

BIOL 99: Senior Research and Senior Honors in Biology

Information and Timetable/Deadlines

Petition (detach, complete, and return to Biology office)

**2011-2012 Academic Year - Senior Research Program (BIOL 99) and Senior Honors Coordinator:
Dr. Joan Press, Rosenstiel Center room 511; x62450; press@brandeis.edu**

BIOL 99: Senior Research and Senior Honors in Biology

The Senior Research Program is designed to provide an opportunity for students concentrating in Biology to participate in a **two-semester long**, independent research project during their senior year and to receive both course and elective credit for that research. Any senior concentrating in Biology can participate in Senior Research (BIOL 99) and ask to be considered for Senior Honors (see BIOL 99 petition); eligibility for honors is determined by the student's academic record and research performance.

1. BIOL 99 Senior Research. Students may select any Brandeis faculty member in the Department of Biology as their research sponsor. If a student wishes to do research with a Brandeis faculty in other departments, e. g., Biochemistry, Chemistry, or with a faculty member at another institution in the Boston area, the student *must receive permission* from the Senior Honors Coordinator to do so, and, the *research must have a biological basis, pose a biological question, and use biological techniques*.

BIOL 99 course credit. BIOL 99 is a **two-semester course restricted to seniors**. A single semester of BIOL 99 should not be taken unless the student also has taken BIOL 93 (see below). Two semesters of BIOL 99 may be used as one elective toward the Biology major; for this to occur, the student should fill out an RG01 form and submit it to the Biology Undergraduate Advising Head (UAH). If the student is taking a very light course load and can spend significantly extra time in the lab, and if the faculty sponsor agrees, the student can request permission from the BIOL UAH to enroll in BIOL 99e to obtain a third course credit. If the UAH grants permission, the student would register for BIOL 99a in the Fall and for BIOL 99e in the Spring. A single semester of BIOL 99, even if BIOL 99e, cannot be used as an elective. A student may **not** receive more than three course credits and one elective for Senior Research (this includes combining BIOL 93 and BIOL 99, see below). There is no GPA requirement to enroll in BIOL 99.

Combining BIOL 93 and BIOL 99. BIOL 93 is a one-semester long research internship (see BIOL 93 pdf for more information). Typically, students who elect to take BIOL 93 intend to do only one semester of research. However, a student who really likes the BIOL 93 experience may want to continue doing research, and if this student is a senior, s/he can then take one semester of BIOL 99. The BIOL 99 research must be done with the same research sponsor as BIOL 93, **and** BIOL 99 must be taken the semester immediately after BIOL 93 was taken. This two-semester combination of BIOL 93 and BIOL 99 can be used as one biology elective (and also as Senior Research) as long as the student (i) **fulfills the BIOL 93 requirements** (see BIOL 93 pdf for details), and (ii) **writes a senior research dissertation at the conclusion of BIOL 99** (see below). The BIOL 99 senior dissertation may incorporate some of the BIOL 93 report but it must have a longer review and introduction, be more detailed, contain much more data, and a lengthier discussion. It is unlikely that the 2-semester combination of BIOL 93 and BIOL 99 will provide research sufficient for senior honors. However, a 3-semester combination of research courses may also be taken: BIOL 93 in spring of junior year or over the summer before senior year, followed by two semesters of BIOL 99 in senior year. This 3-course combination will yield one elective for the Biology major, and there may be sufficient research accomplished for candidacy for senior honors.

How to enroll in BIOL 99: (1) The student must complete and return to the Biology office the BIOL 99 petition (at the end of this document) which includes the signature of the Biology faculty sponsor. If the student wishes to do BIOL 99 with a research sponsor not in the Biology Dept., the petition must be approved and signed by the Senior Research/Senior Honors Coordinator. (2) The student must enroll in BIOL 99 using the typical add/drop form from the registrar. This form requires the signature of the student's faculty sponsor and must be returned to the registrar.

