

**Handbook for
Graduate Studies in
Biological Sciences**

Updated August 2018



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OVERVIEW

The Department of Biological Sciences offers three graduate programs of study:

- PhD program provides training for students interested in taking leadership positions in academic institutions and/or the biotech industry.
- MS program provides training in research skills for students who have not had previous research experience and/or wish to assume laboratory management positions.
- MA program introduces students to advanced topics in biological sciences, preparing students for successful careers in health professions, government agencies, and education.

WHO'S WHO IN THE DEPARTMENT

Department Chair

The Department Chair is the department's chief executive and administrative officer. The Chair guides the department's teaching, research, and service activities; conducts its administrative operations; and represents the department to the University.

The current chair is Dr. Paul Gollnick.

Director of Graduate Studies (DGS)

The DGS supervises the department's graduate program. The DGS is responsible for directing the recruitment of graduate students, orienting new graduate students and assigning them a temporary faculty advisor, maintaining and developing the graduate curriculum, and monitoring graduate student progress towards the completion of degree requirements.

The current DGS is Dr. Laura Rusche.

Director of PhD and MS Admissions

The director of admissions oversees the review of PhD and MS applications and recruitment activities.

The current Director of Admissions is Dr. Michael Yu.

Graduate Affairs Committee (GAC)

The GAC is an advisory body to the Director of Graduate Studies. Members of the GAC participate in the recruitment of PhD and MS students, serve as temporary advisors for new PhD and MS students, approve new graduate courses, and advise the DGS on graduate policy.

The current members of the GAC are Drs. Berry, Gunawardena, Krabbenhoft, and Yu.

Director of the MA program

The director of the MA program supervises this program. The director is responsible for overseeing the recruitment of MA students, orienting new MA students and assigning them an academic faculty advisor.

The current director of the MA program is Dr. Mary Bisson.

MA Program Administrator

The MA Administrator is responsible for managing the review of MA applications and monitoring student progress towards the completion of degree requirements.

The current administrator of the MA program is Dr. David Hoekstra.

MA Advisory Committee

This is an advisory body to the Director of the MA program. Members participate in the recruitment of MA students, serve as academic advisors for MA students, and advise the Director on MA policy.

The current members of the MA Advisory Committee are Drs. Hoekstra, Hennessey and Loretz.

Graduate Secretary

The Graduate Secretary coordinates all paperwork and logistics for the graduate program.

The current graduate secretary is Ms. Betsy Thornton.

Research Advisor (also known as the Thesis or Dissertation Advisor)

The Research Advisor is a faculty member who provides primary supervision and guidance to the graduate student during his/her program of study. Most importantly, the advisor has the scientific expertise to guide the student's research project.

PhD and MS students identify advisors after completing at least two research rotations.

MA students identify advisors in the first semester of residence.

Biology Graduate Student Association (BGSA) officers

The BGSA is affiliated with the university-wide Graduate Student Association (GSA). The officers keep students posted on departmental and university policies and events and organize the annual symposium, journal clubs, and social activities.

BGSA officers for 2018-2019 are: Nicole Wong, President; TJ Krzystek, Vice President; Peter Schuessler, Treasurer, Maggie Postolache, Secretary; Chris Rupert, Senator

Graduate Affairs Student Representative

The student representative to the Graduate Affairs Committee attends monthly meetings, although they are dismissed when sensitive student information is discussed. The representative shares graduate student concerns with the committee and reports back to other students about committee business.

Nominations for the graduate affairs student representative are taken in September, and the nominee who wins by popular vote is elected to serve for a term lasting a year (September – August).

REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY (PHD) DEGREE

A. Course Work

Credits required

72 total credit hours required to graduate, including:

22* credit hours formal courses, including at least 11 credit hours in foundational courses

4 credit hours BIO 610 (graduate student seminar)

4 credit hours BIO 614 (departmental seminar)

*Credits for research rotations (BIO600), graduate research (BIO680), research topics (BIO615), or supervised teaching (BIO599) do not count towards these 22 credit hours.

In addition, the spring semester of evolution colloquium (BIO553S) cannot count towards these 22 credit hours, although the fall semester (BIO553F) does count.

Definition of courses

Formal courses enroll multiple students, who meet regularly with an instructor and are awarded a letter grade based on classroom performance.

Foundational courses focus on concepts that are foundational to a discipline.

Specialized courses explore a particular topic in depth or develop analytical and communication skills.

The following courses are foundational courses:

BIO500, BIO501, BIO502, BIO504, BIO506, BIO507, BIO511, BIO515, BIO517, BIO518, BIO525, BIO549, BIO556

The following courses are specialized courses:

BIO519, BIO522, BIO523, BIO526, BIO540, BIO553F, BIO558, BIO608, BIO611

Suggested timeline

19 credit hours each of the first three semesters

7 credit hours in the fourth semester, for a total of 64 credits at the end of the second year

8 credit hours (BIO680 or BIO700) during the remaining 3-4 years of the program

**Please notice that the Dean's office may not provide tuition assistance to students serving as TAs if they have completed 72 or more credit hours.

Course selection

Entering PhD students are assigned a first year advisor by the Director of Graduate Studies.

This first year advisor assists in the selection of courses.

For the first two semesters, students must have their first year advisor sign their course selection form prior to registration.

