

Biology Graduate Program Handbook

University of Vermont

2019

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PREFACE

Welcome! You are joining the Graduate Program in the Department of Biology. Our Program has excellent students like you, world-class faculty for advisors, and superb staff. We will work with you to design a set of courses, a research project and other activities that will prepare you for your career choice: academic teaching and research, medical institution research, biotechnology, private sector research, government work are only some of the possibilities. No matter what your choice is, we will help you to develop as a research scientist who knows how to write and think critically, and express yourself effectively. We will also help you to network and find the right position for your next step, whether it is postdoctoral training, industry, teaching position, or something else. All of our graduate students learn to teach undergraduates, and we will help you develop your teaching skills, which will serve you well even if teaching is not your ultimate career goal. Our graduates are very successful and we expect that you will be as well.

In today's science community, you must be flexible and broadly trained, as well as very expert in several technologies and sub-disciplines. As part of your training, you are required to attend the department's Monday seminar series to insure that you are aware of the broad discipline of Biology; and BioLunch, in order to be part of a narrower group and hear about cutting edge topics that will help you to develop depth in your interest area. These meetings also help you to think and analyze data, as you first listen to faculty and more senior students debate about data, and then eventually take part in this debate yourself.

We want all of you to attend regional, national and international conferences, publish your research and develop your track record as a productive scientist. This handbook includes information on how some of this can be funded.

Graduate Students are an important part of the Department of Biology. We appreciate your contribution to undergraduate research, to the research program of our faculty, and to the quality and liveliness of the department as a whole. There are several committees within the department. The two committees most closely related to your graduate education are the Advisory Council, consisting of the department Chair, three faculty members and one graduate student; and the Graduate Affairs Committee with three faculty and a graduate student representative. You will also have a Studies Committee overseeing your graduate education. This handbook is meant to help you navigate your way through the first year, and know what to expect as you progress through your program.

I. General Information

New graduate students should go to the Biology Department office, Room 120A Marsh Life Sciences Building. Here you will be welcomed and shown your mailbox. In the office you will be provided with information on how to set up your UVM email account, information on parking permits, obtaining keys, and how to obtain your UVM ID "Cat Card". The department administrative assistant will need information on your local address, phone, etc. If you are a Teaching Assistant, information regarding your teaching assignments should be in your mailbox. Other important information for new and continuing graduate students is described below.

1. Diagnostic Examination – The Biology Department requires that all new M.S. and Ph.D. students take a diagnostic examination on **the Monday of the week before classes begin**. The results will be used in making teaching assignments; however, this examination is NOT punitive or pass/no pass! Its purpose is to assess the student's background for adequate strength in at least 4 of 8 areas of biology: cell biology, biochemistry, genetics, and physiology for students studying cell/molecular/behavioral biology and for those students studying ecology or evolution: statistics & philosophy of science, population ecology, community ecology, macroevolution, population genetics and general genetics.

The exams will be answered in long hand and without aid of other materials.

After the exam, during the week before classes begin: Answers will be reviewed by discipline-specific faculty committees and the chairs of the committees will convey in writing the opinions of the committees to the department Chair and the student's academic advisor. The exam summaries will be accompanied by a list of potential options for how the student might make up deficiencies apparent from the exam to assist the Advisory Council and advisors. Records of Diagnostic Exams and resulting actions will go into your file and be given to you and to the advisor. Before the start of classes, students will meet with faculty members of department's Advisory Council to discuss the results and to establish the procedure for making up deficiencies identified by the examination.

The Chair will use the results and the recommendations to determine immediate and future teaching assignments. The student's advisor will use the information for immediate course selection and, in the future with the Studies Committee, determine how deficiencies would be remediated. All plans for addressing the diagnostic exam results must be approved by the Chair.

2. Advising and Registration for Classes - On the Friday before classes begin, you will meet with your Advisor, to review any teaching assignments, review your background in biology and the results of the diagnostic examinations. The Advisor will help you to decide on choice of courses based on your research interests and diagnostic exam results. You will receive a letter from the Chair based on your Advisor's recommendations. You will register for courses on the web after your Advisory Council or Advisor review on Friday before classes begin

A Graduate College Orientation will be held during the first week of class. For more information, please contact them at 656-3160.

3. Teaching Assignments - If you are a Teaching Assistant for a course, you will be asked to meet with the course coordinator during the week before classes begin. You will receive a letter with details about this meeting in your mailbox.

After you have worked out your class schedule and your teaching schedule, a copy of your schedule should go to the department administrative assistant.

4. Salary - You will receive your first academic year paycheck in mid-September and your last on May 30. You will be paid twice a month. Registering for courses will generate your bill for fees, which are deducted from your first paycheck. If you are paid from a grant, you may have to pay tuition from the funds provided from the grant. In this case, you should work out a payment schedule with the Student Financial Services.

Your summer salary is paid from advisors' funds. The department Business Manager works with the faculty members and arranges for these funds to be paid to you and knows the schedule of checks over the summer.

For additional information about what bills will come out of your first paycheck, call the Student Accounting Office

at 221 Waterman Building at 656-3170.

5. Maintenance of Good Standing – Students will report on their progress each semester in response to a questionnaire from the Graduate Affairs Committee. The Graduate Affairs Committee will review the files of each graduate student each year, to determine whether adequate progress is being made toward completion of requirements and research progress. At the end of each academic year, the Advisory Council will notify students of uncorrected deficiencies.