Course requirements for 1st semester (usually, BIOL 99a). At the completion of the 1st semester of BIOL 99, students write a paper which **reviews** the literature in the scientific field pertinent to their research:

In a minimum of 7 pages of double-spaced text, this paper should describe and discuss the scientific literature that is important for the problem being investigated. If there are models or hypotheses, the review should describe what they are. What evidence supports or negates the models. What is the specific question or problem being explored, how will it be solved. The review should include references in the text and provide a bibliography containing those citations [the bibliography does not count toward the 7 pages of text]. This review will be useful when writing the introduction to the senior thesis.

Copies of this review paper are to be given to the research sponsor and the Biology office.

Course requirements for 2nd semester (usually, BIOL 99b). At the completion of the 2nd semester of BIOL 99, students write a Senior Research thesis which contains the following sections:

Title Page: includes student's name, the title of Senior Research, and date.

Abstract (not more than 250 words): summarizes the nature of the research project, the results obtained, and the relevance of those results.

Introduction: poses the research question that was asked in the context of current knowledge in the relevant field.

Materials and Methods: provides in sufficient detail all aspects related to how the experiments were conducted.

Results: provides a written description along with figures and tables, of the experimental data obtained.

Discussion: evaluates the results obtained and their relevance and significance to current models and data in the field.

References: includes complete citations (authors' names, paper titles, journal, volume, page, year). See the journal *Cell* for examples.

Copies of the thesis are to be given to the research sponsor and the Biology office.

2. Candidacy for Senior Honors. To become a *candidate* for Senior Honors, the student enrolls in two semesters of BIOL 99 in senior year and completes the BIOL 99 petition including the section asking to be considered a *candidate* for Senior Honors. Senior Honors is the Departmental award for Distinction in Biology and requires both excellence in laboratory research and a good academic record (GPA eligibility):

- ❖ Biology majors enrolled in BIOL 99 who have a GPA of **3.30 or better in all courses required for the Biology FOC** are automatically eligible for Honors.
- ❖ Biology majors enrolled in BIOL 99 who have a **Biology FOC** GPA between 3.0 and 3.3 **and** who have achieved an **average of B+ or better in THREE electives** taken to fulfill the Biology FOC are also eligible. *For this calculation, BIOL 99 does not count as one of the 3 required electives.*

Senior Honors requirements. All the 1st and 2nd semester BIOL 99 course requirements given above for Senior Research apply to *candidates* for Senior Honors. The Honors candidate writes a Senior Honors thesis using the format of the Senior Research thesis (see above). Copies are given to the candidate's Faculty Research Committee (the research Sponsor and two Biology faculty members) by a designated deadline (see timetable). The Research Committee reads and evaluates the thesis. The honors candidate gives a public, ~50 min **oral presentation and defense** of his/her research. The talk introduces the topic, indicates why the work was undertaken and what the goals were, provides a summary of the experiments done and results obtained, and gives a succinct discussion of the significance of the findings. Throughout this presentation, the Research Committee members will ask questions. Presentations may include use of a blackboard, handouts, slides,

overhead transparencies, and/or Power Point projections. Each member of the Research Committee evaluates the written thesis and oral presentation/defense and makes a recommendation of: no honors, Honors, High Honors, or Highest Honors. Assuming GPA eligibility has been met, these recommendations are considered by the Department of Biology faculty, who make the final determination about the candidate's Honors status.

BIOL 99 TIMETABLE FOR 2011-2012 ACADEMIC YEAR

FALL SEMESTER, 2011

BEFORE September 15, 2011 (last day to enroll in classes):

- 1. Enroll in BIOL 99** (usually, BIOL 99a): obtain a course enrollment form from the Registrar's office, have it signed by your BIOL faculty sponsor, hand it in to the Registrar's office. You cannot enroll in BIOL 99e without permission from and signature of the Senior Research/Honors Coordinator. If your BIOL 99 is with someone who is not BIOL faculty, you need approval from and signature of the Senior Research/Honors Coordinator.
- 2. Return** the completed Senior Research/Senior Honors **petition** to Biology Office.

