CONTENTS

Who’s who in the department…………………………………………………………………………………………………………………………..2

Requirements for the PhD degree ...........................................................................................................................................3
  Course Work.................................................................................3
  Rotations..................................................................................4
  Seminars...................................................................................5
  Required Training.................................................................6
  PhD Advisory Committee.......................................................6
  The Candidacy Exam..............................................................7
  Graduate Research and Thesis.................................................9
  Suggested Timeline...............................................................10

Requirements for the MS degree ............................................................................................................................................11
  Course Work.................................................................................11
  Rotations..................................................................................12
  Seminars...................................................................................13
  Research Experience..............................................................13
  Suggested Timeline...............................................................14

Requirements for the MA degree ............................................................................................................................................15
  Course Work.................................................................................15
  Seminars...................................................................................15
  Scholarly Project........................................................................16
  Suggested Timeline...............................................................17

Grading procedures in the graduate school ............................................................................................................................18

Graduate student standing .........................................................................................................................................................18

Petitions to the graduate affairs committee ...........................................................................................................................18

Financial support for graduate students ................................................................................................................................19

Graduate student organizations ...............................................................................................................................................21

Department events ....................................................................................................................................................................21

Graduate courses offered in Biological Sciences................................................................................................................22

OVERVIEW

The Department of Biological Sciences offers three 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 research skills training 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, education, and regulatory organizations.
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. Gerald Koudelka.*

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 program requirements.

*The current DGS is Dr. Laura Rusche.*

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 matters of graduate policy.

*The current members of the GAC are Drs. Cullen, Taylor, Walker, Xu-Friedman.*

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 a temporary faculty advisor, and monitoring student progress towards the completion of program requirements.

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

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

*The current graduate secretary is Ms. Betsy Thornton.*

Faculty Advisor (also known as the Thesis or Dissertation Advisor)
The Faculty 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.*
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, BIO525, BIO526, BIO540, BIO553F, BIO558, BIO608

Suggested timeline

17 credit hours each semester in the first year, for a total of 34
15 credit hours each semester in second year, for a total of 30
8 credit hours (BIO680 or BIO700) during the remaining 3-4 years of the program

**Please notice that the Dean’s office does 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 temporary faculty advisor by the Director of Graduate Studies.
This temporary advisor assists in the selection of courses.
For the first two semesters, students must have their temporary 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 graduate 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 a description of the course of interest and why it is considered by the student and advisor to be necessary for the student’s research topic.

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 18).

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, 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 rotations 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 Director of Graduate Studies. The Director of Graduate Studies 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 prepare written reports describing the work completed during their rotations. These reports should be submitted to the rotation mentor. Laboratory rotations are graded on an S/U basis. The grade is based on completion of BOTH the laboratory work and the poster or written report. 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 candidacy 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 in the laboratory.  
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. 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.

E. 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. If a student is unable to identify an advisor after completing four rotations, the student will be dismissed from the graduate program.

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 from the Biological Sciences Department. The members of the PhD Advisory committee must be members of the UB Graduate Faculty. The Graduate Affairs Committee 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 research advisor cannot serve as the chair.

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. For the meeting, the student prepares a thirty minute presentation summarizing his/her progress. The actual presentation of this material will likely 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 should delineate a clear path to completion of the thesis project. Progress will be reported to the Graduate Affairs Committee by a letter signed by all of the PhD Advisory Committee members. This report should be accompanied by the student’s most recent CV.

F. The Candidacy Exam

General Policies
Each PhD student must pass a candidacy exam conducted by his or her PhD Advisory Committee. All Committee members must be in attendance for candidacy examinations. Should a student fail the exam, he or she will have one opportunity to repeat the examination. Failure to pass the candidacy exam twice will lead to the student's dismissal from the PhD program.

Timeline
Students must pass the candidacy exam in the fourth semester of the PhD program. It should be completed no later than March 31 (fall start) or October 31 (spring start). In the third semester of the program, the student will select a paper on a topic of interest and present the paper and topic to the PhD Advisory committee for approval. Once the topic is approved, the paper will be presented in graduate student seminar (BIO 610). In the fourth semester of the program, a written research proposal, based on the approved topic, will be submitted to the PhD Advisory Committee no later than the fifth week of the semester. 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 prior to the oral exam. In the event a student fails the exam, a second attempt must be completed by May 15 (fall start) or December 15 (spring start).
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 must be different from the planned thesis research or other research in progress in the department.
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, Background, and Approach sections. The Approach section should include data interpretation and alternative approaches. The document should be written with at least 11 point font, double-spaced, and should be no longer than ten pages, excluding references.
The student is strongly encouraged to consult with the research advisor and committee frequently during selection of the proposal topic and the 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 student will prepare a twenty minute presentation outlining the research proposal.
During the presentation, the PhD Advisory Committee will examine the student about relevant background information, the proposed experiments, and alternative strategies.
After the presentation, the student will be examined on his/her foundational knowledge related to the broad field the student has chosen for his or her PhD research project.
Following the oral questions and answers, the student and thesis advisor will 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.
G. Graduate Research and Thesis

After the successful completion of course work, 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. Research will be graded on an S/U basis. If a student receives a grade of U for BIO 680 more than once, the student 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 to the student to commence writing the thesis. Under normal circumstances, the target for completion of the PhD thesis is four to 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/content/dam/www/graduate/documents/etd/etdguide.pdf
http://grad.buffalo.edu/Academics/ETD/ETD-FAQ.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.