6. Advisor, Studies Committee and Dissertation/Thesis Defense Committee – Ecology/Evolution students generally are admitted to the department only when an advisor has agreed to sponsor him/her. Some cell/molecular biology students do lab rotations in their first year, as a prelude to choosing an advisor, but often enter the program with an advisor identified. To change your advisor, you need to confer with the Chair of the Graduate Affairs Committee and get the approval of the Department Chair and your new advisor.

By the end of the first year, your advisor will recommend a Studies Committee of faculty who are members of the University Graduate College to the Biology Department Chair who then transmits the names to the Graduate College. It is the responsibility of the committee to supervise the student's program (which must also have the approval of the department Chair and the Dean of the Graduate College), to review the student's progress at least annually, and thus to determine whether the student is making adequate progress and should be retained in the program.

For PhD students, the Dissertation Defense committee consists of at least one faculty member from outside the department and at least two members from within the department for a total of four (or more). For M.S. students, the Thesis Defense Committee consists of three Graduate College faculty members; two from the department and one from another department. These committees are recommended to the Department Chair and formally appointed by the Graduate Dean. The member from outside the department serves as chair. The date time and place for the dissertation defense must be submitted to the Graduate College Dean at least 3 weeks in advance of defense

7. Residence Requirement and Grades – The Biology Department abides by the requirements of the Graduate College, which calls for 21 credits in graded graduate level courses for the M.S. degree and 51 hours for the Ph.D. degree to be taken at the University of Vermont. See the Graduate College Catalogue for policies on transfer credit. These requirements should not be confused with the total required course and research credits for PhD and MS students.

The Graduate College policy on grades, stated simply, requires maintaining at least a B average in courses applicable to the degree. There is no foreign language requirement for the M.S. or Ph.D. degree programs.

8. Committee Meeting – At least once per year, the student will arrange a formal meeting with their advisor and other members of their Studies Committee. The purpose of this meeting is to review the student's course work *and research progress and completion of degree requirements and to discuss proposed research in the upcoming year*. You should provide the Studies Committee with a written progress report and ideally present at Biolunch before the committee meeting each year. This way the Studies Committee will have been able to read the student's proposal and listen to the presentation before meeting to discuss the work. After the meeting, the student and advisor will write up a summary of the meeting, which will include any particular requirements by the committee for research or course work. This summary will be distributed to the Studies Committee and to the student and will become part of the student's file. Early meetings are recommended so that modifications to proposed plans can be approved and so that the student's research progresses smoothly.

9. Teaching Requirement – The Graduate College requires each degree candidate to acquire appropriate teaching experience as determined by the department concerned. This is satisfied in the Biology Department by participation in teaching at least one semester in the laboratory or discussion session of an undergraduate-level course.

Teaching Assistants can expect to receive help in their teaching techniques from the faculty member in charge of their laboratory sections. In addition, their faculty supervisors will prepare an evaluation of teaching performance. Summaries of these evaluations will be maintained in the graduate student's file and are available for inspection by the Teaching Assistant, the advisor, and the appropriate department committees. Each

semester, the Advisory Council will evaluate all students who hold a teaching fellowship. Funding may be discontinued if teaching performance or academic progress is not deemed satisfactory.

10. **Plagiarism – Plagiarism is copying words or a figure from another source without quotation. This is a very serious offence and can lead to dismissal from the University. You must write everything in your own words - not by taking a phrase, sentence or paragraph from a book, web site or paper and copying it and also not by changing a word or two. This is paraphrasing and is a form of plagiarism. You MUST learn to take notes and then write your papers in your own words, even if they are not as nice as those you have seen in print or on the web.**

It is also necessary that when you write something in your own words and you learned the information from a source, that you reference the source. There are standard scientific writing manuals, and we will ask you to purchase one of these for your future reference. If you have any doubt about plagiarism, consult your advisor or more senior graduate students for advice.

11. BioLunch and Biology Department Seminar - All students are required to attend BioLunch each week. Registration and how BioLunch credits count toward the required credits are described in Table 1.

Graduate students are required to attend the departmental seminars. The Biology Department brings active investigators to campus to present formal seminars and to talk informally with students and faculty. This provides the student with a chance to network and hear about ongoing research, often before the study appears in the literature. There are several other departments that have their own seminar series, which are frequently of interest to Biology students. See This Week @ UVM and the bulletin board outside the department office for postings.

12. Scientific Integrity All students are required to take a course in scientific integrity. If no courses are scheduled at the time, a student may fulfill the requirement with an on-line course, such as the one below. If a different on-line course is taken, the Studies Committee should approve it.

INSTRUCTIONS FOR THE CITI RCR COURSE

It is recommended that you complete RCR training as soon as possible while working on your NSF supported research project. Training in the Responsible Conduct of Research provides instruction on conducting research activities with excellence and integrity and is an essential element in preparation for a career in science or engineering. This training is best completed as soon as possible so that it may be of benefit to you while you conduct research on the project and so that UVM remains compliant with the federal requirement of the sponsor, the National Science Foundation.

Students and Postdoctoral Scholars should go to
<https://www.citiprogram.org/> Choose to "Log in via SSO" (single sign on) and find the link for the University of Vermont. Login using the UVM NetID and password.