Once a student selects a research advisor, this research advisor assumes responsibility for advisement.

It is expected that Biological Sciences PhD students will complete course requirements by enrolling in graduate courses offered by the Biological Sciences Department. However, students may petition to

take courses outside the department. To do so, the student should email the Director of Graduate Studies with the syllabus of the course and an explanation of how it is important for the student's training.

Requirements for good academic standing

Students must maintain a QPA of at least 3.0 for foundational courses and for specialized courses.

Failure to maintain the required QPA will result in a student being placed on probation.

A student on probation has one semester to restore the QPA in each category to 3.0. If this QPA is not attained, the student will be dismissed from the graduate program.

Students will be immediately dismissed from the program if their QPA is so low as to preclude their achievement of a 3.0 QPA within one semester of further course work.

A student who has been dismissed may petition the Graduate Affairs Committee to be retained in the program (see page 21).

Continuous Registration

Graduate students must register for a minimum of one credit each fall and spring term until ALL requirements for the degree are completed. If continuous registration is impossible, the student **must** secure a Leave of Absence from the Graduate School.

B. Rotations (BIO 600)

Research rotations consist of small research projects that are designed to introduce the student to the research program in a particular laboratory.

Rotations serve as an opportunity for a student and potential advisor to become acquainted and determine whether they wish to enter into a working relationship for the student's thesis project.

Students are reminded that making a positive impression during a rotation is critical to being accepted into that laboratory for thesis research. In this light, students should clearly understand the faculty advisor's expectations prior to beginning a rotation.

Timing of rotations

In the first year, PhD students perform two 10-week research rotations with different faculty members. The first rotation begins in the third week of the first semester.

The second rotation commences immediately after the first rotation ends.

Students should note that the second rotation includes the winter session between the fall and spring semesters. Please do not plan a long vacation during this time.

Students have the option of performing additional research rotations if a suitable research lab and advisor have not been identified after two rotations. The third rotation should commence immediately after the second rotation, and the student must inform the DGS before the end of the second rotation.

Selection of rotation advisors

During graduate student orientation, faculty present overviews of their research programs.

Students should arrange to meet with those faculty whose research is of interest. During this meeting, students should learn about rotation projects available in the laboratory and clarify whether the faculty member intends to take new PhD students in the current academic year.

By the end of the first week of classes, students should provide their top three choices for research rotations to the Graduate Affairs Committee Representative.

The Representative will assign rotation advisors based on student requests.

This selection process is repeated prior to the beginning of the second rotation period. Students should contact the faculty with whom they would like to conduct the second rotation, even if they already spoke with that faculty member prior to the first rotation.

Evaluation of rotation

After the first rotation, students prepare posters describing the work conducted during their rotations.

These posters are presented at the departmental research symposium in January.

After the second rotation, students present their work orally to interested members of the department. Laboratory rotation grades are based on completion of BOTH the laboratory work and the poster or oral presentation.

Students must receive passing grades in two laboratory rotations to complete the rotation requirement.

C. Seminars

Graduate student seminar (BIO 610)

The Graduate Student Seminar allows students to hone their oral presentation skills.

PhD students are required to enroll in Graduate Student Seminar each semester during the first two years in the program.

During the first year in the program, PhD students prepare written critiques of seminars presented by second year students. First year students are graded on an S/U basis.

During the second year in the program, PhD students present two seminars in BIO 610.

- During the third semester, each student summarizes and critiques a journal article, which will form the basis for the qualifying exam.
- During the fourth semester, each student describes his/her proposed thesis research project. The seminar should include a presentation of the relevant background information, the major hypotheses being tested, and the planned experimental approaches. The seminar may also include results the student has obtained.

The student's PhD advisory committee will attend both seminars and will assign a letter grade for each.

To fulfill the seminar requirement the student must achieve at least a B grade for each presentation.

Students are required to present additional seminars to make up for unsatisfactory presentation grades.

Departmental seminar (BIO 614)

The departmental seminar series features distinguished scientists from UB and across the country and offers the opportunity to become acquainted with the latest research.

PhD students are required to enroll in and attend Departmental Seminar each semester during the first two years in the program.

Senior graduate students are encouraged to attend seminars, although they do not register for credit.

D. Public Presentation of Ongoing Research

Clear oral presentation of scientific material is a critical skill for biologists. To develop this skill, PhD students are required to present their ongoing research orally at least once a year.

Fulfilling speaking requirement in the first two years

First year PhD students present their second rotation project orally (BIO 600).

Second year PhD students present their research in graduate seminar (BIO 610).

Fulfilling speaking requirement in year three and beyond

Senior PhD students must present their research orally in a public forum at least once each academic year between June 1 and May 31.

Options include, speaking at the annual symposium, speaking in the student research showcase, speaking at a regional or national research meeting, presenting “work-in-progress” seminar (described below), and completing a public dissertation defense.

Other public presentations of the student’s research may be accepted at the discretion of the DGS.

This requirement cannot be fulfilled by lab meeting presentations or poster presentations.

Work-in-progress seminar

This seminar will run in the spring semester.

Each session will include three 15-minute presentations.

The seminar will be open to the department, and the speakers’ thesis committees and other seminar participants will be in attendance.

The talks will not be graded, but could occur shortly before a thesis committee meeting.