BY December 21, 2011:

A **review paper** on your field of research **is due**. Submit one copy to your faculty Sponsor, and send an electronic copy to the Biology office.

SPRING SEMESTER, 2012

BEFORE Jan. 30, 2012 (last day to enroll in classes):

- 1. Enroll in BIOL 99** (usually, BIOL 99b). Same comments as above for Fall semester.
- 2. No petition is needed, you did the petition last semester.** However, if you are starting BIOL 99 this (Spring) semester and will conclude BIOL 99 by taking it in Fall of next year, or if you are a senior combining BIOL 93a (Fall) and BIOL 99b (Spring), then complete the BIOL 99 petition and return it to the Biology office.

BY April 27, 2012: SENIOR THESIS IS DUE

Students who are not doing Honors: Give a copy of your Senior Research thesis to your research Sponsor and an electronic copy to the Biology office.

Students who are Honors candidates: Give one copy of your Senior Honors Research thesis to each member of your Faculty Research Committee. You will be notified beforehand as to the faculty composition of your committee, and the date, time, and room assignment for your oral presentation.

May 2, May 3, and May 4, 2012: oral defenses take place

May 10, 2012: final version of Honors thesis is due If revisions are required by your Research Committee, an electronic copy of the *final version* of your Senior Honors Research thesis is due in the Biology Dept. office by 3:00 pm.

PETITION FOR BIOL 99 SENIOR RESEARCH AND SENIOR HONORS IN BIOLOGY

Complete and return this petition to the Biology Office by Sept. 15, 2011

Student's Name: _____
(Print) First Last

Telephone #: _____ Mailbox #: _____

Email: _____

A. Petition to enroll in Senior Research (BIOL 99)

I will take BIOL 99 with: _____
(PRINT the Name of your Research Sponsor)

Title of research project:

Brief synopsis of proposed research:

*Fill in the section below if your Sponsor is **NOT** a member of the Brandeis Biology Department:*

Institution and Department affiliation of your Sponsor: _____

Telephone number and e-mail address of your Sponsor: _____

The Senior Research/Honors Coordinator **gives permission** for BIOL 99 to be taken with the above non-Brandeis scientist or non-Biology Department Brandeis faculty member.

I understand that taking Senior Research (BIOL 99) **requires that I submit both a written review** (1st semester) **and a senior thesis** (2nd semester) to my Research Sponsor by the deadlines specified on the timetable for this academic year:

Student's signature

B. Petition for candidacy for Senior Honors in Biology. *Eligibility for Honors will not be determined until the conclusion of the senior year* and includes a written Senior Honors thesis, an oral presentation and defense, and a GPA requirement.

I understand that candidacy for Senior Honors requires a final GPA of *3.30 or higher* in science courses offered to fulfill the Biology concentration, **or** a final GPA of *at least 3.00* in science courses offered to fulfill the Biology concentration **AND** an **average of B+ or better** in **three Biology electives, not including BIOL 99**, taken to fulfill the Biology concentration requirement.

I petition to be considered a *candidate* for Senior Honors.

Student's signature

C. To be completed by the Research Sponsor

I accept this student for BIOL 99 (Senior Research) and, if applicable, as a candidate for Honors in Biology. I will provide appropriate safety instructions as required for each hazard (checked off below) that may be encountered by this student while conducting research in my laboratory.

Sponsor's signature

If the research to be conducted by this student involves any of the potential hazards listed below, please put a check next to that hazard:

____ radiation or radioactivity

____ chemical hazards, e. g., drugs, poisonous or explosive materials, carcinogens

____ physical hazards, e. g., high voltages, pressure, or temperature; intense laser sources

____ microbiological hazards, e. g., infectious or disease-producing bacteria, viruses, etc.

____ recombinant DNA or genetic engineering

____ use of or exposure to human tissues/cells/fluids/samples, etc.

____ other (please specify) _____