Go through the registration process and choose the Responsible Conduct of Research Basic Course. DO NOT choose the Refresher course - it will not satisfy the NSF requirement.

The course allows for users to save their work and come back to it later. It will take several hours to complete.

Please contact Hilda Alajajian with any questions.
Hilda.Alajajian@uvm.edu
656-1322

13. Responsibility – It is the joint responsibility of the student and the advisor to see that all requirements are

completed fully and on time so that no oversight delays a student's graduation. **However, final responsibility falls on the student to see that all requirements are met and in a timely manner.**

14. **Conflict Resolution** – Graduate Students have resources within the department to help resolve conflicts with advisors. The Graduate Affairs Committee Chairs will meet confidentially with students who wish to discuss their disagreements with advisors about issues ranging widely from data ownership to publication deadlines to personal issues.

Disagreements about course selection and the direction and progress of research should first be discussed with the student's Studies Committee. If these issues cannot be resolved by the Studies Committee, they should be taken to the Graduate Affairs Committee. Because the Graduate Affairs Committee has two chairs, it is unlikely that both will be involved in the conflict, so that at least one can serve as an independent sounding board and arbiter.

The department Chair also provides an avenue for graduate students to discuss problems, but we encourage you to contact the Committee Chairs first. The Graduate College can also play a role in conflict resolution, but expects the Department to first attempt to bring about an agreement.

15. **Reporting on Progress** - The department staff will ask you to enter your data into a database two to three times per year. Enter details of your graduate course work, research and Studies Committee meetings. The Graduate Affairs Committee uses the database to track your progress.

16. **Miscellaneous Responsibilities** – Students are responsible for contacting the Graduate College (656-2699) to get on **GRAD NET**. You must remain in close contact with the Graduate College in order to ensure all paperwork is complete and all requirements are met for graduation. **Again, this is the responsibility of the student.**

17. **English as a Second Language** – All international students will take an exam given by the Graduate College to assess your needs for remedial work in English. It is very important that you communicate well as a scientist, to your students, in your classes, and through written reports and publications. The Graduate College usually provides a course in English as a Second Language, which you should count on taking in the fall of your first year. After that, you and your advisor should continue to work on your English language skills.

18. **Data Ownership** - An important issue in your research is the ownership and availability of data you collect as a graduate student. Ownership of data should be established early-on in your work, and you should have a discussion with your advisor, who will provide details on data ownership procedures in a particular laboratory. It is the responsibility of the faculty advisor to make a clear policy of data ownership known to the students.

18. **Travel to Professional Meetings** - The Department strongly encourages graduate students to attend national and regional scientific meetings and to make oral presentations or present posters at these meetings. There are three mechanisms of funding for meetings from the University:

Graduate College: "Mini" grants: These awards cover travel and other expenses, are available on a competitive basis and are matched by the Department. See the Graduate College webpage for details.

The Ronald Suiter Award: This award is designed to help defray costs of attending conferences, seminars, workshops, etc., by undergraduate and graduate students in the College of Arts and Sciences at the University of Vermont. For more information go to:

<http://www.uvm.edu/artsandsciences/foruvmsstudents/research/?Page=suiter.html&SM=fundingsub.html>

Department of Biology: If you plan to attend a meeting, send a brief letter to the Department Chairperson describing the meeting (time, place, etc.) and your proposed participation in it. Preference will be given to students who are presenting papers or posters. As is the case for faculty travel, reimbursement requests must be made within 10 days of return and is for travel expenses and registration, but not for meals or lodging. We will attempt to pay round-trip air fare at the lowest rate or gasoline and tolls. In some cases, students' travel to meetings may also be supported by their faculty advisors.

20. **Participation in Department Governance** - The University of Vermont and the Biology Department will attempt to provide as many opportunities as possible for expression of opinions by graduate students and for direct involvement in decision making. A graduate student representative serves on the Biology Department Chair and on the Graduate Affairs Committee. Students participate in the choice of seminar speakers and in the running of the seminar program.

If a student feels a particular administrative or academic decision was inappropriate, an appeal may be directed to the Department Chair, the Chair of the Graduate Affairs Committee, or the graduate student elected Advisory Council Member. Recourse to higher administrative levels requires only prior notification to the chairperson.

21. Toward the end of your training - Most International Students are required to be enrolled full time (9 credits) to comply with immigration regulations. Students who are US citizens or Permanent Residents who have completed all credits required for the degree, but have not completed all graduation requirements (e.g., incomplete grades, comprehensive examination, completion and defense of thesis or dissertation), must enroll each semester for Continuous Registration (GRAD 901-903) and pay a Continuous Registration fee each semester until all degree requirements are completed. See the Graduate College webpage for details. Please request the Chair of the Biology Graduate Program to give you an over-ride to register for these courses.