Consequence of not meeting speaking requirement

Senior students who do not complete the speaking requirement will receive an “Incomplete” grade in BIO 680. This grade will be changed once the requirement has been met.

In addition, students who do not speak will not be in good standing in the program and will not be eligible for TA positions.

E. Required Training

Orientation

New PhD students are required to attend all programs during orientation week, including training in laboratory safety, equity, and union benefits.

Responsible Conduct of Research

All PhD candidates at the University at Buffalo are required to complete training in responsible conduct of research. This requirement is achieved through an online training module.

The University at Buffalo has an institutional membership in the Collaborative Institutional Training Initiative (CITI) online program, which can be accessed at <http://www.citiprogram.org/>

After registering on the site, PhD students in Biological Sciences should select the Biomedical Sciences Responsible Conduct of Research (RCR) training. The RCR program is comprised of a series of modules, each of which consists of readings and case studies and ends with a quiz covering the material.

A minimum total score of 80% is required to pass the online course.

Once the student has successfully completed the CITI RCR program, he/she should print the "Completion Report" and submit it to the Biological Sciences graduate secretary.

This requirement must be completed by the end of the second year.

F. The PhD Advisory Committee

Selection of Faculty Advisor

After completing two or three rotations, students arrange for one of the rotation mentors to become their faculty advisor. This advisor will guide the student through the remainder of the PhD program. Once the faculty member has agreed to accept the student as an advisee, the student should notify the Director of Graduate Studies of this choice.

Composition of the PhD Advisory Committee

After choosing an advisor, the student and advisor will select a PhD Advisory Committee.

The PhD Advisory committee should consist of the advisor and at least three other faculty members. At least two of the committee members, excluding the advisor, must be from the Biological Sciences Department.

All members of the PhD Advisory committee must be members of the UB Graduate Faculty.

The Director of Graduate Studies should be informed of the membership of the committee and should be notified of any changes, including a change in advisor.

All meetings of the PhD Advisory Committee will be chaired by a member of the Advisory Committee designated by the student. The chair must be a faculty member in the Biological Sciences Department but cannot be the research advisor.

Duties of the PhD Advisory Committee

The PhD Advisory Committee will administer the qualifying examination.

The PhD Advisory Committee will meet with the student at least once a year to provide guidance on the research project and ascertain whether the student is making adequate progress towards the degree.

The PhD Advisory Committee will evaluate an informal presentation of the student's thesis data and determine whether the student may commence writing the PhD thesis.

The PhD Advisory Committee will approve the thesis and certify the completion of degree requirements.

Procedures for Annual Committee Meeting

The annual committee meeting is an important opportunity for students to obtain guidance on their thesis projects. Committee members have different expertise from the primary advisor and provide valuable suggestions and new perspectives on the project.

Failure to meet with the advisory committee at least once a year may result in loss of TA support.

The advisor and at least two committee members should be present for a meeting. If a committee member cannot attend the meeting, for example if they are on sabbatical or extended leave, the student should update him/her separately.

For the meeting, the student prepares a thirty minute presentation summarizing his/her progress. The actual presentation of this material will take longer than thirty minutes, as the committee will discuss the data and provide suggestions for further experiments.

After the presentation, the student and committee will review the student's progress and delineate a path to completion of the thesis project.

Progress will be reported to the Graduate Affairs Committee by a signed Committee Meeting Report Form (available on department website).

G. The Qualifying Exam

General Policies

Each PhD student must pass a qualifying exam conducted by his or her PhD Advisory Committee.

All Committee members must be in attendance for qualifying examinations.

Should a student fail the exam, he or she will have one opportunity to repeat the examination.

Failure to pass the qualifying exam twice will lead to the student's dismissal from the PhD program.

Timeline

Students must pass the qualifying exam in the fourth semester of the PhD program. It should be completed no later than the end of the ninth week of the semester.

In the third semester of the program, the student will identify a topic for an original research proposal.

This topic may be related to the student's thesis research. However, it cannot be substantially the same as research proposed by the advisor. The topic must be approved by the PhD Advisory committee.

Once the topic is approved, a paper related to this topic will be presented in graduate student seminar (BIO 610).

Early in the fourth semester of the program, the student should hold a pre-qualifier meeting. Prior to this meeting, the student should submit a specific aims page outlining the planned research proposal.

At the meeting, the committee will provide feedback on the proposed aims and also discuss general knowledge topics that will be tested. A pre-qualifier meeting report form should be completed and submitted to the graduate secretary (available on department website).

In the fourth semester of the program, a written research proposal will be submitted to the PhD Advisory Committee no later than the fifth week of the semester and at least three weeks prior to the oral exam date.

The proposal will be read by the committee members, who will provide comments and suggestions to the student at least two weeks prior to the oral exam.

The student will then revise the proposal and provide a copy to the committee at least two days before the oral exam.

In the event a student fails the exam, a second attempt must be completed by the end of the semester in which the first exam took place.

Students who do not complete the exam in the designated semester are ineligible for TA appointments until the exam has been completed.

Format of the exam

I. Written examination

The purpose of the written examination is to evaluate the student's ability to design a line of inquiry into a specific scientific topic.

The student must prepare an original research proposal on a topic of his/her choosing. The topic may be related to the student's thesis research. However, it cannot be substantially the same as research proposed by the advisor.

