

**DEPARTMENT OF BIOLOGY
GRADUATE STUDENT GUIDEBOOK**

NORTHEASTERN UNIVERSITY

CONTENTS	Page
I. LIST OF BIOLOGY FACULTY MEMBERS	1
II. DOCTOR OF PHILOSOPHY	3
A) Advisor	3
B) Academic Requirements	3
C) Graduate Student Presentations	5
D) Residency Requirement	5
E) Teaching	5
F) Off Campus Research	5
G) Qualifying Examination	6
1) General Description	6
2) Timetable	6
3) Written Examination	6
4) Oral Examination	10
5) Candidacy	11
H) Dissertation	12
1) Dissertation Committee	12
2) Dissertation Proposal Format	12
3) Dissertation Defense	13
I) Ph.D. Requirements Checklist	14
III. MASTER OF SCIENCE	16
A) Advisor	16
B) Academic Requirements	16
C) Graduate Student Presentations	17
D) Research	17
1) Thesis	18
2) Thesis Proposal Format	18
3) Thesis Defense	19
4) Thesis Work Conducted in Off-Campus Laboratories	19
E) M.S. Literature Thesis	20
F) M.S. Requirements Checklist	21

IV. PROFESSIONAL SCIENCE MASTER’S DEGREES (PSM)	23
A) PSM in Bioinformatics and Computational Biology	23
B) Multi-track PSM in Biotechnology	23
C) PSM in Marine Biology	23
V. FINANCIAL SUPPORT	24
A) Eligibility	24
B) Categories	24
C) Departmental Policies Re Teaching Assistantships	24
1) Total number of available assistantships	24
2) Full-time Status	24
3) Academic Standing	24
4) Specialized Teaching Needs	25
5) Previous Performance as T.A.	25
6) English as a Second Language Students	25
D) Time Limits on Appointment of Teaching Assistantships	25
1) Ph.D. Students	25
2) M.S. Students	25
E) Professional Meetings	25
VI. PROCEDURES FOR TRANSFER BETWEEN PROGRAMS IN BIOLOGY	26
VII. STUDENT’S RECORDS AND GRADES	27
A) Graduate Student Folders	27
B) Grading of Research and Seminars	27
C) Minimum Q.P.A.	27
D) Grade of Incomplete	27
E) Clearing Entry Course Requirements	27
F) Bi-yearly Review	27
G) Time Limits on Course Credits	28
1) Ph.D.	28
2) Master’s Degree	28

VIII. THESIS/DISSERTATION: OBLIGATIONS	29
A) Advisor	29
B) Committee Members	30
C) Student	30
D) Other Faculty	31
E) Committee Voting	31
Appendix I. Definitions	32
A) Full-time Status	32
B) Semester Hours	32
Appendix II. University Policies	33
Appendix III. Departmental Forms	35
A) M.S.-1. Change of Academic Advisor	36
B) M.S.-2. Petition for Approval of M.S. Thesis Proposal	37
C) M.S.-3. Results of M.S. Thesis Defense	38
D) M.S.-4/Ph.D.-8. T.A. Evaluation Form	39
E) M.S.-5/Ph.D.-9. Checklist for Graduate Student Progress	41
F) M.S.-6/Ph.D.-10. Application for Travel Award	42
G) Ph.D.-1. Intent to Take Written Qualifying Exam	43
H) Ph.D.-2. Schedule for Written Qualifying Examination	44
I) Ph.D.-3. Results of Written Qualifying Examination	45
J) Ph.D.-4. Petition of Approval of Ph.D. Dissertation Topic and Committee	46
K) Ph.D.-5. Letter to Outside Committee Member	47
L) Ph.D.-6. Results of Oral Qualifying Examination	48
M) Ph.D.-7: Confirmation of Annual Post-Oral Exam Committee Meeting	49
N) Ph.D.-8. Results of Ph.D. Dissertation Defense	50

I. LIST OF BIOLOGY FACULTY MEMBERS

- **Joseph Ayers, Jr.**, Professor; Ph.D., University of California, Santa Cruz; Neurophysiology.
- **Gail Begley**, Associate Academic Specialist and Director of University Pre-Health Program; Ph.D. Boston University, Membrane Transporters.
- **Kostia Bergman**, Associate Professor; Ph.D., California Institute of Technology; Sensory Physiology of Microorganisms, Nitrogen Fixation.
- **Matthew Bracken**, Assistant Professor; Ph.D., Oregon State University; Marine Biology
- **Donald P. Cheney**, Associate Professor; Ph.D., University of South Florida; Ecology and Systematics of Marine Algae; Genetic Engineering of Seaweeds.
- **Erin Cram**, Assistant Professor; Ph.D., University of California, Berkeley; Cancer Biology, *In vivo* approaches to cell migration
- **Frederick C. Davis**, Professor; Ph.D., University of Texas at Austin; Circadian Rhythms, Developmental Neurobiology.
- **H. William Detrich, III**, Professor; Ph.D., Yale University; Marine Molecular Biology and Biochemistry.
- **Slava S. Epstein**, Professor; Ph.D., Institute of Oceanology, Moscow, Russia; Microbial Ecology.
- **Veronica Godoy**, Assistant Professor; Ph.D., Tufts University, School of Medicine; Molecular Biology and Microbiology
- **Gwilym S. Jones**, Professor, and Director of The Marine Science Center and The Center for Vertebrate Studies; Ph.D., Indiana State University; Mammalogy; Vertebrate Systematics and Ecology.
- **Kim Lewis**, Professor and Director of the Antimicrobial Discovery Center; Ph.D., Moscow University; Microbiology/Biotechnology.
- **James M. Manning**, Professor; Ph.D., Tufts University; Protein Structure/Function.
- **Richard L. Marsh**, Professor; Ph.D., University of Michigan; Biology of Skeletal Muscle; Temperature Regulation.
- **Charles A. M. Meszoely**, Professor; Ph.D., Boston University; Parasitology; Vertebrate Paleontology; Herpetology.
- **Donald M. O'Malley**, Associate Professor; Ph.D., Harvard Medical School; Neuroscience.
- **Jacqueline Piret**, Associate Professor; Ph.D., Massachusetts Institute of Technology; Microbiology; Microbial Genetics.
- **Mary-Susan Potts-Santone**, Associate Academic Specialist; Ph.D., University of New Hampshire; Marine Invertebrate Biology.

- **Susan G. Powers-Lee**, Professor; Ph.D., University of California, Berkeley; Enzyme Structure/Function.
- **Christopher Richardson**, Lecturer; Ph.D., Boston University; Physiological Ecology, Evolutionary Physiology
- **Rebeca Rosengaus**, Assistant Professor; Ph.D., Boston University; Sociobiology, Entomology.
- **Michail Sitkovsky**, Professor and Director of The New England Inflammation and Tissue Protection Institute Consortium at Northeastern University; Ph.D. Moscow State University; Biochemistry and Immunophysiology
- **Wendy A. Smith**, Associate Professor; Ph.D., Duke University. Endocrinology, Cell Signaling.
- **Dagmar Sternad**, Professor of Biology, Electrical & Computer Engineering; Ph.D., University of Connecticut; Motor Control and Neuroscience.
- **Phyllis R. Strauss**, Professor; Ph.D., Rockefeller University. DNA Repair.
- **Geoffrey Trussell**, Associate Professor and Director of the Marine Science Center; Ph.D., College of William and Mary; Marine Ecology.
- **Steven R. Untersee**, Lecturer; Ph.D., Tufts University; Marine Biology
- **Steven V. Vollmer**, Assistant Professor; Ph.D., Harvard University; Evolutionary Ecology, Genetics and Speciation
- **M. Jade Zee**, Assistant Academic Specialist; Ph.D., University of Oregon; Behavioral Neurobiology, Neuroendocrinology
- **Günther K. H. Zupanc**, Professor and Chair; Ph.D., University of California, San Diego; Behavioral Neurobiology, Developmental Neurobiology, Comparative Neurobiology, Regenerative Biology

II. DOCTOR OF PHILOSOPHY

After acceptance into the Ph.D. program, the student is classified as a Ph.D. student. After successful completion of both the written and the oral Qualifying Exams, the student is classified as a Ph.D. candidate.

A) Advisor

Upon matriculation into the doctoral program, students will be assigned a member of the graduate faculty as an academic advisor. The academic advisor will help the student design a course of study until a dissertation advisor is agreed upon. It should be noted that the initial academic advisor need not become the dissertation advisor. If the student has already contacted a potential doctoral dissertation advisor, this person will serve as the academic advisor. A change in advisor can be made only after written notification to the Graduate Committee (Form M.S.-1).

Students who do not have a committed doctoral dissertation advisor in the first year are encouraged to enroll in Laboratory Rotation 1, BIOL 8420, and, if needed, Biology Laboratory Rotation 2, BIOL 8421. Students must have a dissertation advisor by the end of the second semester of study. If the advisor differs from the initial academic advisor, this change must be communicated to the Graduate Coordinator using form M.S.-1.

B) Academic Requirements

1) For students admitted with a bachelor's degree.

Students must complete 30 semester hours of graduate level coursework, 20 of which must be taken for a letter grade.