II. DEGREE PROGRAMS

The Biology Department offers programs leading to the degrees of Master of Science (M.S.; including Accelerated Master's Program, AMP, students), Doctor of Philosophy (Ph.D.), and Master of Science in Teaching (MST). General Graduate College requirements for these programs can be found from the Graduate College webpage. In addition, there are specific departmental requirements that are explained on the following pages. **It is the responsibility of the student to know and adhere to both.**

A. REQUIREMENTS FOR M.S. (including AMP) and Ph.D. PROGRAMS:

1. Coursework including Colloquia – Coursework requirements are outlined in Table 1. Ph.D. students are required to take a minimum of 75 credits, at least 30 of which are from courses that give a letter grade. There is a minimum requirement of 6 colloquia, one of which must be Scientific Integrity BIOL 371 or an equivalent course approved by the Studies Committee. The colloquia count toward the 30 course credits and toward the 75 total if they bear grades. If they are graded S/US they count toward the total 75 but not toward the 30 course credits.

M.S. students must complete 30 credits at a minimum, 15 of which are in courses that give letter grades. M.S. students are required to take 4 colloquia that count toward the 15 course credits and 30 total credits if they bear a grade. If they are graded S/US, they do not count toward the 30 total.

Transfer credits can count toward the total credits, but not toward the 30 (Ph.D.) or 15 (M.S.) course credits unless they bear grades. The Studies Committee must approve the courses to be transferred. See the Graduate College Catalog for more details:

<http://catalogue.uvm.edu/graduate/academicenrollment/transfercredit/#numberofcredits>

2. Acceptance to Candidacy – All Biology M.S. students who are admitted to the Graduate College and have taken the diagnostic exam are admitted to candidacy for the degree. Ph.D. students are admitted to candidacy when deficiencies in course prerequisites and those identified by the diagnostic examination are corrected, and exam, course, and residence requirements are completed. The student is notified in writing and should be certain that he or she understands clearly what requirements must be met in order to be accepted to candidacy. The advisor should notify the Graduate College and the Department as these requirements are fulfilled.

3. Thesis or Dissertation – The M.S. degree requires a thesis and the Ph.D. a dissertation, which is the formal written report of the research done for the degree. The student may choose to write this in the traditional format or use an alternate format that compiles manuscripts prepared for journal publication. (See Graduate College website for details.)

The style and format of a thesis are relatively standardized. It is recommended that you become familiar with the Style Manual for Biological Journals, 3rd edition (1972), published by the Conference of Biological Editors of the American Institute of Biological Sciences. In addition, the Graduate Faculty have adopted specific rules which are given in "Guidelines for Thesis Writing," available in the Graduate College Dean's Office. Every graduate student should have one for reference.

Before the defense, a format check is required by the Graduate College. Deadlines are available from the Graduate College website. (Earlier deadlines, however, may be specified by the Department.)

Once the thesis defense is passed, the student should sign up for Grad 399 (MS) or 499 (PhD).

4. Approved Thesis or Dissertation – The original and copies, signed by the Committee, with necessary corrections made, should be delivered to the Graduate College Dean's Office. Deadline dates are available from the Graduate College website.

Binding of the approved thesis or dissertation will be done by the Graduate College. Bound copies of a Master's thesis are given to the library (original), the department, and to the advisor. Bound copies of the Doctoral dissertation are given to the library (original and one copy), the department, and the advisor.

5. Comprehensive Exam for PhD only (Research Proposal and Defense) During Year 2 (no later than the end of the spring semester) a written proposal and proposal defense are required.

The student will prepare for the Studies Committee a formal research proposal, 5-10 pages in length, in the format of a standard NSF proposal or NIH R01 application. The student may sign up for a special 3-credit writing course to receive course credit while preparing the proposal. The major advisor will advise and help the student prepare the proposal, and will give approval for submitting the proposal to the rest of the committee, but the proposal must represent original writing by the student. Each committee member of the Studies Committee will independently evaluate and grade (pass/fail) the written proposal.

The oral exam will begin with a 15 minute "chalk talk" (no PowerPoint or computer presentation will be allowed) in which the student explains and defends the proposed research. The oral exam will begin with questions about the research talk, but can freely cover other specific and general topics.

Students can consult with their committee on suggestions for reading and coverage, but the intent of the exam is to test the student for the knowledge they have accumulated during the first two years of the program, not to reflect their ability to cram and study during an intensive test preparation.

Separate pass and fail grades will be assigned to both the written and oral parts of the exam. A record of the examination shall be included in each student's file. The committee can ask the student to repeat either or both parts of the exam, or to undertake additional coursework or writing to address deficiencies from either the written or oral part of the exam. Students who do not successfully pass the exam on a second try will not be eligible to continue in the PhD Program in Biology and may be dismissed from the graduate program. **It is the student's responsibility to ensure these deadlines are met.**

6. Comprehensive Examination – The M.S. and AMP comprehensive examinations are designed to determine whether or not the student has acquired the necessary background and competence appropriate to the field of specialization. The comprehensive examination for the M.S. student must be taken by the end of the second year. The exam for the AMP student must be taken by the end of the second semester of the first and only graduate academic year. A record of the examination shall be included in each student's file.

The examination will cover broad knowledge of the student's discipline. The details and format of the examination are decided upon by the Studies Committee and will be discussed with the student well in advance of the exam. Students should meet with Studies Committee members to discuss their expectations and the format of the comprehensive examination. Typically, about one month in advance, each Studies Committee member will suggest key words that the student should read about to prepare for the examination. The student's research should not come to a grinding halt while they prepare for the comprehensive examination.