The topic must be approved by the PhD Advisory committee before the student begins writing.

The proposal should follow the format used by a major granting agency, such as NSF or NIH. It should include Specific Aims, Significance, and Approach sections. The Approach section should include data interpretation and alternative approaches. The document should be written with at least 11 point font and should be no longer than eight pages, excluding references.

The student is strongly encouraged to consult with the research advisor and committee frequently during selection of the proposal topic and writing of the proposal.

II. Oral examination

The purpose of the oral examination is to evaluate both the student's ability to reason scientifically and the breadth and depth of the student's knowledge in his/her field of study.

The oral exam will last approximately two hours.

The chair will moderate.

The student will prepare a twenty minute presentation outlining the research proposal. The actual presentation of this material will take longer than twenty minutes, as the committee will pause the presentation to examine the student about relevant background information, the proposed experiments, and alternative strategies.

After the presentation, the student will be examined on foundational knowledge related to the broad field the student has chosen for the PhD research project.

During the oral exam, the advisor will refrain from speaking.

Following the oral questions and answers, the student will leave the room. The advisor will comment and answer questions about the student's performance, and then leave the room.

The remaining members of the PhD Advisory Committee will determine if the student has passed the oral examination. The student will pass the exam if there is no more than one dissenting vote.

H. Graduate Research and Thesis

After the successful completion of course work and qualifying exam, the student will devote the major portion of his/her time to research.

The student should register for one credit of graduate research (BIO 680) each semester.

If a student receives a grade of U for BIO 680 more than once, s/he will be dismissed from the program.

When a student and his/her advisor agree that sufficient research has been completed to comprise a PhD thesis, an informal presentation of this work will be made to the PhD Advisory Committee. A body of publishable work should be obtained prior to writing the thesis.

The Committee must give unanimous permission for the student to write the thesis and schedule the oral defense. After this point, additional thesis committee meetings are not required. Under normal circumstances, the target for completion of the PhD thesis is five years after entrance into the graduate program.

The thesis should be written by the student with the advice and criticism of the research advisor. It should be a scholarly effort that conforms with principles of good grammar, organization, and style. The following links provide detailed guidelines from the university on formatting the dissertation.

<http://grad.buffalo.edu/study/graduate/etd.html>

<http://grad.buffalo.edu/study/graduate/etd/submission-guidelines.html>

A near final draft of the thesis should be submitted to each member of the PhD Advisory Committee at least three weeks before the defense date.

After the thesis has been read and approved by the committee, a defense of the thesis will be conducted, with the designated chair presiding. This defense will be open to all students and faculty, who will have the right to pose questions.

After the presentation and question period, the Committee will meet to examine the student and then vote on the outcome of the thesis defense.

I. Annual progress report

At the end of each year, PhD candidates must complete an annual progress report. The student should meet with his/her advisor to discuss progress in the last year and goals for the next year. Together, the student and advisor should complete the progress report form, which available on the department website. The completed form should be submitted to the graduate secretary within one week of grades being posted.

J. Suggested Timeline to complete PhD requirements

<i>First Semester</i>	Attend orientation program Two formal courses (6-8 credit hours) Grad student seminar (BIO610) Department seminar (BIO614) Research rotations (BIO600)
<i>Second Semester</i>	Two formal courses (6-8 credit hours) Grad student seminar (BIO610) Department seminar (BIO614) Complete rotations (BIO600) Identify advisor and begin thesis research Submit annual progress report
<i>First Summer</i>	Continue thesis research Select advisory committee Begin developing proposal topic for qualifying exam
<i>Third Semester</i>	Two formal courses (4-6 credit hours) Present seminar on qualifying exam topic (BIO610) Department seminar (BIO614) Continue thesis research (BIO680)
<i>Fourth Semester</i>	Complete 22 credit hours of formal courses Present seminar on research project (BIO610) Department seminar (BIO614) Continue thesis research (BIO680) Complete written and oral qualifying exam by ninth week Complete training in Responsible Conduct of Research Submit application to candidacy Submit annual progress report
<i>Year 3 and beyond</i>	Submit annual progress report each year Complete thesis research (BIO680) Prepare dissertation Present thesis research in public seminar Defend dissertation to PhD advisory committee Submit M form

REQUIREMENTS FOR THE MASTERS OF SCIENCE (MS) DEGREE

A. Course Work

Credits required

32 total credit hours required to graduate, including:

- 18 credit hours in formal courses*
- 4 credit hours BIO 610 graduate student seminar
- 4 credit hours BIO 614 departmental seminar

* Credits for research rotations (BIO600), graduate research (BIO680), research topics (BIO615), or supervised teaching (BIO599) do not count towards these 18 credit hours.

In addition, the spring semester of evolution colloquium (BIO553) cannot count towards these 18 credit hours, although the fall semester (BIO553F) does count.

Note: If you are considering switching to the PhD program, please ensure that the courses you take conform to the PhD requirements.

Suggested timeline

- 12 credit hours each semester in the first year, for a total of 24
- 4 credit hours each semester in second year, for a total of 8

Course selection

Entering MS students are assigned a first year advisor by the Director of Graduate Studies.

This first year advisor assists in the selection of courses.

For the first two semesters, students must have their first year advisor sign their course selection form prior to registration.