- a) 12 semester hours will consist of the following REQUIRED 4 SH courses taken for a letter grade: BIOL 7399 Research Problem Solving, Ethics, and Communication Skills, and two out of the following four discipline-specific courses: Neurobiology and Behavior (BIOL 6303), Dynamics of Microbial Ecology (BIOL 6399), Critical Analysis in Cell Biology (BIOL 6401), and a new course in Ecology (BIOL 6xxx).
- b) 8 or more semester hours will consist of approved BIOL 5000-level or higher graduate courses taken for a letter grade, with an option to petition the Graduate Committee for substitution of graduate courses from other departments. The following courses cannot be taken for a letter grade: Biology Colloquium (BIOL 5100), Biology Lab Rotation (BIOL 8420-8421), Master's Research (BIOL 8984), Full-time Master's Research (BIOL 8986), Doctoral Research (BIOL 9984), Thesis (BIOL 7990), Thesis Continuation (BIOL 7996), Dissertation (BIOL 9990), Dissertation Continuation (BIOL 9996), and other comparable research courses.
- c) 2 semester hours will consist of two semesters of Biology Colloquium (BIOL 5100) taken during the first two semesters of graduate study. Students are expected to attend Biology Colloquia thereafter.

- d) Requests for transfer credit should be sent to the Graduate Assistant accompanied by a course description, transcript, and official GSAS transfer credit form. The recommendations of the Graduate Coordinator will be forwarded to the Graduate School.
- 2) For students transferring from the Master's Program.**
Students transferring from the Master's Program must meet the coursework requirements listed under B.1 above. Coursework taken toward the master's degree is transferable to the doctoral program. For full-time students, the original entry date into the Master's program becomes the entry date into the Ph.D. program.
- 3) For students admitted with the Master's degree.**
The Graduate Committee will assess the previous coursework of students entering with a Master's degree and determine if further coursework is required on a case-by-case basis. Full-time students must, however, be registered at all times except during summer term.
- 4) For all Doctoral students.**
- a) The dissertation advisor may recommend or require courses for the student's general scientific development or for specific research objectives.
 - b) Depending upon the student's performance on the Ph.D. Written Qualifying Examination, the Examination Committee may recommend or require specific courses.
 - c) A cumulative average of 3.0 is required for graduation. All regulations of the Graduate School of Arts and Sciences apply with regard to maintenance of academic standing.
 - d) All Doctoral students are required to have one first authored publication accepted in a peer-reviewed journal prior to their defense.
 - e) If a student is unable to work toward their degree for a period of time it is possible to request a Leave of Absence. A Request for Leave of Absence Form signed by the Graduate Coordinator must be submitted to the Graduate School of Arts and Sciences.
 - f) Once candidacy has been established by passing both qualifying exams, the Ph.D. student must take Ph.D. Dissertation (BIOL 9990) for the next two semesters. Continuous registration is still required in subsequent semesters and is usually satisfied by registering for Dissertation Continuation (BIOL 9996).

C) Graduate Student Presentations

All graduate students, beginning in their second year of study, will be required to give talks on a yearly or near-yearly basis.

- Seminar slots will be assigned on a rotating basis; two students will share each date.
- Each talk should be no longer than 20 minutes, providing adequate time for questions and discussion.
- Students will be assigned a speaking date by the Graduate Committee. If that date is not acceptable, it is the student's responsibility to switch with another student. If a student trades speaking dates, s/he will inform the Graduate Committee of the switch.
- Students will also be required to make sure that at least two faculty members are present at their talk. Assuming the advisors attend, this will arise naturally from the shared format. All Faculty and graduate students are welcome and encouraged to attend.

D) Residency Requirement

The Graduate School of Arts and Sciences requires that a Ph.D. candidate spend at least one year as a full-time student in residence at the University. This requirement may be satisfied by either a full year or two six-month periods of full-time graduate study on campus. Time spent in residence prior to candidacy for the doctorate may not be used to meet the doctoral degree residence requirement.

E) Teaching

Teaching experience is highly recommended but not required.

F) Off-Campus Research

It is hoped that at all times every Ph.D. student will be an active member of the Department's academic community. However, under special circumstances and with the approval of the Graduate Committee, dissertation work may be done in a laboratory external to the University. At a minimum, the residency requirement (section III-C, above) must be satisfied, as well as the requirements for M.S. work conducted in off-campus laboratories described in section III-D-4, below.

G) Qualifying Examination

- 1) **General Description:** The Ph.D. Candidacy Examination consists of both written and oral examinations, with the written examination preceding the oral examination. **The written examination** is intended to evaluate the student's academic preparedness and graduate-level knowledge in areas of biology related to the student's specialization. **The oral examination**, termed the Ph.D. research proposal defense, is intended to ascertain the student's readiness to pursue a research program in their chosen area and also to provide experience in formulating a research plan in the format of an external grant proposal.
- 2) **Timetable:** For students who enter with the bachelor's degree, the written qualifying examination will be scheduled toward the end of the second semester of the second year of graduate study. For students who enter with an M.S. degree, the written examination may be taken in the spring of either their first or second year in the program. For students who transfer from the M.S. program, the written examination will be scheduled for the earliest exam time one year after formal application to transfer. Requests to alter this schedule should be submitted in writing to the graduate committee. The oral examination (the Ph.D. research proposal defense) should be completed within 6 months after the completion of the written examination. A student must successfully complete both the written examination and the oral research proposal defense in order to become a Ph.D. candidate.
- 3) **Written examination:**

The written examination is offered once a year in the spring semester. Students repeating the examination will do so in the subsequent fall semester. To prepare for the written examination, each student will read 8 original research articles assigned by the Qualifying Examination Committee. Students will then be tested for their comprehensive understanding of these 8 articles.

 - a) **Assignment of research articles for the written examination**

The set of 8 research articles will be generated by 4 written examiners: the student's advisor plus 3 additional Biology faculty members selected by the student in consultation with his/her advisor. By September 15th of their second year of graduate study, each student will obtain the consent of their advisor and 3 additional Biology faculty members to serve as written examiners and will submit this list of names to the Qualifying Examination Committee on form Ph.D.-1. The student may elect to substitute an outside examiner for one of the

3 Biology faculty examiners. In this case, the student should provide on this form the outside examiner's name, title/position, contact information and a brief note explaining the outside examiner's credentials for this service. It is anticipated that some of the written examiners may subsequently join the student's Ph.D. thesis committee, but for the purpose of this exam their sole role is to provide research articles and to serve as graders for the written exam. By October 1st, the student's advisor will forward a set of 8 research articles to the Qualifying Examination Committee for approval. On or before November 1st the Qualifying Examination Committee will provide the finalized set of research articles (as either hardcopy or digital copy) to each student scheduled for the spring written exam.

b) Criteria for selection of research articles and scope of the written examination

Each student's advisor will solicit research articles from the written examiners in mid September, and will work with them to obtain a consensus set of 8 original research articles for submission by October 1st. The final set of articles should broadly represent the interests and expertise of the written examiners. The chosen articles may, in addition, be tailored to complement and inform the student's academic interests and planned research area. Suitable articles would include recent publications, classic papers in a field, and other articles published in peer-reviewed journals. The major objective is to test the student's ability to understand and write about the methodology, logic and implications of select articles within their general area of research. For each article, the student should read sufficient cited literature so as to discuss the article's significance in relation to extant knowledge at the time of publication. Students should be able to describe the methods and experimental techniques used, the logic of the sequence of experiments and the extent to which the paper accomplished (or failed to accomplish) its stated objectives. Examiners may also ask students to critique the authors' interpretations of their data and to evaluate the validity and ramifications of the results within the context of the article's Discussion section.

An overall goal is for the student to develop a viewpoint on the degree to which each article made new discoveries and/or extended knowledge in a given research area. The student may employ any and all means to obtain such an understanding of the 8 assigned

articles with one exception: they may not consult with any of the 4 examiners regarding any detail of the 8 assigned articles. However, students may consult with other faculty, other experts in the field and the authors of the assigned articles. Students are particularly encouraged to engage in study sessions with fellow students to discuss/present articles and to consider potential questions and answers. The Biology office will maintain a record of exam questions used in prior years and make this record available to students upon request.

c) Examination Committee

For each student taking the exam, their Examination Committee consists of their thesis advisor along with the four elected members of the departmental Qualification Examination Committee. This committee is charged with the following responsibilities:

- i) Approving the set of 8 research articles provided to the committee by the thesis advisor and providing said articles to the students along with Form Ph.D.-2 informing them of the schedule for the written exam.
- ii) Soliciting questions from the four written examiners
- iii) Selecting the questions for the written examination;
- iv) Administering the written examination;
- v) Returning the questions to their respective originators and to a second person in the field for independent grading;
- vi) Performing a secondary evaluation of the answers;
- vii) Analyzing the overall performance of the student.

d) Scheduling and conduct of the written examination

Students will be notified upon admission to the Ph.D. program of the schedule for their written qualifying examination. Changes in this schedule must be approved by the graduate committee. Once the set of 8 research articles is finalized (target date is November 1st for each spring examination), the Qualifying Examination Committee will notify the student in writing of the scheduled date for the written exam. The written exam should be scheduled on or about March 15th, but students must be provided the 8 research articles at least 4 months in advance of the exam. In the semester that the examination is scheduled, the Qualifying Examination Committee will solicit questions from the written examiners and will meet to select the questions to be used in the exam. A student who is scheduled to take the written

qualifying examination, and subsequently finds that he/she will not be able to take the exam on the appointed day, will immediately notify the Qualifying Examination Committee in writing of the reason for the absence.