The Studies Committee will collectively decide whether the student has passed or failed the exam. Students who fail portions of the exam may be asked to retake those portions. A student who fails this or fails the comprehensive examination outright may be required to retake the entire exam. If, following the second exam, the Studies Committee feels the student does not have sufficient knowledge or adequate communication skills, a student will be dismissed from the program.

In the case of inadequate examination answers, the student may be asked to study the material and demonstrate his/her knowledge on an oral examination to be given by the Studies Committee. If the result of the examination is an outright failure, it must be retaken before the end of the next semester. Failure on the retake will result in dismissal from the graduate program. **It is the student's responsibility to ensure these deadlines are met.**

7. Oral Presentations - to develop your presentation skills, you are required to make several presentations.

BioLunch Presentation. During the first four years of the program, doctoral students will present a research talk each year at BioLunch. M.S. students will make two presentations. Presentations should be on their research projects. AMP students are not required to make presentations, but they must attend.

Departmental Seminar. *Doctoral students only*. During the student's final semester, the student will be invited to present a seminar during the Biology Department's regular seminar series. This seminar is in the typical format of the department's Monday seminars, which should be tailored to a general audience of biologists.

8. Colloquia - The Department offers graduate colloquia (BIOL371 - 379) on various topics of interest to students and particular faculty members. The topics are announced at the time of pre-enrollment. The colloquia carry 1

credit each. Students in the M.S. and Ph.D. programs are required to take four and six colloquia respectively during the course of their programs. Students may also enroll in colloquia offered by other academic units but should consult their advisors before doing so.

For the semester in which a student makes a presentation in BioLunch, and attends this lunch meeting group each week, s/he should register for 1 credit. Over time, students may count up to 1 or 2 credits of BioLunch toward the colloquium requirements for M.S. or Ph.D. students respectively.

9. Admission of AMP students: The Accelerated Master's Program (AMP) allows upper division UVM Biology, Zoology, Neuroscience, or Environmental Science B.S. majors to obtain a master's degree with typically only one additional year of study beyond the bachelor's degree. AMP students are eligible to apply to the program in their junior year of undergraduate study, for admission in their senior year. Students are strongly encouraged to apply in the fall semester of their junior year. The admissions criteria are similar to those for regular graduate students. Although we do not maintain strict cutoffs, we look for GRE scores typically in the upper half of students taking the exam, an undergraduate GPA typically above 3.1 with a GPA in biology courses above 3.3. We also require a focused, well-written statement of purpose, strong letters of recommendation from our faculty, and interest and willingness on the part of a particular faculty member to serve as an advisor.

In the junior year, the prospective AMP student will also select 6 credits of coursework that will count towards both the bachelor's degree and the MS. These courses must be taken AFTER the student has applied and been accepted into the program, typically in the fall and spring of the senior year. The courses come from an approved list in the catalog. <http://catalogue.uvm.edu/graduate/biology/biologyamp/>. Beyond these six double-counted credits, an additional graduate-level course—taken before the bachelor's degree is completed—may be used for the master's, provided the course does not also count toward the bachelor's degree. In all cases, students must be admitted by the Graduate College before taking any courses that will apply to the master's degree, i.e., all courses used for the master's degree must be taken after formal admission to the AMP. AMP students may not receive fellowship or assistantship funding prior to completion of the bachelor's degree.

To apply for the AMP use the general application form for the Masters Program at UVM:
<https://www.applyweb.com/uvmg/menu.html> Also, click on this [LINK](#) to fill in the Accelerated Master's Degree Permission Form.

B. REQUIREMENTS FOR M.S.T.

1. Acceptance into the Program – Applications to these programs are reviewed by the Advisory Council with respect to grade point average, graduate record examination scores, and letters of recommendation. If the Council recommends acceptance of the applicant, the Department Chairperson or his/her delegate is designated the advisor. M.S.T. students are usually accepted to candidacy at the time of admission to the program.
2. Advisor and Studies Committee – The M.S.T. students have co-advisors from the Biology and the Plant Biology departments. The advisor(s) should appoint an additional faculty member, who, together with the advisor(s) will constitute a Studies Committee. For M.S.T. students, the Committee member from outside the department will serve as Chair. It is the responsibility of the Committee to supervise the student's program and to review progress regularly. It is also the Committee's responsibility to evaluate the student's work and to determine whether he/she should be retained in the program.
3. Residence Requirement and Grades – The Biology Department abides by the minimum residence requirements of the Graduate College, which call for 21 hours of graduate credit with at least a B average for the M.S.T. degree to be taken in residence.
4. Certification Requirement – MST students are required to hold teaching certification before admission to the graduate college.
5. Comprehensive Examination –The Biology portion of examinations are taken before the end of the second year of the student's MST program, and are designed to determine whether or not the student has gained, from reading and courses, the appropriate formal background knowledge and facility in integrating material. See MS program for description of the masters level exam.

The examinations are prepared by the Studies Committee. For the M.S.T., a written examination must be completed. Only one reexamination is allowed for the comprehensive or part thereof.
6. Thesis committee and Defense of Thesis: The student will organize a thesis committee of 3 faculty, including the advisor(s). One member must be from outside the department (s). All faculty must be members of the Graduate College. The committee will evaluate the oral defense and written thesis.
7. Responsibility – It is the joint responsibility of the student and the advisor(s) to see that all requirements are completed fully and on time so that no oversight delays a student's graduation. Final responsibility falls on the **student** to see that **all** requirements are met.
8. Colloquia - MST students are not required to, but may take colloquia, which count as credits toward the required 30 credits for the degree, BioLunch, taken for a grade, may count toward the course requirements.