Once a student has selected a research advisor, the research advisor will assume responsibility for advisement.

It is expected that Biological Sciences MS students will complete their course requirements by enrolling in graduate courses offered by the Biological Sciences Department. However, students may petition to take courses outside the department. To do so, the student should email the Director of Graduate Studies the syllabus of the course and an explanation of how it is important for the student's training.

Requirements for good academic standing

Students must maintain a QPA of at least 3.0 in content courses.

Failure to maintain the required QPA will result in a student being placed on probation.

A student on probation has one semester to achieve the cumulative QPA of 3.0. If this QPA is not attained, the student will be dismissed from the graduate program.

Students will be immediately dismissed from the program if their QPA is so low as to preclude their achievement of a 3.0 QPA within one semester of further course work.

A student who has been dismissed may petition the Graduate Affairs Committee to be retained in the program (see page 21).

Continuous Registration

Graduate students must register for a minimum of one credit hour each fall and spring term until ALL requirements for the degree are completed. If continuous registration is impossible at any time, the student **must** secure a Leave of Absence from the Graduate School.

B. Rotations (BIO 600)

Research rotations consist of small research projects that are designed to introduce the student to the research program in a particular laboratory.

Rotations serve as an opportunity for a student and potential advisor to become acquainted and determine whether they wish to enter into a working relationship for the student's MS project.

Students are reminded that making a positive impression during a rotation is critical to being accepted into that laboratory for thesis research. In this light, students should clearly understand the faculty advisor's expectations prior to beginning a rotation.

Timing of rotations

In the first year, MS students perform two 10-week research rotations with different faculty members. The first rotation begins in the third week of the first semester.

The second rotation commences immediately after the first rotation ends.

Students should note that the second rotation includes the winter session between the fall and spring semesters. Please do not plan a long vacation during this time.

Students have the option of performing additional research rotations if a suitable research lab and advisor have not been identified after two rotations. The third rotation should commence immediately after the second rotation, and the student must inform the DGS before the end of the second rotation.

Selection of rotation advisors

During graduate student orientation, faculty present overviews of their research programs.

Students should arrange to meet with those faculty whose research is of interest. During this meeting, students should learn about rotation projects available in the laboratory and clarify whether the faculty member intends to take new MS students in the current academic year.

By the end of the first week of classes, students should provide their top three choices for research rotations to the Graduate Affairs Committee Representative.

The representative will assign rotation advisors based on student requests.

This selection process is repeated prior to the beginning of the second rotation period. Students should contact the faculty with whom they would like to conduct the second rotation, even if they already spoke with that faculty member prior to the first rotation.

Evaluation of rotation

After the first rotation, students prepare posters describing the work conducted during their rotations. These posters are presented at the departmental research symposium in January.

After the second rotation, students present their work orally to interested members of the department.

Laboratory rotations grade are based on completion of BOTH the laboratory work and the poster or oral presentation.

Students must receive passing grades in two laboratory rotations to complete the rotation requirement.

C. Seminars

Graduate student seminar (BIO610)

The Graduate Student Seminar allows students to hone their oral presentation skills.

MS students are required to enroll in Graduate Student Seminar each semester during the first two years in the program.

During the first year, students prepare written critiques of seminars presented by second year graduate students. First year students are graded on an S/U basis.

During the second year, MS students present one seminar in BIO 610 describing their research project. The presentation will be graded by three faculty members, including the student's advisor and reader. Generally, the third grader is the instructor for the seminar course, but the student may select another faculty member.

This grading committee will attend the seminar and assign a letter grade.

To fulfill the seminar requirement, the student must achieve at least a B grade for the presentation.

Students are required to present additional seminars to make up for unsatisfactory presentations.

Departmental seminar (BIO614)

The departmental seminar series features distinguished scientists from UB and across the country and offers the opportunity to become acquainted with the latest research.

MS students are required to enroll in and attend Departmental Seminar each semester they are in residence.

D. Research Experience

An important component of the MS program is the completion of a significant experimental research project. One of the research rotations may be used as part of this research project.

To fulfill the degree requirements, a written report of the research project must be approved by the faculty member in whose laboratory the research was performed and by a "reader," who is a member of the UB Graduate Faculty.

The reader must be identified to the graduate affairs committee by the end of the third semester.

The written report should have the format of a research article. It must include sufficient background to explain the rationale for the project, the objectives of the project, the methods used, the results of the investigation, and the interpretation of these results.

E. Annual progress report

At the end of the first year, MS candidates must complete an annual progress report. The student should meet with his/her advisor to discuss progress in the last year and goals for the next year. Together, the student and advisor should complete the progress report form, which available on the department website. The completed form should be submitted to the graduate secretary within one week of grades being posted.