The written examination will be given in a room reserved solely for taking the examination. Students taking the exam are not allowed access to notes, papers or any other written materials. The examiners may, at their discretion, include figures or tables in the body of their questions. Answers will be written over an eight-hour examination period and a computer will be provided solely for writing of the answers. The student will answer 6 of the 8 questions provided. In order to pass the exam, the student must pass 5 of the 6 questions (see grading, below). While the exam may consist of 1 question for each of the 8 assigned articles, questions could be included that e.g. involved comparing and contrasting several of the assigned articles. The exam questions will specifically address the content of the assigned articles, but students should note that understanding this content depends upon an understanding of prior works that describe previous experiments, the underlying methodology and the prior state of knowledge in that field.

e) Grading of the written examination

- i) High pass:** an exemplary answer
- ii) Pass:** an answer that adequately answers the question
- iii) Fail:** an inadequate answer; one that is lacking in key aspects

Each completed written examination answer will be duplicated and distributed to the question originator and an additional grader. The graders, who will remain anonymous, will be expected to grade the questions as high pass, pass, or fail, and to make sufficient comments to convey the basis of their grades to both the Qualifying Examination Committee and to the student. If any question receives one passing (high pass or pass) grade and one failing grade, the question will be submitted to a third grader. Receipt of two failing grades will result in failure of that question. Students must pass at least 5 of the 6 questions in order to pass the written exam. The answers will be graded by the 4 written examiners and additional faculty members as necessary. Before the end of the semester, the Qualifying Examination Committee will meet to discuss the corrected answers.

The student's performance will result in one of four possible actions by the Committee:

- i) Successful completion;
- ii) Successful completion with remedial requirements;
- iii) Unsuccessful completion and reexamination or
- iv) Unsuccessful completion with termination of study.

The Qualifying Examination Committee will inform the student of the results and provide copies of the anonymous graders' notations and comments. For students who passed the exam, but cumulatively received two or more failing grades, the Qualifying Examination Committee will by a majority vote determine whether any specific requirements aimed at correcting problems identified in the examination must be satisfied by the student. Any such requirements must be satisfied before the Ph.D. degree will be awarded. If the examination results in unsuccessful completion, the student may retake the examination only once. The reexamination will consist of a new set of 8 research articles, selected by the above-described procedures. Reexamination must take place in the next fall semester.

The Committee will submit a final report (Form Ph.D.-3) on each student to the Graduate Coordinator.

4) The Oral Examination (Ph.D. dissertation proposal defense):

a) General description of the oral examination

Prior to the oral examination, the written examination must be successfully completed, after which Form Ph.D.-4 should be submitted to the graduate committee. The oral examination may not be scheduled until form Ph.D.-4 has been submitted to the graduate committee. In lieu of a committee member's signature on form Ph.D.-4, the student may provide email from that committee member consenting to serve on the Ph.D. committee. Email should be sent to the Graduate Coordinator and copied to the Graduate Administrative Assistant. The curriculum vitae of any external committee member must be included with Ph.D.-4.

b) Scheduling and conduct of the examination

The oral examination must occur within 6 months of completing the written exam. The oral examination committee will consist of all members of the Ph.D. dissertation committee (see below). The student and thesis advisor will agree on the selection of another member of the dissertation committee (who must also be a graduate faculty member of the Department of Biology) to serve as chairperson for the oral examination. The student, thesis advisor and chairperson

for the oral examination will discuss the format for the examination (e.g., length of presentation, order of questions from the committee, allowed times for questioning). At the beginning of the oral examination, the oral examination chairperson will present the predetermined examination format to the entire committee. At the end of this meeting, form Ph.D.-6 will be filled out and a copy placed in the student's permanent file.

c) Evaluation of student performance

The outcome of the oral examination (Form Ph.D.-6) will be decided by a majority of the Ph.D. dissertation committee. The student's performance will result in one of four possible actions by the committee:

- i) Successful completion;
- ii) Successful completion with recommendations;
- iii) Unsuccessful completion with reexamination; or,
- iv) Unsuccessful completion with termination of study.

If the examination results in **successful completion with recommendations**, and those recommendations include revision of the Ph.D. research proposal, then the student must complete such revisions within 2 months. The dissertation advisor will then sign Form Ph.D.-6 attesting that satisfactory revisions have been completed and that the revised proposal has been placed in the student's file.

If the examination results in **unsuccessful completion with reexamination**, the student may retake the oral examination only once. Reexamination must take place within one year.

d) Required Annual Post Oral Exam Committee Meeting

Students are required to schedule annual committee meetings after you have passed your oral exam. Please submit form Ph.D.-7 (Confirmation of Annual Post Oral Exam Committee Meeting) each year after you have had your meeting until you defend your dissertation.

5) Candidacy

Upon successful completion of both written and oral examinations, the student will be designated a candidate for the Ph.D. degree. See section II.b.4 for course registration expectations after the achievement of Ph.D. Candidacy.

H) Dissertation

The dissertation must be an original and independent scientific study. The dissertation advisor and student will determine the problem and solicit members to serve on the dissertation committee. The proposal topic and dissertation committee composition (Form Ph.D.-4) will be submitted to the Graduate Committee for approval.

1) Dissertation Committee

The minimum number of members for a Ph.D. committee is five. At least one member must be an acknowledged expert external to the Department of Biology at Northeastern University. The majority of committee members must be graduate faculty of the Northeastern University, Department of Biology. Committee members should be chosen for their ability to advise the student on various aspects of the research project, particularly in aspects not directly in the advisor's field of expertise. The student and advisor should solicit members' agreements to serve. The outside member's curriculum vitae must be submitted to the Graduate Committee with the proposed dissertation topic and committee (Form Ph.D.-4). The outside member should be mailed a letter from the student's advisor similar to Form Ph.D.-5, together with an abbreviated description of the qualifying exam available from the Graduate Staff Assistants. The dissertation advisor will chair all meetings except the proposal defense.

2) Dissertation Proposal Format

In its initial form, the Dissertation Proposal should **not** be considered as a written agreement of what the dissertation research will consist. It is a document to: 1) outline an anticipated line of research for the Ph.D. dissertation, and 2) provide a focus for the oral examination. After the oral examination, the Dissertation Committee may require a revision of the proposal so that it more accurately reflects the proposed research that has been agreed to by the student and the Dissertation Committee. It is recommended that an updated outline of the dissertation research be prepared for a Dissertation Committee meeting to be held at some time between the oral exam and the Ph.D. dissertation defense.

The doctoral dissertation proposal should be organized according to the format given below. No specific length is required, but generally, the proposal will consist of 10 -15 pages exclusive of the literature cited.

- a) **Title Page:** Title of the dissertation, the names of the student and advisor, and date of submission.
- b) **Abstract:** An abstract of a maximum of 300 words which includes: 1) a statement of the broad area to which the research is relevant, 2) a statement of the hypotheses or questions to be addressed by the research, 3) a summary of methods to be used, and 4) a statement of how the proposed research is expected to contribute to the general field of study.

- c) **Body of the proposal:**
- i) **Introduction:** brief background, rationale and significance of the project in relation to existing knowledge. Include a clear statement of the specific objectives and hypotheses to be tested.
 - ii) **Preliminary Data:** summary of data already obtained including its relevance to either the feasibility of planned experiments or the overall objectives of the project.
 - iii) **Research Plan:** detailed description of experiments designed to test the proposed hypotheses. Explain how the data will be collected, analyzed and interpreted. Discuss potential difficulties and limitations of the proposed plan.
- Note:** Experimental methods that have already been used by the student to generate data should be described under Preliminary Data. New methods to be used for proposed experiments should be incorporated into the Research Plan.
- d) **Literature cited:** Complete references with authors, year of publication, title, journal, volume and pages.
- e) **Timetable:** Outline of entry date, initiation of research and expected completion dates for the various portions of the project, including writing of the dissertation.

Once the dissertation proposal is approved by the thesis advisor, it should be provided to all members of the dissertation committee at least 2 weeks in advance of the date of the oral examination.

Upon approval, the Department is obligated to pay for the external committee member's expenses to attend the oral qualifying exam and the dissertation defense. Notice of a change in the outside member of the dissertation committee must be submitted to the Graduate Committee for approval.

3) **Dissertation Defense**

Use *A Guide to the Preparation and Submission of Theses and Dissertations* for details regarding dissertation preparation and approval. (http://www.northeastern.edu/casgraduate/commencement/thesis_guidelines/documents/thesis.pdf) The proposed final draft of the dissertation should be in the hands of each dissertation committee member at least two weeks prior to the defense. Also, notice of the dissertation defense must be posted in the Biology Department at least two weeks prior to the defense. The defense is public. The results are transmitted to the Graduate Coordinator on Form Ph.D. -8. The defense consists of three parts: student presentation of the work; public questions from non-committee members; and after dismissal of the public, questions from committee members. All committee members must be present at the defense. See section VIII.C for details regarding the presentation of the dissertation.