III. FELLOWSHIPS, FINANCIAL AID and HEALTH INSURANCE

Teaching Assistants are appointed by the Dean of the Graduate College on recommendation of the Department Chairperson and Advisory Council. A Teaching Assistant is expected to handle responsibilities in the course or courses to which they are assigned with a maximum of 20 hours per week . Those assigned to introductory courses normally teach 2 laboratory sections, attend prep sessions and lectures, and help proctor and grade examinations. Those assigned to more advanced courses may have more varied responsibilities. Teaching assignments depend largely on the student's previous course background and the needs of the department.

Teaching Assistants can expect to receive help in their teaching techniques from the faculty member in charge of the course to which they are assigned. In addition, their faculty supervisors will prepare an evaluation of teaching performance. Summaries of these evaluations will be maintained in the graduate student's file and are available for inspection by the Teaching Assistant, the advisor, and the appropriate department committees. Each semester, Teaching Assistants will be evaluated by the Graduate Affairs Committee. Funding may be discontinued if teaching performance or academic progress is not deemed satisfactory.

Graduate Research Assistants are supported by faculty research grants. The particular responsibilities and term of appointment vary with the requirements of the source of funds. However, appointments can be for a calendar year, a single semester, or a summer (particularly if the student has a Teaching Assistantship for the academic year).

Graduate Research Assistants who are supported by Training Grants are required to teach two semesters during their graduate career. Progress will be evaluated as for Teaching Assistants.

Fellowship Grants: Students are encouraged to compete for national graduate fellowships, such as those made available by the National Science Foundation, the Smithsonian Institution, and the Grass Foundation. Information on these fellowships are be available in the office of the Graduate College and the Department.

Students should not expect support beyond the normal time of completion of the degree, namely, 2–3 years for an M.S. and five years for a Ph.D. However, the Graduate College emphasizes that MS students should receive no more than four semesters of TA support and PhD students eight semesters. We encourage the support of students on research funds and independent fellowships. Our goal is to support our students through combination of teaching and research assistantships for their entire graduate training period, and we generally meet that goal.

Dealing with FICA: Here is how to minimize FICA taxes:

- a. *Teaching or Research Assistants who will be done with all course work by the following summer:* Signing up as a “continuing graduate student” for the summer. You will then be a student and not have to pay FICA.
- b. *Teaching Assistants who are not yet finished with courses:* If you are returning for the next academic year, you can sign up for 6 credits in the summer, and spread out your other credits the next academic year. That is, your credits are available to you on a summer/fall/spring schedule (your credits for any academic year are available for the summer before that academic year). Your summer credits are free if you do it this way. You would thus be a student in the summer and not have to pay FICA.

For tax purposes, it is best if you sign up for 6 credits in the summer, 9 in the fall semester, and 9 in the spring semester. However, most International Students are required to be enrolled full time (9 credits) to comply with immigration regulations.

Credits on Grants: Graduate students funded on research grants and contracts are an important resource for the University's overall research efforts. The work that they do on sponsored projects not only advances project goals, but it frequently provides the basis for the student's individual thesis or dissertation. Recognizing the dual purposes of the research, the University provides tuition scholarship support to students funded on research grants and contracts.

Graduate students are eligible for a tuition scholarship for thesis/dissertation research credits or for the

continuous registration fee only during those semesters (including summer session) for which they are supported as Graduated Assistants on research grants and contracts awarded to and administered by UVM. To receive the scholarship, minimum stipend support levels and enrollment requirements must be met. For more details please go to: http://www.uvm.edu/~gradcoll/pdf/Research_Credit_Policy.pdf

Health Insurance: Health Insurance is mandatory at the University of Vermont. Each year you need to complete a form to either:

- a) purchase the University of Vermont Sponsored Health Insurance or,
- b) decline/waive participation in the sponsored health insurance by identifying comparable coverage which is currently in force with another insurance company.

International students must participate in the sponsored health insurance policy.

For additional information on health fees and insurance, please call 802-656-0602 or visit
<http://www.uvm.edu/~chwb/insurance/>.

Table 1: Degree Requirements for Biology Graduate Program

	MS	PhD
Minimum total credits	30	75
Minimum course credits that bear letter grade	15	30
Balance of research credits (Bio 391 or 491 usually)	15	45
Colloquium requirement -		
Colloquia total required as 1 credit courses	4	6
One colloquium must be on Scientific Integrity unless a course on the topic has been taken	1	1
BioLunch that may count as Colloquia	1	2
Colloquia if graded (not S/US) will count toward the 15 MS or 30 PhD course credits - otherwise they count toward the total 30 credits for MS or 75 for PhD		
BioLunch and Seminar Requirements (0-1 credits each semester) - must be graded to count toward the 15 MS or 30 PhD course credits	Every semester	Every Semester

APPENDIX USEFUL INFORMATION

A. THE MARSH LIFE SCIENCES BUILDING (MLS):

Your Catcard gives you access to the Building. Ask Mark Biercevicz (Rm 120A MLS) to set up access.