F. Suggested Timeline to complete MS requirements

<i>First Semester</i>	Two formal courses (6-8 credit hours) Grad student seminar (1 credit) Department seminar (1 credit) Research rotations (2-4 credits)
<i>Second Semester</i>	Two formal courses (6-8 credit hours) Grad student seminar (1 credit) Department seminar (1 credit) Complete rotations (2-4 credits) Identify advisor and begin research project Submit annual progress report
<i>Third Semester</i>	Complete 18 credit hours of formal courses Continue research project (1 credit) Grad student seminar (1 credit) Department seminar (1 credit) Select reader Submit Application to Candidacy Form
<i>Fourth Semester</i>	Finish research project (2 credits) Present seminar on research project (1 credit) Department seminar (1 credit) Research report approved by advisor and reader Submit M form

REQUIREMENTS FOR THE MASTERS OF ARTS (MA) DEGREE

A. Course Work

Credits required

30 total credit hours required to graduate, including:

18 credit hours in formal* courses, including 8 credit hours in BIO courses

6 or more credit hours of study with a faculty member on scholarly project (BIO 615 or BIO 680)

2 credit hours graduate student seminar (BIO 610)

2-4 credit hours departmental seminar (BIO 614)

**Formal courses* are those that enroll multiple students, who meet regularly with an instructor and are awarded a letter grade based on written performance.

Course selection

On entering the program, the student will be assigned an academic advisor by the director of the MA program. The student will meet with this advisor to arrange a program of study and select appropriate course work for the first semester.

Once the student has chosen a project advisor and a reader, these faculty may also advise the student on course work, as well as the project.

Requirements for good academic standing

Students must maintain a QPA of at least 3.0 in formal courses, and an overall QPA of at least 3.0.

Failure to maintain the required QPA will result in a student being placed on probation.

A student on probation has one semester to achieve the cumulative QPA of 3.0. If this QPA is not attained, the student will be dismissed from the graduate program.

Students will be immediately dismissed from the program if their QPA is so low as to preclude their achievement of a 3.0 QPA within one semester of further course work.

Continuous Registration

Graduate students must register for a minimum of one credit hour each fall and spring term until ALL requirements for the degree are completed. If continuous registration is impossible at any time, the student **must** secure a Leave of Absence from the Graduate School.

B. Seminars

Graduate student seminar (BIO610)

The Graduate Student Seminar course allows students to hone their oral presentation skills and develop other professional skills.

MA students are required to enroll in Graduate Student Seminar in each of the first two semesters in the program.

In one semester, MA students prepare written critiques of other students' presentations. They are graded on an S/U basis.

In the other semester, MA students present and discuss progress on their scholarly projects. The project does not have to be complete at the time of the presentation; this is NOT a final defense. Instead, the student should give a presentation as soon as the project has been determined with a well-defined question. The student should explain why the project is interesting and important, how the questions fits within the larger field, and what the plan is for answering the question.

The presentation is graded by three faculty members, including the student's advisor and reader. Generally, the third grader is the instructor for the seminar course, but the student may select another faculty member if he/she wishes.

This grading committee will attend the seminar and assign a letter grade.

To fulfill the seminar requirement the student must achieve at least a B grade for the presentation.

Students are required to present additional seminars to make up for unsatisfactory presentations.

Note that this is not a final defense of the project. Completion of the project requires a written report, as described below.

Departmental seminar (BIO614)

The departmental seminar series features distinguished scientists from UB and across the country and offers the opportunity to become acquainted with the latest research.

MA students are required to enroll in and attend Departmental Seminar during each semester they are in residence.

C. Scholarly Project

MA candidates develop an original scholarly project under the supervision of a faculty mentor.

This project is tailored to the student's interests and career goals. Examples of projects include investigating a particular scientific question or public health issue, analyzing a case study in environmental law, developing and evaluating curriculum for a biology course, or assessing a new application in biotechnology. Project methodologies range from bench research to reviewing and evaluating scholarly literature, to analyzing existing data to answer a new question, to product development.

MA projects may be supervised by a faculty member from the Biological Sciences department or another department at the university. The research advisor must be a member of the graduate faculty, see <http://grad.buffalo.edu/intranet/leadership/gradfaculty/roster.html>. If the project advisor is not in Biological Sciences, the reader must be. In this case, students should register for research credits (BIO 615 or BIO 680) under the name of the reader.

Research Report

Upon the completion of the project, usually in the second or third semester of study, the MA candidate prepares a written report.

The exact format of the report is determined in conjunction with the advisor, but it should be written in a format appropriate to the subject, including a description of the problem or questions, a literature review, and a summary of the findings.

This report is read and evaluated by the candidate's faculty mentor and reader.

At least one of the two faculty members evaluating the report must be in the Biological Sciences Department.

D. Progress reports

MA candidates are required to complete the MA progress report form and meet with their academic advisor each semester. These regular checks allow issues and challenges to be addressed as they arise. Each semester, MA progress report forms should be submitted to the MA Program Administrator within two weeks of grades being posted.

E. Suggested Timeline to complete MA requirements

<i>First Semester</i>	Two formal courses (6-8 credit hours) Grad student seminar (BIO 610) Department seminar (BIO 614) Identify advisor for scholarly project Begin project (BIO 615 or BIO 680) Submit progress report
<i>Second Semester</i>	Two formal courses (6-8 credit hours) Present scholarly project at grad student seminar (BIO 610) Department seminar (BIO 614) Continue project (BIO 615 or 680) Select reader for project Submit progress report
<i>Third Semester</i>	Complete 18 credit hours of formal coursework Department seminar (BIO 614) Complete scholarly project (BIO 615 or 680) Project report approved by advisor and reader Submit M form

GRADING PROCEDURES IN THE GRADUATE SCHOOL

Letter grades and QPA

Letter grades carry the following weights:

A = 4.0, A- = 3.67, B+ = 3.33, B = 3.0, B- = 2.67, C+ = 2.33, C = 2.0, D = 1.0, F = 0

QPA is calculated as follows:

For each course, the weighted grade is multiplied by the credits attempted.