Choose advisor

You will be assigned an advisor upon entering the program. If your assigned advisor does not turn out to be your thesis advisor, use Form M.S.-1 to officially change your advisor.

Complete coursework (30 semester hours)

NOTE: For students transferring from the Master's Program, see section II.B.2.

For students admitted with a Master's degree, see section II.B.3.

For other Ph.D. students:

20 semester hours: Twenty semester hours of Biology graduate courses (or approved graduate courses from another department) carrying a letter grade. 12 semester hours will consist of the following **REQUIRED** 4 SH courses taken for a letter grade: BIOL 7399 Research Problem Solving, Ethics, and Communication Skills, and two out of the following four discipline-specific courses: Neurobiology and Behavior (BIOL 6303), Dynamics of Microbial Ecology (BIOL 6399), Critical Analysis in Cell Biology (BIOL 6401), and a new course in Ecology (BIOL 6xxx).

The remaining 8 SH of graded courses will be chosen by student and his or her advisor. Topics in Biochem/Cell (BIOL7383), Topics in Integrative Biology (BIOL7384), and graded Readings (BIOL8982) courses will "count" as graded courses. Rotations, Research, Thesis, Exam Preparation, Thesis, Dissertation, or any form of Continuation will NOT count as graded courses, as they do not carry, nor have they ever carried, a grade.

Students are encouraged to take Biology Colloquium (BIOL 5100) during each semester of graduate study.

Additional coursework, as needed, to total 30 SH.

Residency requirement: at least one year full-time graduate study on campus, Section II.D

Written qualifying examination, scheduled at the end of the second semester of the second year of study (earlier if entering with an M.S.) Note that student must ask faculty to serve on 4-person written examination committee, which is not necessarily identical to the dissertation committee. For details, see Section III.F.

Oral qualifying examination, scheduled within 6 months of completion of written examination

Sub requirements:

Ask faculty to serve on your oral examination/dissertation committee (Advisor + four scientists, the majority of whom are Biology department faculty members, and at least one of whom is outside of the Biology department, see form Ph.D.-5).

Submit form Ph.D.-4 to graduate committee (title of thesis and committee including CV any committee member from outside of the university).

Select a Chairperson specifically for the oral qualifying examination (a Biology faculty committee member who is not your advisor). Discuss format of examination with advisor and chairperson.



- Complete proposal according to format provided in section III.G.2 of this guidebook. Provide committee with proposal at least two weeks prior to examination date.
- Schedule oral examination date, upon consultation with advisor and remainder of committee. Arrange for location through appropriate Biology staff member.
- Bring form Ph.D.-6 (Results of Oral Examination). Upon completion of the exam forward signed form to Biology office to be placed in your file.
- Schedule annual committee meetings after you have passed your oral exam and submit form Ph.D.-7 (Confirmation of Annual Post Oral Exam Committee Meeting)

- Make satisfactory research progress (yearly review)**
- After first full year of study, present yearly short seminar, as assigned**
- Defend Ph.D. dissertation**
Sub requirements:
 - Schedule defense date, upon consultation with advisor and remainder of committee. Arrange for location through appropriate Biology staff member.
 - Deliver dissertation to each committee member at least 2 weeks prior to defense.
 - Post notice of defense in Biology department at least 2 weeks prior to defense
 - Two crucial forms to bring to your defense:
 - One appropriate signature page for Ph.D. dissertation (a sample is provided in A Guide To The Preparation And Submission Of Theses And Dissertations)
 - Form Ph.D.-8: Results of Ph.D. Defense (regular paper)
 - For preparation of the final copy of your thesis, and approval by the Graduate School, follow instructions provided in A Guide To The Preparation And Submission Of Theses And Dissertations (to download see Graduate School Of Science web page)
 - Commencement is optional. Deadlines and procedures are outlined in A Guide To The Preparation And Submission Of Theses And Dissertations

Some Important Graduate School Science Rules

1. Any determination by the Department that adequate progress towards a degree is not being made is grounds for termination.
2. Two consecutive semesters of QPA under 3.0 is grounds for termination.
3. Only two courses may be repeated and any one course can be repeated only once.
4. Failure to register for classes for one year may require reapplication.
5. Course credits earned in the program or accepted for transfer are valid for a maximum of seven years, unless an extension is granted by the Director of the Graduate School of Science.
6. The Ph.D. requirements must be completed within five years after candidacy is established.

III. MASTER OF SCIENCE (M.S.)

The M.S. program may be pursued on a part-time or full-time basis. Full-time students should plan to complete the program in two years. The thesis required for the M.S. may be fulfilled with either a research or literature thesis.

A) Advisor

An academic advisor is assigned to the M.S. student upon entering the program. The advisor is chosen according to the area of interest indicated in the student's application. The academic advisor will help the student design a course of study until a thesis advisor is chosen. A change of advisor must be reported in writing to the Graduate Coordinator (Form M.S.-1).

Students who do not have a committed thesis advisor in the first year are encouraged to enroll in Laboratory Rotation 1, BIOL 8420, and, if needed, Biology Laboratory Rotation 2, BIOL 8421. Students must have a thesis advisor by the end of the second semester of study. If the advisor differs from the initial academic advisor, this change must be communicated to the Graduate Coordinator using form M.S.-1.

B) Academic Requirements

1) For Master's Program Students

Students must complete 30 semester hours of graduate level coursework, 20 of which must be taken for a letter grade.

- a) 12 semester hours will consist of the following REQUIRED courses taken for a letter grade: BIOL 7382 Research Problem Solving, Scientific Writing and Communication (4 SH), and two out of following four discipline-specific courses: Neurobiology and Behavior (BIOL 6303), Dynamics of Microbial Ecology (BIOL 6399), Critical Analysis in Cell Biology (BIOL 6401), and a new course in Ecology (BIOL 6xxx).
- b) 8 or more semester hours will consist of approved BIOL 5000-level or higher graduate courses taken for a letter grade, with an option to petition the Graduate Committee for substitution of graduate courses from other departments. The following courses cannot be taken for a letter grade: Biology Colloquium (BIOL 5100), Biology Lab Rotation (BIOL 8420-8421), Master's Research (BIOL 8984), Full-time Master's Research (BIOL 8986), Doctoral Research (BIOL 9984), Thesis (BIOL 7990), Thesis Continuation (BIOL 7996), Dissertation (BIOL 9990), Dissertation Continuation (BIOL 9996), and other comparable research courses.
- c) 2 semester hours will consist of two semesters of Biology Colloquium (BIOL 5100) taken during the first two semesters of graduate study. Students are expected to attend Biology Colloquia thereafter.
- d) Requests for transfer credit should be sent to the Graduate Assistant accompanied by a course description, transcript, and official GSAS transfer credit form. The recommendations of the Graduate Coordinator will be forwarded to the Graduate School.

- 2) For full-time students continuous registration is required in the Fall and Spring semesters. After course work has been completed, this requirement is usually satisfied by registering for BIOL 7990, Thesis, followed by BIOL 7996, Thesis Continuation. If a student is unable to work toward their degree for a period of time, it is possible to request a Leave of Absence. A Request for Leave of Absence Form signed by the Graduate Coordinator must be submitted to the Graduate School of Arts and Sciences.
- 3) A cumulative average of 3.0 is required for the award of the M.S. degree. All regulations of the Graduate School of Arts and Sciences apply with regard to maintenance of academic standing. (See Graduate Regulations of the Graduate School of Arts & Sciences).

C) Graduate Student Presentations

All graduate students, beginning in their second year of study, will be required to give talks on a yearly or near-yearly basis.

- Seminar slots will be assigned on a rotating basis; each date will be shared by two students.
- Each talk should be no longer than 20 minutes, providing adequate time for questions and discussion.
- Students will be assigned a speaking date by the Graduate Committee. If that date is not acceptable, it is the student's responsibility to switch with another student. If a student trades speaking dates, s/he will inform the Graduate Committee of the switch.
- Students will also be required to make sure that at least two faculty members are present at their talk. Assuming the advisors attend, this will arise naturally from the shared format. All Faculty and graduate students are welcome and encouraged to attend.

D) Research

1) Thesis

The M.S. program involves laboratory and/or field research leading to the writing and oral defense of a thesis. The candidate is under the direction of a member of the graduate faculty and a committee of two (or more) other scientists. A qualified individual outside of the department may serve as a member of the committee or, if appropriate, as co-advisor. The majority of the committee must be department of biology faculty members. Thesis committee members external to the department must be approved by the Graduate Committee. An adjunct faculty member of the Department of Biology may serve as the co-advisor, but may not serve as the sole major advisor.

At least one initial thesis committee meeting, before the thesis proposal is signed and submitted to the Graduate Committee, and a final thesis defense are required. Additional meetings are highly recommended and

may be held as deemed necessary by the advisor or student.