Notice of the defense of thesis will be mailed to Faculty and Graduate Students of the Department and to other interested parties at least two weeks prior to the defense.

After the presentation and question period, the Committee will meet to examine the student and then vote on the outcome of the thesis defense.
H. Suggested Timeline to complete PhD requirements

First Semester
- Attend orientation program
- Two courses (6-8 credit hours)
- Attend grad student seminar (BIO610)
- Attend department seminar (BIO614)
- Research rotations (BIO600)

Second Semester
- Two courses (6-8 credit hours)
- Attend grad student seminar (BIO610)
- Attend department seminar (BIO614)
- Complete rotations (BIO600)
- Identify advisor and begin thesis research

First Summer
- Continue thesis research
- Select advisory committee
- Begin developing proposal topic for candidacy exam

Third Semester
- Two courses (4-6 credit hours)
- Present seminar on proposal topic (BIO610)
- Attend department seminar (BIO614)
- Continue thesis research (BIO680)

Fourth Semester
- Complete 22 credit hours of content courses
- Present seminar on research project (BIO610)
- Attend department seminar (BIO614)
- Complete thesis research (BIO680)
- Complete written and oral candidacy exam by March 31 (Oct 31)
- Complete training in Responsible Conduct of Research
- Submit application to candidacy

Years 3-5
- 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.

Please 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 temporary faculty advisor by the Director of Graduate Studies. This temporary advisor assists in the selection of courses.

For the first two semesters, students must have their temporary 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 graduate 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 with a description of the course of interest and why it is considered by the student and advisor to be necessary for the student’s research topic.

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 18).

**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 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, 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 rotations 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 Director of Graduate Studies. The Director of Graduate Studies 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 prepare written reports describing the work completed during their rotations. These reports should be submitted to the rotation mentor. Laboratory rotations are graded on an S/U basis. The grade is based on completion of BOTH the laboratory work and the poster or written report. 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. The student can select to present a journal article or a summary of his/her research. The presentation will be graded by three faculty members, including the student’s advisor and the reviewing faculty member. 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.

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 an additional faculty member, who is a member of the UB Graduate Faculty. The reviewing faculty member must be identified to the graduate affairs committee on an approval form before the end of the third semester of residence. The written report should have the format of a research article. It must include sufficient background to understand 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. Suggested Timeline to complete MS requirements

**First Semester**
- Two courses (6-8 credit hours)
- Attend grad student seminar (1 credit)
- Attend department seminar (1 credit)
- Research rotations (2-4 credits)

**Second Semester**
- Two courses (6-8 credit hours)
- Attend grad student seminar (1 credit)
- Attend department seminar (1 credit)
- Complete rotations (2-4 credits)
- Identify advisor and begin research project

**Third Semester**
- Complete 18 credit hours of content courses
- Continue research project (1 credit)
- Attend grad student seminar (1 credit)
- Attend department seminar (1 credit)
- Select reviewing faculty member

**Fourth Semester**
- Finish research project (2 credits)
- Present seminar on research project (1 credit)
- Attend department seminar (1 credit)
- Submit research report to advisor and reviewing faculty member
- 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)

*For the MA program, formal courses are defined as those for which there is a grade based on course work beyond presentations and participation.

Course selection
On entering the program, the student will consult with the director of the MA program 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 reviewing faculty member, these faculty will 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.
MA students are required to enroll in Graduate Student Seminar in each of the first two semesters in the program.
During the fall semester, all Biological Sciences students (MA, MS, PhD) attend a single seminar class, with the PhD students presenting. MA students prepare written critiques of each presentation and are graded on an S/U basis.
During the spring semester, there is a section of BIO610 specifically for MA students, during which students present and discuss their planned scholarly project.
The presentation is graded by three faculty members, including the student’s advisor and the reviewing faculty member. 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.

**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 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 reviewing and evaluating scholarly literature, to analyzing existing data to answer a new question, to product development. Students may also conduct experimental research for their project, although this type of project is only suggested for students who have previous laboratory experience. MA projects may be supervised by a faculty member from the Biological Sciences department or another department at the university. If the project advisor is not in Biological Sciences, the student should register for research credits (BIO 615 or BIO 680) under the name of the reviewing faculty member.