Keys to laboratories will be issued to research personnel and teaching assistants. Be certain you do not use your key to admit someone who is not entitled to enter the building/laboratory. Lock your research laboratories, classrooms, teaching laboratories, and offices before you leave the building. When using common rooms, be sure to lock them when you finish. It is your responsibility to return your key when you leave the University or if you have no further need for it.

MLS houses a Computer Room (Rm 003). You may use it when it is not being used for a class. Ask the office for the room key code.

Fire doors should not be propped open except when moving large items through them.

UVM is a No-Smoking institution. No smoking is allowed within 25 feet of a building.

B. THE DEPARTMENT OFFICE

1. Office Supplies – Paper and departmental supplies are available in the Department Office (Rm 120A) for teaching needs.
2. Copying Services – The department maintains a copy machine, located in Rm 130 MLS. Graduate students who need to photocopy for teaching and/or research may use this machine using an appropriate account number. In addition, the department assigns individual account numbers to each graduate student for personal photocopying. Each month, a bill is sent to the student for their photocopying charge
3. Mail – Mail boxes for graduate students are located in Rm 120A MLS.

C. JOURNALS AND THE LIBRARIES:

The University of Vermont libraries provide a sufficient base to begin the literature review for your thesis or dissertation. Journals that are primarily zoological, botanical, environmental or evolutionary tend to be found in the Bailey-Howe Library, while journals which are primarily physiological, biochemical, or cellular are more likely to be found in the Dana (Medical) Library. Both libraries have copier facilities and are quite prompt in requesting interlibrary loans for material not at UVM. Please note: Dana Library charges students for interlibrary loans while the Bailey-Howe Library does not. **Electronic holdings of journals can be accessed by computer if you are a registered student.**

D. SUPPLIES AND EQUIPMENT:

1. Supplies for Research and Teaching – A stockroom is maintained in Rm 004 MLS for the convenience of teaching and research personnel. The stockroom is open during regular hours as posted. Materials can be obtained from the stockroom only with a proper budget number. Stockroom purchases should only be made with the knowledge and approval of your research advisor or teaching supervisor.

The stockroom currently carries freezer programs and dry-good products from Fisher, Krackler, Invitrogen, Sigma, Amersham, NewEngland Biolabs, USA Scientific, Perkin Elmer and others. These freezer programs provide the researcher with convenient access to purchasing a wide variety of Molecular biology/cell culture and Molecular genetics media.

For materials not available through the stockroom or not provided by your research advisor, a *purchase*

credit card, issued to someone with budget authority in your lab, will be required. When you order with a UVM credit card, the course coordinator or lab supervisor should receive copies of all receipts, invoices and the packing slip after you check the contents.

Under no circumstances should material be borrowed from another laboratory without the permission of the person in charge.

2. Computer Facilities – Graduate students may use the computer lab (Rm 003 MLS) including the printers that can be remotely accessed.

Research laboratories have computers whose use is determined by the laboratory director. These are generally networked for access to UVM networks and the internet. Students may apply for a free University computer account for use high performance computers.

3. Graduate Student Research Expenses – The need for supplies or equipment to perform graduate student research projects varies with the particular research problem. The University of Vermont can provide only limited direct financial support for these projects. Each year, the Department budgets a small amount for incidental research needs. If the thesis project you choose requires additional funds, those funds are usually obtained from research grants.

Faculty members are encouraged to apply for institutional grants, federal, state and private grants and contracts to support the graduate student research of their laboratories. Graduate students are urged to apply for those grant funds for which they are eligible, such as Graduate College Mini-Grants, NSF-Doctoral Dissertation grants, Sigma Xi-RESA research awards, and the special funds from the Smithsonian Institution and American Museum of Natural History. A directory of appropriate funding agencies is kept in the Department office. The Office of Sponsored Programs is ready to assist graduate students in locating appropriate funding sources and produces a special issue of their newsletter to assist students.

4. Research Equipment – Some research instruments are housed in special rooms, such as rooms 011 and 005, while others are in individual faculty research laboratories. In most cases, the equipment is available for graduate student use, and students should feel free to ask permission to learn to use any piece of equipment or facility appropriate to their research. Under no circumstances should graduate students use an instrument without proper instruction and permission of the faculty member in charge.

E. CHEMICAL RIGHT TO KNOW AND LABORATORY SAFETY

All students must take a risk management class in laboratory safety. The class can be accessed on line. Laboratory safety, whether in a research setting or in the teaching laboratories requires an understanding not only of the risks involved but also of Safety and Health Administration regulations (OSHA) and with VOSHA, the Vermont counterpart. This is particularly true with regard to the "right to know" about chemicals. Information about all available chemicals in a laboratory must be readily available to all users of that laboratory. For your safety, and others in your teaching or research laboratory, you are expected to attend a Chemical Safety Training Session (arranged for you by a lab coordinator).

The first necessity for laboratory safety is a desire on the part of the individual, whether teacher or student, for protection of one's associates as well as for self-protection. The second is to have a clear set of rules of procedure and conduct for general situations and also for each specific circumstance.

It is the responsibility of a person conducting a teaching laboratory to convey these attitudes and rules to the students under her/his supervision. In a research laboratory this responsibility lies not only with the person who supervises the laboratory but equally with each of the independent investigators who make use of the facilities. All graduate students either teaching or working in a research laboratory must take a lab safety course and pass a written test.