The thesis proposal (format described below) must be submitted with Form M.S.-2 for approval by the Graduate Committee **no later than the end of the first semester of the second year of study**. Part-time students should submit the thesis proposal within the first 23 semester hours of study. Outside members' curriculum vitae must be submitted with the proposal. The Graduate Coordinator will notify the student and advisor of the Graduate Committee's approval of the proposal and of any committee members external to the department.

2) Thesis Proposal Format

The Master's thesis proposal should be organized according to the format given below. No specific length is required, but generally, the proposal will consist of 6 to 10 pages exclusive of the literature-cited section.

- a) **Title Page:** Title of the dissertation, the names of the student and advisor, and date of submission.
- b) **Abstract:** An abstract of a maximum of 300 words which summarizes all parts of the proposal, including: i) the broad area to which the research is relevant; ii) statement of hypotheses or questions to be addressed by the research; iii) summary of methods to be used; and iv) statement of expected contribution of the proposed research in context of the general field of study.
- c) **Body of the proposal:**
 - i) **Introduction:** brief background, rationale and significance of the project in relation to existing knowledge. Include a clear statement of the specific objectives and hypotheses to be tested.
 - ii) **Preliminary Data:** summary of data already obtained including its relevance to either the feasibility of planned experiments or the overall objectives of the project.
 - iii) **Research Plan:** detailed description of experiments designed to test the proposed hypotheses. Explain how the data will be collected, analyzed and interpreted. Discuss potential difficulties and limitations of the proposed plan.

Note: Experimental methods that have already been used by the student to generate data should be described under Preliminary Data. New methods to be used for proposed experiments should be incorporated into the Research Plan.
- d) **Literature cited:** Complete references with authors, year of publication, title, journal, volume and pages.
- e) **Timetable:** Outline of entry date, initiation of research and expected completion dates for the various portions of the project, including writing of the dissertation.

Once the dissertation proposal is approved by the thesis advisor, it should be provided to all members of the dissertation committee at least 2 weeks in advance of the date of the oral examination.

Upon approval, the Department is obligated to pay for the external committee member's expenses to attend the oral qualifying exam and the dissertation defense. Notice of a change in the outside member of the dissertation committee must be submitted to the Graduate Committee for approval.

Please also note, as described in section 1 above, that Form M.S.-2 must accompany the proposal, and that the required initial thesis committee meeting must have been held.

3) Thesis Defense

Use *A Guide to the Preparation and Submission of Theses and Dissertations* (http://www.northeastern.edu/casgraduate/commencement/thesis_guidelines/documents/thesis.pdf) for details regarding thesis preparation and approval.

The proposed final draft of the thesis should be delivered to each thesis committee member at least two weeks prior to the defense. Notice of the thesis defense also must be posted in the Biology Department at least two weeks prior to the defense. The defense is public. The results are transmitted to the Graduate Coordinator on Form M.S.-3. The defense consists of three parts: student presentation of the work; public questions from non-committee members; and, after dismissal of the public, questions from committee members. All members must be present for the defense. See section VIII.C for details regarding the presentation of the thesis.

4) Thesis Work Conducted In Off-Campus Laboratories

With the approval of the Graduate Committee, thesis work may be done in a laboratory external to the University. The following criteria for the off-campus lab must be satisfied.

- a) Independent, original research by the student is required.
- b) Research may be conducted in an off-campus facility only when on-campus facilities are inadequate for the project. There must be a mutual agreement among the student, person in charge of the external facility and the student's N.U. thesis advisor.
- c) The off-campus supervisor must be on the thesis committee. As with all thesis committee members, that individual is expected to attend thesis committee meetings.
- d) The entire thesis committee is responsible for acceptance of the thesis proposal.
- e) The student is responsible for progress reports to the on-campus thesis advisor.
- f) The student must be listed as an author on any publication of the thesis work. The student's address must be listed as the Department of Biology, Northeastern University, Boston, MA 02115.

- g)** The Graduate Coordinator must receive, with the thesis proposal, a letter from the student and off-campus advisor, that agrees to the above conditions and includes the following:
- i)** Student's name
 - ii)** Title of thesis project
 - iii)** Name and affiliation of person in charge of laboratory
 - iv)** Location of laboratory where thesis research will be performed
 - v)** Research Support: facilities, equipment and supplies.
 - (1)** Off-campus: Are these from a grant or contract source? If so, is there a terminal date for the support?
 - (2)** N.U. Biology Department: What if any is required?
 - vi)** Access to facilities: When and under what circumstances may the student use the off-campus facilities to work on this research?
 - vii)** Employment status: Is the student employed by the off-campus supervisor or institution? If so, will the student be reimbursed for services rendered while working on the thesis? To what extent will the student be engaged in thesis work during regular working hours?

E) M.S. Literature Thesis

A literature thesis involves extensive literature research leading to a comprehensive and critical written review of a significant biological problem and an oral examination on the thesis. The regulations for the structure of the thesis committee, the organization and submission of the thesis proposal, and the requirements of the thesis defense are the same as for the Research Thesis.



Choose advisor

You will be assigned an advisor upon entering the program. If your assigned advisor does not turn out to be your thesis advisor, use Form M.S.-1 to officially change your advisor.

Complete coursework (30 semester hours)

Specific course requirements:

20 semester hours: Twenty semester hours of Biology graduate courses (or approved graduate courses from another department) carrying a letter grade. 12 semester hours will consist of the following REQUIRED 4 SH courses taken for a letter grade: BIOL 7399 Research Problem Solving, Ethics, and Communication Skills, and two out of the following four discipline-specific courses: Neurobiology and Behavior (BIOL 6303), Dynamics of Microbial Ecology (BIOL 6399), Critical Analysis in Cell Biology (BIOL 6401), and a new course in Ecology (BIOL 6xxx).

One 4-SH Research Ethics and Communication Skills course, offered annually, starting Spring 2011. Note that, for PhD and research MS students, this 4 SH course will replace the 2 SH Ethics class (BIOL6381), which will nonetheless continue to be offered for our current research students and P.S.M. students.

The remaining 8 SH of graded courses will be chosen by student and his or her advisor. Topics in Biochem/Cell (BIOL7383), Topics in Integrative Biology (BIOL7384), and graded Readings (BIOL8982) courses will “count” as graded courses. Rotations, Research, Thesis, Exam Preparation, Thesis, Dissertation, or any form of Continuation will NOT count as graded courses, as they do not carry, nor have they ever carried, a grade.

Students are encouraged to take Biology Colloquium (BIOL 5100) during each semester of graduate study.

Additional coursework, as needed, to total 30 SH.

Complete research or literature thesis proposal by end of first semester of second year of full-time study, or within first 23 semester hours of part-time study.

Sub requirements:

Ask faculty to serve on your committee (Advisor + two or more scientists, the majority of whom are Biology department faculty members)

Complete proposal according to format provided in section IV.C.2 of this guidebook. Include CV of any outside member.

Arrange for initial thesis committee meeting at which thesis proposal is discussed and approved. Committee must sign M.S.-2: Petition for approval of M.S. Thesis Proposal

Forward signed M.S.-2 and copy of proposal, to Graduate Committee for final approval

Make satisfactory research progress (yearly review)

After first full year of study, present yearly short seminar, as assigned



Defend M.S. thesis

Sub requirements:

- Schedule defense date, upon consultation with advisor and remainder of committee. Arrange for location through appropriate Biology staff member.
- Deliver thesis to each committee member at least 2 weeks prior to defense.
- Post notice of defense in Biology department at least 2 weeks prior to defense
- Two crucial forms to bring to your defense:
 - One appropriate signature page for M.S. thesis (a sample is provided in A Guide To The Preparation And Submission Of Theses And Dissertations)
 - Form M.S.-3: Results of M.S. Thesis Defense
- For preparation of the final copy of your thesis, and approval by the Graduate School, follow instructions provided in A Guide To The Preparation And Submission Of Theses And Dissertations (to download see Graduate School Of Arts And Sciences web page)
- Commencement is optional. Deadlines and procedures are outlined in A Guide To The Preparation And Submission Of Theses And Dissertations

IV. PROFESSIONAL SCIENCE MASTER'S DEGREES

The Department of Biology participates in two interdisciplinary professional master's degree programs: Bioinformatics and Biotechnology. These programs consist of three parts: core courses, elective courses and internships. The department also offers a professional master's degree program in Marine Biology.

- A) **THE PSM IN BIOINFORMATICS AND COMPUTATIONAL MOLECULAR BIOLOGY** is offered by the Department of Biology of the College of Arts and Science, the College of Computer and Informational Sciences, and the Bouvé College of Health Sciences. For more information, please contact the administrative assistant for the program (gradbio@neu.edu, ext. 2262).

- B) **THE MULTITRACK PSM IN BIOTECHNOLOGY** is offered by the Department of Biology of the College of Arts and Science, the College of Engineering, and the Bouve College of Health Sciences. For more information, please contact the Program Director (gradbiotech@neu.edu, ext. 2627).