**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 a reviewing faculty member. At least one of the two faculty members acting as readers must be in the Biological Sciences Department.
D. Suggested Timeline to complete MA requirements

**First Semester**
- Two formal* courses (6-8 credit hours)
- Attend grad student seminar (BIO 610)
- Attend department seminar (BIO 614)
- Identify advisor for scholarly project
- Begin project (BIO 615)
- Submit progress report

**Second Semester**
- Two formal* courses (6-8 credit hours)
- Present scholarly project at grad student seminar (BIO 610)
- Attend department seminar (BIO 614)
- Continue project (BIO 615)
- Select reader for project
- Submit progress report

**Third Semester**
- Complete 18 credit hours of formal* coursework
- Attend department seminar (BIO 614)
- Complete scholarly project (BIO 615)
- Submit project report to advisor and reviewing faculty member
- Submit M form

*For the MA program, formal courses are defined as those for which there is a grade based on course work beyond presentations and participation.
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 STUDENT STANDING

The Director of Graduate Studies, the director of the MA program, and the Graduate Affairs Committee 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 above 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 shall be addressed to the Graduate Affairs Committee and must clearly state what requirements are being petitioned and the reason for the petition.

The Graduate Affairs Committee will meet and decide upon such petitions in a prompt manner.

*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 (i.e. a description of the student’s performance and experience in the program).
• 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 by May 30th or December 30th.

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

Multiple criteria are considered when a student wishes to change programs, including:
  • previous 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 be able to finish his or her thesis research. However, these students, if qualified, 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 by May 30th or December 30th.

FINANCIAL SUPPORT FOR GRADUATE STUDENTS

General Policy
Support of PhD students is guaranteed for six semesters and may be 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 prior to registration. Students who score just below passing (50–55) on the SPEAK test will have an interview with a representative of the ESL department to determine whether the student has 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. If it is available, support will be granted.

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 $2,500 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. Applicants should be in the latter stages of research.

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 may provide 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.

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://wings.buffalo.edu/student-life/graduate/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 places 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 COURSES OFFERED IN BIOLOGICAL SCIENCES

## FORMAL COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Semester</th>
</tr>
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<tbody>
<tr>
<td>500</td>
<td>Bioinformatics &amp; Genome Analysis</td>
<td>4</td>
<td>Spring</td>
</tr>
<tr>
<td>501</td>
<td>Advanced Biological Chemistry</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td>502</td>
<td>Advanced Cell &amp; Developmental Biology</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td>504</td>
<td>Advanced Molecular Genetics</td>
<td>4</td>
<td>Spring</td>
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<td>506</td>
<td>Signal Transduction</td>
<td>3</td>
<td>Fall</td>
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<td>507</td>
<td>Advanced Ecology</td>
<td>3</td>
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<td>Marine Ecology</td>
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<td>Spring</td>
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<tr>
<td>515</td>
<td>Virology</td>
<td>2</td>
<td>Spring</td>
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<tr>
<td>517</td>
<td>Neurobiology</td>
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<tr>
<td>518</td>
<td>Integrative Neuroscience</td>
<td>4</td>
<td>Spring</td>
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<tr>
<td>525</td>
<td>Special Topics in Modern Biology</td>
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<td>Spring</td>
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<tr>
<td>549</td>
<td>Comparative Genomics</td>
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<td>556</td>
<td>Evolutionary Genetics</td>
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## Specialized Courses

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<th>Credits</th>
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<tr>
<td>519</td>
<td>Bioinformatics &amp; Computational Biology</td>
<td>3</td>
<td>Spring</td>
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<tr>
<td>522</td>
<td>Protein-Nucleic Acid Interactions</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>523</td>
<td>Tissue Engineering</td>
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<td>Fall</td>
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<td>526</td>
<td>Special Topics</td>
<td>1-3</td>
<td>Fall &amp; Spring</td>
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<td>540</td>
<td>Experimental Endocrinology</td>
<td>2</td>
<td>Fall</td>
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<td>553F</td>
<td>Evolution Colloquium</td>
<td>2</td>
<td>Fall</td>
</tr>
<tr>
<td>608</td>
<td>Topics in Macromolecular Structure</td>
<td>2</td>
<td>Spring</td>
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## OTHER COURSES

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<td>553S</td>
<td>Evolution Colloquium</td>
<td>Student Presentations</td>
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<tr>
<td>599</td>
<td>Supervised Teaching</td>
<td>Teaching Assistantship</td>
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<td>600</td>
<td>Problems in Biology</td>
<td>Rotation</td>
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<td>Graduate Student Seminar</td>
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<td>Departmental Seminar</td>
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<td>MA Project</td>
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<td>MS or PhD Research</td>
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