Possible hazards in the laboratory include the following:

- Improper storage of chemicals
- Improper disposal of chemicals
- Uninformed use of toxic, flammable, and explosive reagents
- Faulty or careless techniques
- Faulty handling of equipment
- Lack of proper room or fume hood ventilation
- Failure to use safety equipment or protective clothing
- Burns from flames, chemicals or hot glassware; freezing; UV irradiation
- Electrical shock
- Radiation exposure
- Delayed first aid treatment
- Inattention, fooling around, failure to follow established rules

A set of general rules should include:

- **Do not eat, drink, or smoke in the laboratory.**
- Use proper laboratory conduct yourself, and require the same of your co-workers.
- Know how to contact help in an emergency. Dial 911 – This number is on the faceplate of each telephone.
- Know the location and proper use of fire extinguishers, showers, eyewashes, first aid supplies, and fire exits.
- Observe all established protocol and recommendations; state and enforce rules for your students which are appropriate for each laboratory that you teach.
- Use, and require your students to use, eye protection, protective clothing, and protective equipment as recommended. Confine long hair and loose clothing before working in a laboratory.
- Know and convey to your students the flammability, reactivity, corrosiveness, toxicity and other hazards of chemicals you are using.
- Do not work alone with potentially dangerous chemicals and equipment; do not allow students to work in the laboratory without adequate supervision.
- Use the fume hood when handling chemicals that are toxic, irritating or highly reactive. Check the hood airflow before using, and at least daily when in constant use.
- Check the room ventilation frequently.
- Keep the work area clear of excess chemicals and equipment.
- Thoroughly understand the equipment you are using.
- Do not leave equipment running unattended.
- Do not pour chemicals down the sink drain.

Know and use the proper storage and handling for chemicals. Waste chemicals should be properly stored, and disposed of promptly at the next hazardous waste pickup. (The University picks up and disposes of hazardous wastes about four times a year.)

The Federal Chemical Right-to-Know Law focuses on the employee and requires:

- 1) availability in the laboratory of Chemical Safety Data Sheets for each chemical used in that laboratory;
- 2) labeling of all hazardous chemical containers;
- 3) training for all employees, and 4) a written compliance plan for the University.

The Vermont Chemical Right-to-Know Law focuses on the community. It requires that the University have an inventory of all chemicals used on campus and a file of Safety Data Sheets for each of those chemicals. This file must be readily available to anyone in the community and particularly to firefighters and rescue personnel.

The University carries out Right-to-Know compliance through the Risk Management office. Ralph Stuart is the coordinator for Chemical Right-to-Know. He conducts training sessions for employees as needed. In the Life Science Building, each lab keeps the chemical inventory list and updates the orange book of Safety Data Sheets as new chemicals are added. You will find an orange loose-leaf book in each laboratory.

Hazardous situations which are not being properly addressed should be reported to Mark Biercevicz, the Biology Department Lab Research Technician and Safety Coordinator (Rm 120A MLS, 656-8394). Every effort will be made to take corrective action.

F. Learning Goals for Graduate Students (Assessment Matrix)

1. Students will be capable of novel, independent and sustained contributions of new knowledge
2. Students will be capable of communicating professionally through oral presentations and writing.
3. Students will be effective teachers

Website and/or other avenues by which these are readily available to students, prospective students, and faculty:
www.uvm.edu/~biology

<i>Measure</i>	<i>Goal 1</i>	<i>Goal 2</i>	<i>Goal 3</i>	<i>Use of the information</i>
1. diagnostic exam	X			Chair and advisor use information to determine course and teaching assignments
2. Proposal exam	X	X		Advisor and studies committee will determine whether the student can form hypotheses and is ready to proceed with research and needs direction in writing
3. Written Comprehensive	X	X		Advisor and studies committee determine if the student has the mastery of content and scientific reasoning to proceed
4. Annual meeting with Studies Committee	X	X	X	Determines whether the student is "on track" for finishing courses, learning writing and oral expression skills, developing as a scientist. Remediation and intermediate benchmarks are set if the student is not on track.
5. Data base reviewed by Graduate Affairs Committee	X	X	X	Review the student record relative to the benchmarks for the MS, AMP or PhD students each year and determines whether the student is maturing as a scientist and succeeding as a teacher. Remediation is recommended for any deficiencies.
6. Reviews of teaching by instructor and students			X	The chair receives the Instructors' and student evaluations of the TA. If remediation is needed, the advisor and Graduate Affairs Committee are informed and a remediation plan is designed. The advisor and Graduate Affairs Committee are responsible for follow up.
7 and 8: Seminar and public defense of thesis	X	X		The faculty and studies committee hear the seminar and defense. The thesis is also evaluated separately. The student cannot graduate until both the oral defense and the thesis are adequate.
9. Exit Survey	X	X		The survey will be reviewed by the Chair and Graduate Affairs Committee. The results inform the department about the program's effectiveness but there is no consequence for the student.
Student exit	X	X	X	As above.

<i>Measure</i>	<i>Goal 1</i>	<i>Goal 2</i>	<i>Goal 3</i>	<i>Use of the information</i>
<i>survey</i>				

G. Progress Report (example)