- C) **THE PSM IN MARINE BIOLOGY** is offered by the Department of Biology of the College of Arts and Sciences. For more information, please contact the program director (www.marinebioms.neu.edu, 781-581-7370, ext. 311).

V. FINANCIAL SUPPORT

A) Eligibility

All full-time students enrolled in the Ph.D. and M.S. programs of the Department of Biology are eligible to be considered for financial support. Awards are made after consideration of the documents accompanying the application, the number of awards available, and the candidate's teaching or research experience. Students in residence who did not initially receive an award may be eligible for support at a later time.

As noted in the Graduate School of Arts and Sciences Catalogue, all students who hold assistantships and research fellowships are expected to devote full-time to their studies and the duties of the award. Pay and duties begin on the first day of orientation week of the each semester and run through the last day of finals week or until all assigned duties are completed. A student taking a course may not assist as a teaching assistant in the same course at the same time.

B) Categories

Financial support is available through the following categories:

- 1) Teaching Assistantship (TA)
- 2) Tuition Assistantship (Graduate School Scholarship, GSS)
- 3) Research Assistantship (RA).

Individual faculty with research grants may provide support for Research Assistants. In addition, a limited number of departmental RAs are available each summer and are generally awarded to eligible Ph.D. students as part of their initial award.

C) Departmental Policies Regarding Teaching Assistantships

Appointment or reappointment to a teaching assistantship depends upon:

- 1) **Total number of available assistantships:** The Department is limited in the number of TA positions it can offer.
- 2) **Full-time status:** A TA must be full-time (Appendix I).
- 3) **Academic Standing:**
 - a) Provisional students are not eligible for TA or NUTA appointments.
 - b) A QPA of at least 3.0 for all graduate credits.
 - c) Completion of at least half (i.e. 15 S.H.) of the required graduate credits by the end of the second semester (except students entering with a Master's Degree).
 - d) All proposal and examination deadlines must be met and when appropriate, research progress must be acceptable.

- 4) **Specialized teaching needs:** In many of the Department's courses, teaching is facilitated by previous training in certain special fields. Numerically, needs for T.A.s are greatest in introductory biology, human anatomy and physiology, and microbiology. Certain smaller courses may be more demanding of special training (e.g., biochemistry, mammalogy, ecology). For students with comparable academic merit, a strong background in one of the special areas may be decisive in the award of a teaching assistantship. Input from the faculty member teaching a course is considered.
- 5) **Previous Performance as T.A.:** The faculty member responsible for each laboratory course is requested to evaluate the T.A.'s performance in that course. In addition, the support staff, including the Assistant Laboratory Supervisors, are requested to evaluate the performance of each T.A. who has worked in their areas. The Graduate Committee reviews these evaluations (Form M.S.-4/Ph.D.-10) as it makes reappointment decisions.
- 6) **English as a Second Language Students:** International students are eligible for teaching assistantships (which require both excellent English skills and familiarity with the American academic system). The English skills of international students are evaluated as part of the International Teaching Assistant Orientation Program run by the Northeastern University English Language Center. When T.A. awards are made to new or continuing international students, they are required to participate in two programs run by the Northeastern University English Language Center: (1) the International Teaching Assistant Orientation which takes place during the two weeks before the Fall semester and, (2) the Listening and Speaking Workshop for at least one semester. This workshop is available each semester (except summer) and is tuition-free for full-time students. Depending on their evaluation, students may be required to take English as a Second Language (ESL) courses.

D) Time Limits on Reappointment of Teaching Assistantships

- 1) **Ph.D. Students:** Doctoral students are considered high priority for reappointment for five years if they entered the Ph.D. program with a B.S. or B.A. degree or for four years if they entered with a Master's degree.
- 2) **Master's Time Limitation:** Master's students are considered high priority for reappointment for the equivalent of two years of full-time study.

E) Professional Meetings

Funds are available to defray a portion of registration and travel expenses for students delivering papers at professional meetings. As these funds are limited, students should apply as soon they know their travel plans. Applications (Form M.S. 6/Ph.D.-10) should be made through the Department Chairperson.

VI. PROCEDURES FOR TRANSFER BETWEEN PROGRAMS IN BIOLOGY

A candidate for the M.S. degree may apply for transfer to the Ph.D. program after 15 semester hours of full-time study. This application must include the application form, an up-to-date transcript of courses taken since admission to the Master's Program, and 3 letters of reference. Two letters must come from faculty members at Northeastern. One of the reference letters must be from the student's proposed doctoral dissertation advisor, and must indicate agreement to supervise the Ph.D. dissertation. The request for transfer will be considered by the Admissions subcommittee of the Graduate Committee along with other applications to the Ph.D. program.

A doctoral student who does not currently hold a master's degree in a biological science may apply for transfer to the M.S. program by petitioning the graduate coordinator in writing.

A Ph.D. candidate in good standing, who has successfully completed the qualifying examination (both written and oral portions), and completed the 30 semester hours of course and research credit required under III.B. with at least a 3.000 cumulative average, may apply to receive the M.S. degree without submitting a thesis. Students entering with a Master's degree are not eligible for this option.

VII. STUDENT'S RECORDS, GRADES, AND EVALUATION

A) Graduate Student Folders

All correspondence relevant to a student's program must be copied and placed in the student's folder (i.e. permanent record) in the Department's office. This includes the various forms.

B) Grading of Research and Seminars

The grades of S, U, or I are the only grades to be given in Ph.D. Dissertation (BIOL 9990), Thesis (BIOL 7990), Master's Research (BIOL 8984), Full-time Master's Research (BIOL 8986), Doctoral Research (BIOL 9984), Full-time Doctoral Research (BIOL 8984), Biology Laboratory Rotation (BIOL 8420 - 8421), Thesis Continuation (BIOL 7996) or Dissertation Continuation (BIOL 9996). In Seminar courses, faculty have the discretion of deciding, at the beginning of a seminar, whether to assign A-F grades or S/U grades. However, there shall be no mixing of the two grading systems in the same seminar.

C) Minimum Q.P.A.

Graduate students are required to maintain a 3.000 QPA for graduation and to be eligible for financial aid. QPA values are assigned as follows:

A = 4.0; A- = 3.667; B+ = 3.333; B = 3.000; B- = 2.667; C+ = 2.333; C = 2.000; C- = 1.667; F = 0

If after 15 semester hours of course work a student's QPA is less than 3.0, s/he will be released from the program.

D) Grade of Incomplete

An incomplete may be given to students who fail to complete course work. The faculty member must complete an incomplete grade contract with the student. The "I" will be changed to a letter grade when the deficiency that led to the "I" is filled to the satisfaction of and in the manner determined by the course's instructor. The period for clearing an "I" is restricted to one calendar year from the date that it is first recorded on the student's permanent record.

E) Clearing Entry Course Requirements

Entry course requirements must be cleared during the first 15 semester hours of graduate credit. Failure to clear requirements may be grounds for release from the program.

F) Annual Review

All graduate students' records will be reviewed by the Graduate Committee each year. This review will consider the students' performance, including QPA, status of thesis proposal and/or research, and will be considered by the Graduate Committee for appropriate action. Criteria for this review are given on Form M.S.-5/Ph.D.-11. A student who is not making satisfactory progress toward degree requirements may be released from the program.

G) Time Limits

Students in either degree program desiring an extension should formally petition the Graduate Committee. If the committee recommends the extension, the Graduate Coordinator will notify the Dean's office of this recommendation and forward the petition to the Director of Graduate Studies.

- 1) **Ph.D.** After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of degree requirements.
- 2) **Master's Degree.** Course credits earned in the program or accepted by transfer are valid for a maximum of seven years.

VIII. THESIS/DISSERTATION: OBLIGATIONS OF COMMITTEE, ADVISOR, AND STUDENT

A) Advisor

- 1)** Faculty members have a general obligation to serve as academic and thesis advisors but each retains an absolute right of refusal regarding any particular student. Appropriate grounds for refusal are described in Section B-1 below.
- 2)** The faculty member should agree to serve as the thesis advisor only after considering the feasibility of the project. Feasibility is decided on a variety of criteria including: time available; availability of materials and equipment; methods; conceptual design, including possible failure of portions of the research plan and alternate routes of exploration; space; advisor's own experience in the area and availability of experienced committee help; educational value to the student and contribution to scientific knowledge; and, the student's background (if insufficient, can deficiencies be remedied in time?).
- 3)** A thesis/dissertation advisor should confer with a student regarding the committee's composition. Under some circumstances the advisor may suggest the addition of a member beyond the required number (3 for M.S., 5 for Ph.D).
- 4)** A thesis/dissertation advisor is required to convene at least two meetings and should offer to convene one more as follows:
 - a)** The M.S. thesis committee must meet to approve the thesis proposal. The Ph.D. dissertation committee must meet for the Ph.D. proposal defense (oral qualifying exam).
 - b)** Ph.D. candidates must meet with their committees on a yearly basis after completion of the Oral Exam (form Ph.D.-7). M.S. candidates should also meet with their committees after significant progress has been made but while there is still time to modify some of the research. Committee meetings should include a report of the candidate's achievements, problems, and objectives. Likewise, the candidate should be made aware of the committee members' expectations before they will accept the thesis/dissertation. Significant deviations from this understanding may require another intermediate committee meeting. While calling a committee meeting is the responsibility of the advisor, this does not relieve the student of the responsibility of asking for a meeting to be convened.
 - c)** The final meeting is a defense of the thesis/dissertation. Each committee member will have a proposed final draft of the thesis/dissertation for at least two weeks prior to the defense.
- 5)** Finally, the thesis/dissertation advisor is to aid the student in the production and publication of appropriate parts of the thesis/dissertation and to encourage presentations of ongoing or finished work at meetings of scientific societies.