The adjusted grades (multiplied by credit hours) are added.

The sum of the adjusted grades is divided by the total number of credits attempted.

If a course is repeated, both grades count in the calculation of the QPA.

Other grades

Satisfactory/Unsatisfactory (S/U)

S indicates credit earned. U indicates no credit earned. These grades do not count in the QPA.

Resign (R)

A student may resign from a course through the 11th week of the semester. This course will not be included in QPA calculations. An R will appear on the transcript.

Graduate School policy on QPA

It is the policy of the UB Graduate School that students must attain a QPA of at least 3.0 to earn a graduate-level degree.

GRADUATE STUDENT STANDING

The Director of Graduate Studies, the director of the MA program, and the advisory committees jointly monitor the progress of graduate students in Biological Sciences.

For PhD students, the PhD Advisory Committee and faculty advisor also assess the student's progress.

For MS and MA students, the faculty advisor monitors progress.

Graduate students will be in good standing provided that the requirements outlined in this handbook are met in a timely fashion and that the research project is judged to be progressing satisfactorily.

Unsatisfactory performance in any phase of the degree program may lead to the student's dismissal from the graduate program.

PETITIONS

Graduate students have the right to petition any decision regarding their standing in the graduate program or to request a change in any of the requirements set forth in this document.

Such petitions should be addressed to the Graduate Affairs Committee and must clearly state what requirements are being petitioned and the justification for the request.

For PhD and MS students, the Graduate Affairs Committee will decide upon such petitions.

For MA students, the MA Advisory committee will decide upon such petitions.

Instructions for preparing a petition to switch from MA to MS or from MS to PhD programs

The student must formally petition the Graduate Affairs Committee to switch programs.

The petition should include:

- Current transcript
- Letter of petition from the student which includes the reason the student is requesting the change as well as a justification for the change.
- Letter of support from the student's advisor, including an assessment of the student's ability to complete the degree program under consideration and a description of financial support available for the student.

Petitions will be considered twice a year and should be submitted within a week after grades are posted for the semester.

Students must complete at least two semesters prior to requesting a switch.

Multiple criteria are considered when a student wishes to change programs, including:

- Performance in coursework and lab work
- Acceptance as a student into a research lab
- Appropriate support from the advisor
- Changes in career goals

Students will not be allowed to switch from the MS to PhD program if they wish to work in a lab that does not appear likely to have sufficient resources for the student to finish his or her thesis research. However, qualified students will be allowed to join the PhD program if they find a lab that does have appropriate resources.

Instructions for preparing a petition to remain in program after academic dismissal

A student who has been dismissed due to lack of academic standing may petition the Graduate Affairs Committee to remain in the program.

The petition should include:

- Current transcript
- Letter of petition from the student which accounts for the academic deficiencies and lays out a plan to remedy these deficiencies within one semester.
- Letter of support from the student's advisor, including an assessment of the student's ability to complete the degree program under consideration and a description of financial support available for the student.

Petitions should be submitted within a week after grades are posted for the semester.

FINANCIAL SUPPORT FOR GRADUATE STUDENTS

General Policy

Support of PhD students is guaranteed for ten semesters, provided adequate progress is made. Support is generally extended beyond this time depending on resources. Support of PhD students is generally provided either through teaching assistantships (TAs) or research assistantships (RAs).

Support through teaching assistantships may be offered to MS students or (rarely) MA students, depending on availability.

Teaching assistantships

Biological Sciences graduate students in good standing are offered teaching assistantships during their first four semesters in the graduate program. Continuing support during this period is contingent upon the student's carrying a full course load.

International students who have been awarded teaching assistantships must pass the Speaking Proficiency English Assessment Kit (SPEAK) test. Students who score just below passing (45- 50) on the SPEAK test will have an interview with a representative of the ESL department to determine whether they have sufficient communication skills to serve as a TA. Based on this interview, the student may be required to take ESL 512 before being allowed to teach. PhD students who do not pass the test or the interview can only serve as assistant TAs and will have reduced support.

An unsatisfactory grade in the teaching assignment or a complaint by a supervising faculty member can result in immediate loss of support. However, such loss will not occur without a thorough investigation by the Graduate Affairs Committee.

After the fourth semester and during the first summer of residence, it is expected that PhD students will be supported by their advisor's research grants or their own external fellowships.

Students who do not have a pre-doctoral fellowship and are working with a research advisor who does not have grant support may request support from departmental funds. These requests will be considered on an individual basis.

If a faculty member loses his or her research funding, all senior (past second year) students in good standing will be considered for teaching assistantships until such time as the faculty member regains funding or the student(s) graduate.

Departmental support is not available for students of research-track and adjunct faculty. Research-track and adjunct faculty are expected to support their graduate students immediately upon accepting them into their labs. If funding should fail for a research/adjunct faculty member, he/she may request support for his/her senior Biological Sciences students.

Other sources of funding

Several university fellowships are awarded to incoming students, including the UB Presidential Fellowship, the College of Arts and Sciences Dean's Scholarship, and the Arthur A. Schomburg Fellowship. The Graduate Affairs Committee evaluates all new applications and selects candidates to nominate for these university awards. Students selected for these awards will be notified.

