimum overall average of 70%** in all courses submitted for the degree. In addition, students should be aware that more Biology Electives are required for graduation with a Honours degree than for a simple major; **check the current calendar for precise details.**

Students that have been accepted to the Honours program but fail to meet the Honours requirements may transfer to the B.Sc. Biology Major Program or to other degree programs. In the case of Biology 490: Honours Research and Thesis, the student can transfer their 12 semester hours to the B.Sc. Biology Major degree.