B) Committee Members

- 1) Faculty members have a general obligation to serve on thesis committees, but the faculty member has absolute right of refusal regarding any particular committee. Appropriate grounds for refusal may be:
 - a) Inadequate background to serve on a committee;
 - b) A disagreement regarding feasibility or other aspects of the proposal that cannot be resolved;
 - c) A disagreement between the student and the advisor regarding whether or not the faculty member is appropriate;
 - d) An upcoming sabbatical;
 - e) Membership on too many thesis/dissertation committees.
- 2) A committee member is obligated to attend and join in planning at thesis/dissertation committee meetings, render advice, and read and render advice concerning the written thesis/dissertation and attend and vote at the final defense of thesis/dissertation.
- 3) Under rare circumstances, disagreement about the research may become so severe that a member may withdraw from a committee. However, withdrawal near the time of defense should be avoided.

C) Student

- 1) To pursue research with honesty and vigor.
- 2) To pursue the thesis/dissertation committee for advice as needed.
- 3) To inform the advisor promptly when problems arise.
- 4) To make appropriate progress in program.
- 5) To provide the advisor with the first draft of a thesis/dissertation that has been proofread.
- 6) To provide a final revised draft to each member of the committee at least two weeks prior to the defense.
- 7) To present a defense of thesis/dissertation involving a public presentation with appropriate visual aids. This presentation should not exceed one hour. Even if the candidate passes the defense, changes in the thesis/dissertation may be required before acceptance. At least four final copies of thesis/dissertation are produced. An original draft, on thesis paper, goes to the Graduate School of Arts and Sciences, presented in a sturdy container, without staples or hole punches. A draft on thesis paper also goes to the department, either professionally bound or presented in a black, spring-clip binder. Finally, one draft goes to the advisor and one draft is retained by the student. As a matter of courtesy, the student may wish to provide a copy for each committee member.
- 8) To make prompt efforts to publish appropriate parts of the thesis.

D) Other Faculty

Graduate students should feel that they can go to any faculty member for advice concerning their research (e.g., regarding experimental design, method or analysis).

E) Committee Voting at the Defense

1) Satisfactory defense of the thesis/dissertation is defined by the delivery and defense of the thesis as adjudged by a simple majority of the committee.

The discussion and vote is taken in private after the defense and questioning is completed. All members of the committee must be present for the defense.

2) Unsatisfactory defense: In such a case, the committee must decide the following:

a) Whether to request another defense of the same thesis/dissertation.

b) Whether to require further research. (Normally, the intermediate meeting would have addressed this issue.)

3) Second Unsatisfactory defense - After two unsatisfactory defenses, the student will be released from the program. However, a Ph.D. candidate may be eligible, upon application, to receive an M.S. in Biology.

APPENDIX I: DEFINITIONS

A. Full-time Status

A graduate student is considered to be full-time if enrolled in a minimum of 8 semester hours of credit with the following exceptions:

- 1) Students who hold Teaching Assistantships or Research Assistantships are considered full-time if enrolled for a minimum of 6 semester hours of credit.
- 2) Students enrolled in Full-time Research, Exam Preparation, Doctoral Dissertation, Thesis Continuation, or Dissertation Continuation are considered full-time students.
- 3) Students could possibly enroll in fewer credits during the summer semester and/or their last semester. Please contact the Biology Administrative Assistant to determine the current procedure.

B. Semester Hours

Credit hours are assigned to a course based on the established educational standard that one credit hour is equal to approximately three hours of student learning time per week over a period of a quarter, semester, or term, usually one hour of lecture or discussion, plus two hours of individual study outside of class. When individual study is involved as in Directing Reading or Laboratory Rotation, each hour of credit should represent at least three hours of student work per week.

APPENDIX II: UNIVERSITY POLICIES

Antidiscrimination Policy

Northeastern University is committed to a policy of equal opportunity for all students and employees without regard to race, color, religion, sex, sexual preference, national origin, handicap, or veteran status. The University prohibits discrimination in all matters involving admission, registration, and all official relationships with students, including evaluation of academic performance.

Equal Opportunity Employment Policy

Northeastern University is an equal opportunity employer. It is institutional policy that there shall be no discrimination against any employee or applicant for employment because of race, color, religion, sex, age, national origin, handicap, or veteran status.

Northeastern University also prohibits discrimination against any employee regarding upgrading, demotion or transfer, layoff or termination, rates of pay or other forms of compensation, and selection for training. In addition, Northeastern adheres to Affirmative Action guidelines in all recruitment endeavors.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states. Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators.

Delivery of Services

The University assumes no liability, and hereby expressly negates the same, for failure to provide or delay in providing educational or related services or facilities or for any other failure or delay in performance arising out of or due to causes beyond the reasonable control of the University, which causes include, without limitation, power failure, fire, strikes by University employees or others, damage by the elements and acts of public authorities. The University will, however, exert reasonable efforts, when in its judgment it is appropriate to do so, to provide comparable or substantially equivalent services, facilities or performance, but its inability or failure to do so shall not subject it to liability.

Precedence Statement

The Graduate Programs Guidebook (M.S., Ph.D.) should be used in conjunction with the *Student Handbook*, the *Basic Day Colleges Course Description and Curriculum Guide*, *Cooperative Education Handbooks* and the *Northeastern University Bulletin*. Where differences exist between this Guidebook and those publications, please note that the *Bulletin*, *Curriculum Guide*, and *Handbooks* take precedence.

Northeastern University International Mission Statement

Northeastern University, a world leader in cooperative education, acknowledges the increasing interdependence among nations, and, therefore, identifies its mission as preparing its graduates to live and work in an interdependent world. To accomplish this goal, Northeastern University actively seeks qualified students from abroad to enroll in its undergraduate and graduate programs in such numbers and with such geographic origins so as to create and foster a truly global exchange of ideas and values among

students, faculty, and staff. The University also encourages all colleges to continually develop and expand course offerings to include international issues and cross-cultural aspects and supports faculty to teach and conduct research in the interrelationship among nations and peoples. In addition, the University promotes international understanding and the sharing of ideas with institutions throughout the world by virtue of faculty and staff exchanges and study and work abroad programs for students.

APPENDIX III: DEPARTMENTAL FORMS

(THESE FORMS MAY BE PHOTOCOPIED AND USED OR COPIES MAY BE OBTAINED FROM THE GRADUATE STAFF ASSISTANTS. PLEASE NOTE THAT THE GRADUATE SCHOOL FORMS NEEDED FOR THESIS OR DISSERTATION SUBMISSION TO THE LIBRARY ARE ONLY AVAILABLE IN THE GUIDE TO THESIS AND DISSERTATION SUBMISSION AS EXPLAINED IN SECTIONS II.H.3 AND III.D.3.)



M.S.-1: Change of Academic Advisor

TO: _____, Graduate Coordinator

FROM: _____, Graduate Student

DATE: _____

This is to notify you that my academic advisor has been changed:

FROM: _____

TO: _____

My previous academic advisor has been notified of the change.

My thesis advisor is (Check One):

Same as new academic advisor

Not yet determined

My current local address, phone number and email address are:

Street Address 1: _____

Street Address 2: _____

City: _____ **State:** _____ **Zip Code:** _____

Phone Number: _____ **Cell Number:** _____

E-mail Address: _____

(Use Northeastern E-mail only)

SIGNATURES

Student: _____

New Academic Advisor: _____



M.S.-2: PETITION FOR APPROVAL OF M.S. THESIS PROPOSAL

TO: _____, Graduate Coordinator

FROM: _____, Thesis Advisor

DATE: _____
(Date of Initial Thesis Committee Meeting at which the Proposal was Approved)

M.S. Student's Name: _____

Type of Thesis (Check One): **Research** **Literature**

Title of Proposed Thesis: _____

Proposed Committee (with signature indicating approval of proposal):

	Name (Type or Print)	Signature
Thesis Advisor:	_____	_____
	_____	_____
	_____	_____
	_____	_____

Action of the Graduate Committee (Check One): **Approved** **Not Approved**

Comments: _____

Signature of Graduate Coordinator

Date



M.S.-3: RESULTS OF M.S. THESIS DEFENSE

TO: _____, Graduate Coordinator

FROM: _____, Thesis Advisor

DATE: _____
(Date of Thesis Defense)

M.S. Student's Name: _____

Type of Thesis (Check One): Research Literature

Title of Thesis: _____

The result of the oral defense is: Passed Failed

Committee Signatures:

Name (Type or Print)

Signature

Thesis Advisor: _____



M.S.-4/Ph.D.-9: T. A. EVALUATION FORMS, page 1 of 2

Name of TA: _____

Date: _____

Term: _____ Course Number: _____

Course Name: _____

Rate how well this TA has met expectations.