The Mark Diamond Research Fund gives grants to graduate students for research expenses related to their thesis or dissertation. PhD students may apply for up to \$3,000 and Master's students for up to \$1,500. The MDRF grant is only for University at Buffalo graduate students in programs participating in the Graduate Student Association and who have not waived the student activity fee. For more information: <http://gsa.buffalo.edu/student-resources/mdrf/>

College of Arts and Sciences (CAS) dissertation fellowships are available to senior students who are preparing their dissertations. Application materials are generally due to the director of graduate studies in mid-March and are then forwarded to the College of Arts and Sciences Dean's office.

Travel awards are available through the Graduate Student Association. For a limited time, the Paul Pizzella and Marta Ayala Travel Award provides graduate students in the Department of Biological Sciences with financial support to enhance their educational opportunities. In particular, the award is designed to allow students to pursue opportunities such as presentation of scholarly works at international conferences, attending workshops, or short-term "sabbaticals" at a laboratory outside of Western New York to learn essential laboratory techniques required for the doctoral thesis project.

GRADUATE STUDENT ORGANIZATIONS

The Biology Graduate Student Association (BGSA)

The BGSA is comprised of and governed by graduate students in the department. It is affiliated with the university-wide Graduate Student Association (GSA). In addition to keeping students posted on departmental and university policies, procedures, and events, the organization assists in planning the annual symposium as well as journal clubs and social activities in the department. All graduate students are welcome and encouraged to participate in the group. Meetings are usually held monthly. Meeting announcements are made through the email listserv.

BGSA officers for 2018-2019 are: Nicole Wong, President; TJ Krzystek, Vice President; Peter Schuessler, Treasurer, Maggie Postolache, Secretary; Chris Rupert, Senator

Graduate Student Employees Union (GSEU)

The GSEU is the collective bargaining unit for Teaching Assistants (TAs) and Graduate Assistants (GAs) employed by SUNY and paid by the State of New York. All TAs and GAs employed by SUNY are part of the GSEU bargaining unit and pay the union a percentage of their income. However, to obtain full union benefits you must fill out a yellow membership form and return it to a union officer (your department rep, Chief Steward, or Business Agent) or mail it to the address on the form. These forms are distributed at health orientations, GSEU meetings, and general orientation activities. For more information visit the Website: <http://gsa.buffalo.edu/gseu/>

DEPARTMENT EVENTS

Annual Research Symposium

The annual Biological Sciences Research Symposium provides an opportunity for students to share their research results with members of the department. The Symposium takes place in January and is organized by the BGSA. First year MS and PhD students are required to present posters based on their first rotation project. Other students are encouraged to present their research either as a poster or short talk. It is suggested that each laboratory be represented by no more than two talks.

Departmental Seminar Series

Weekly departmental seminars feature distinguished scientists from within and outside the university and introduce students to cutting edge research. Seminars take place Thursdays at 4:00 pm. For many seminars, the BGSA hosts an “after-seminar” event, during which students have the opportunity to talk with the seminar speaker in a small group setting.

Graduate Student Research Showcase

Each showcase features two students or postdocs who have a fairly complete research story. Speakers are selected by the Graduate Affairs Committee. Showcases take place during department seminar time slot, Thursdays at 4:00.

Work-in-Progress Seminar Series

This seminar series runs in the spring semester and provides graduate students the opportunity to share their ongoing research with the department. Each session includes three 15-minute talks.

Alumni Career Workshop

Alumni who have succeeded in a variety of careers return to campus to speak about their jobs and to network with current students.

GRADUATE COURSES OFFERED IN BIOLOGICAL SCIENCES

FORMAL COURSES

Foundational Courses

		<i>Credits</i>	<i>Semester</i>
500	Bioinformatics & Genome Analysis	4	Spring
501	Advanced Biological Chemistry	4	Fall
	Advanced Cell & Developmental	4	Fall
502	Biology		
504	Advanced Molecular Genetics	4	Spring
506	Signal Transduction	3	Fall
507	Advanced Ecology	3	Fall
517	Neurobiology	3	Fall
518	Integrative Neuroscience	4	Spring
525	Special Topics in Modern Biology	1-3	Fall & Spring
549	Comparative Genomics	3	Spring
550	Human Evolutionary Genomics	3	Fall

Specialized Courses

		<i>Credits</i>	<i>Semester</i>
511	Marine Ecology	3	Spring
522	Protein-Nucleic Acid Interactions	3	Spring
523	Tissue Engineering	3	Fall
526	Special Topics	1-3	Fall & Spring
532	Microbial Genomics	3	Spring
540	Experimental Endocrinology	2	Fall
553F	Evolution Colloquium	2	Fall
556	Evolutionary Genetics	3	Fall
608	Topics in Macromolecular Structure	2	Spring
611	Scientific Writing	2	Fall

OTHER COURSES

553S	Evolution Colloquium	Student Presentations
599	Supervised Teaching	Teaching Assistantship
600	Problems in Biology	Rotation
610	Graduate Student Seminar	
614	Departmental Seminar	
615	Advanced Research Topics	MA Project
680	Graduate Research	MS or PhD Research
700	Thesis	Preparation of Dissertation