(1 = has not met expectations, 2 = has met expectations, 3 = has exceeded expectations, Do not circle anything if unknown or not applicable)

Attendance and Punctuality			
Attends all assigned lab sections	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Attends all TA meetings	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Attends all his/her office hours	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Is on time for all assigned lab sections	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Is on time for all TA meetings	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Is on time for office hours	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Lab execution			
Is adequately prepared	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Completes all parts of each lab exercise	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Uses time effectively and efficiently	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Engages students on a face-to-face basis during lab	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Leaves the lab clean upon completion	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Attitude			
Has a good attitude towards teaching	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Has a good attitude towards students	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Communication			
Speaks clearly	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Organized	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Responds to student questions	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Makes an effort to find the answer to question if he/she does not know	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Responds to supervisor requests	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Grading			
Assigns grades fairly	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Returns graded assignments promptly	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Overall effectiveness			

TA Signature: _____

Supervisor Signature: _____



M.S.-4/Ph.D.-10: T. A. EVALUATION FORM (Mid-Term Eval.), p. 2 of 2

Name of TA: _____

Date: _____

Term: _____ Course Number: _____

Course Name: _____

Part I - Supervisor Comments:

What has this TA done well this term?

Please list any areas in which this TA needs to show improvement. Include suggestions as to how this improvement could be accomplished.

Part II – Self Evaluation:

How much time on average do you spend per week doing each of the following:

Preparing for lab _____

Grading (outside of office hours) _____

Meeting with students outside of lab or office hours _____

How would you assess your teaching effectiveness at this point of the term? Feel free to include responses to your supervisor's comments.



M.S.-5/Ph.D.-11: CRITERIA FOR GRADUATE STUDENT PROGRESS

As described in Section VII.F, there is a bi-yearly review of all graduate students. The following checklists for student progress are used in these reviews.

M.S.

1. 3.0 QPA is required at all times for financial aid; 3.0 QPA must be attained by 15 SH to remain in the program.
2. The research or literature thesis proposal must be submitted by the end of the first semester of the second year of full-time study or within the first 23 SH of part-time study.
3. Research progress must be evaluated by the research advisor as at least satisfactory.

Ph.D.

1. 3.0 QPA is required at all times for financial aid; 3.0 QPA must be attained by 15 SH to remain in the program.
2. The Graduate Committee must receive a letter of commitment from the proposed research advisor by the end of the third semester of study.
3. The written qualifying examination must be taken by the end of the first semester of the third year (entered with B.S.) or by the end of the first semester of the second year (entered with M.S. or transferred from the M.S. program).
4. The oral qualifying examination must be taken within six months of passing the written qualifying examination.
5. Research progress must be evaluated by the research advisor as at least satisfactory.

Some Important Graduate School of Arts and Sciences Rules

1. Any determination by the Department that adequate progress towards a degree is not being made is grounds for termination.
2. Two consecutive semesters of QPA under 3.0 is grounds for termination.
3. Only two courses may be repeated and any one course can be repeated only once.
4. Failure to register for classes for one year may require reapplication.
5. Course credits earned in the program or accepted for transfer are valid for a maximum of seven years, unless an extension is granted by the Director of the Graduate School of Arts and Sciences.
6. The Ph.D. requirements must be completed within five years after candidacy is established.



M.S.-6/Ph.D.-12: APPLICATION FOR TRAVEL AWARD

TO: _____, **Department Chairperson**

FROM: _____, **Graduate Student**

DATE: _____

I would like to apply for funds to support my travel to the following scientific meeting:

At this meeting I will be presenting a paper/poster entitled:

Advisor's Endorsement:

I support the request outlined above.

(advisor's signature)



Ph.D.-1: IDENTIFICATION OF EXAMINERS FOR THE WRITTEN EXAM

TO: _____, Chair, Written Qualifying Exam Committee

FROM: _____, Graduate Student

DATE: _____

I am scheduled to take the written qualifying examination during Spring Semester of

_____.

I have obtained the consent of the following four Biology faculty members to serve as written examiners: (type or print names)

Advisor: _____

For students who would like to include an outside examiner (outside department or outside the university) and have already obtained that person's consent to serve, please provide the following information:

Name: _____

Position/Title: _____

Department & University/Institution: _____

Mailing Address: _____

Telephone: _____

E-Mail Address: _____

Qualifications to Serve as Written Examiner: (attach comments on a separate sheet)

COMPUTER AVAILABILITY

I would like a computer to be made available for word processing.

SIGNATURES:

Student **E-mail:** _____ **phone:** _____

Advisor **E-mail:** _____ **phone:** _____



Ph.D.-2: SCHEDULE FOR WRITTEN QUALIFYING EXAMINATION

TO: _____, Graduate Student

FROM: _____, Chair, Written Qualifying Exam Committee

DATE: _____

You are scheduled to take the Ph.D. Written Qualifying examination this spring. You will be informed of the precise schedule approximately 2 weeks prior to the week of the examination. Computer access will be provided if you have requested that a computer be made available for you to take your exam.

To prepare for the written examination, you have received 8 original research articles that were approved by the Qualifying Examination Committee. You will be tested for your comprehensive understanding of these 8 articles.

cc: Ph.D. Written Qualifying Exam Committee
Graduate Coordinator



Ph.D.-3: RESULTS OF WRITTEN QUALIFYING EXAMINATION

TO: _____, Graduate Coordinator

FROM: _____, Chair, Written Qualifying Exam Committee

DATE: _____
(Date of Initial Thesis Committee Meeting at which the Proposal was Approved)

Ms./Mr. _____ has been examined regarding qualifications for the Ph.D. Program. The following action has been taken:

- Successful completion. No recommendations
- Successful completion with supplementary requirements
- Unsuccessful completion with remedial requirements and re-examination.
- Unsuccessful completion with termination of study

Specific recommendations:

Signatures of Ph.D. Written Qualifying Examination Committee:

(Chairperson)

(Date)



Ph.D.-4: PETITION FOR APPROVAL OF Ph.D. DISSERTATION TOPIC AND COMMITTEE

TO: _____, Graduate Coordinator

FROM: _____, Graduate Student

DATE: _____

Title of Proposed Dissertation: _____

Proposed Committee (signature indicates receipt of an abstract of the proposal and willingness to serve on the committee):

	Name (Type or Print)	Signature
Chairperson:	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Please attach:

1. A title page and abstract of the dissertation proposal;
2. The Curriculum Vita of the committee member from outside the university.

Action of the Graduate Committee (Check One): **Approved** **Not Approved**

Comments: _____

Signature of Graduate Coordinator

Date



Ph.D.-5: LETTER TO OUTSIDE COMMITTEE MEMBER

Date

Address, line 1

Address, line 2

Address, line 3

Dear Dr. ____:

On behalf of the Department of Biology at Northeastern University, I would like to thank you for agreeing to serve as member of _____'s Ph.D. dissertation committee. Your contribution to the training and evaluation of this student is an important component of the degree program. We appreciate the contribution of your time and expertise and hope that you will find the experience enjoyable.

Please find enclosed information regarding the Ph.D. qualifying exam, dissertation committee, and dissertation defense. If you have any questions, please feel free to contact me.

Sincerely,

Advisor

Phone

e-mail



Ph.D.-6: RESULTS OF ORAL QUALIFYING EXAM

TO: _____, Graduate Coordinator

FROM: _____, Chair for the oral qualifying exam

DATE: _____
(Date of Oral Qualifying Exam)

Ms./Mr. _____ has been examined regarding his/her ability to pursue the proposed Ph.D. dissertation. The following action has been taken:

- Successful completion. No recommendations
- Successful completion with recommendations
- Unsuccessful completion with recommendations and re-examination.
- Unsuccessful completion with termination of study

Specific recommendations:

Signatures of Ph.D. Oral Qualifying Examination Committee:

(Chairperson)

(Date)

For successful completion with recommendations:

- No revisions to the proposal are required
- Revisions are required; advisor is required to certify once revisions are complete

A final version of the dissertation proposal incorporating the committee's recommendations has been satisfactorily completed and has been submitted to the Biology Office.

Dissertation Advisor



Ph.D.-7: Confirmation of Annual Post-Oral Exam Committee Meeting

TO: _____, Graduate Coordinator

FROM: _____, Thesis Advisor

DATE: _____
(Date of Meeting)

Ph.D. Student's Name: _____

Title of Proposed Dissertation: _____

Committee (with signature indicating approval of proposal):

	Name (Type or Print)	Signature
Thesis Advisor:	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Comments: _____



Ph.D.-8: RESULTS OF Ph.D. DISSERTATION DEFENSE

TO: _____, Graduate Coordinator

FROM: _____, Graduate Student

DATE: _____
(Date of Dissertation Defense)

Ph.D. Student's Name: _____

Title of Dissertation: _____

The result of the oral defense is: Passed Failed

Signatures:

Name (Type or Print)

Signature

Dissertation Advisor: _____

This guidebook was updated in Fall 2011.