

Introduction

Students admitted to the B.A./M.S. program will be awarded the M.S. degree if they complete the requirements described below, receive a grade of B or better in all courses during the one year duration of the program, and achieve passing performance on the final written report and oral presentation of the research project completed during the research year as judged by the Thesis Committee.

M.S. Program Administration

The B.A./M.S. program is administered by the Biology Department. A Molecular and Cellular Biology Program Committee makes final decisions regarding admissions, approves coursework, research programs and mentors for students in the program, and formulates and oversees program policies for the B.A./M.S. program. A Thesis Committee evaluates the final reports and presentations from the research year. If you have questions regarding the program, see the Academic Program Coordinator, Mudd 144.

A. Course Requirements

Students in the B.A./M.S. program must complete all requirements for the B.A. degree (students who complete the requirements for a B.S. degree and then enroll in the M.S. program, will be awarded a B.S./M.S. degree). In addition to the Bachelor's degree requirements, students enrolled in the combined Bachelor's/Master's program must complete the following Master's degree requirements:

- Four additional advanced or specialized courses. At least two of these courses must be at the 600-level or above. The eligible courses are listed below.
- 020.401 and 020.402 Advanced Seminar in Molecular and Cellular Biology (3 credits each). All B.A./M.S. students will participate in this 3-credit weekly seminar during their year in the program. The seminar involves student presentations of research, and discussion of topics of current interest in the field.

020.401 and 020.402 Course Policies and Additional Information:

1. Students in the course will take turns presenting their own research as well as relevant scholarly articles.
 2. This seminar serves three purposes:
 - *to give Masters students a forum for presenting and discussing their research
 - *to learn how to give a good presentation by example
 - *to engage in critical reading of the scientific literature
 3. This is a graded course and attendance is factored into the grade.
 4. Attendance will be taken and students are **expected** to be present for the entire class each week. Students must have an attendance record of at least 90% in order to receive credit for each semester's course.
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- 020.551, 020.552 and 020.553 Mentored Research Program in Molecular and Cellular Biology. The Mentored Research Program provides B.A./M.S. students with intensive research experience for a full academic year. Students in the program work under the direction of a research mentor on an original research project approved by the Molecular and Cellular Biology (MCB) Program Committee, produce a written report in the form of a thesis, and make a presentation of the work to the Biology department. Monitoring the progress of the students during the research year is the responsibility of the research mentors. Students register for 020.551 in the fall, 020.552 in the intersession and 020.553 in the spring. Students receive 9 credit hours per semester for research during the fall and spring semesters of the research year, and 3 credit hours for the intersession. This aspect of the program requires a waiver of the usual limit of 6 research credits per year. This assignment of credits is quite conservative for the expected full-time research work. The usual formula for assigning credits for independent research is 3 hours of work per week per credit hour. According to this formula, 9 credit hours would correspond to 27 hours per week of research, somewhat less than will be expected of the M.S. students during the research year. For each semester of research work, students are assigned a letter grade. The evaluation of the mentor takes into account the progress of the student on the research project. The summary of work done and grade will be submitted to Dr. Robert Horner at the end of each semester and Intersession by the research mentor. (These forms are available on the Masters Program website.) Mentor evaluations must be submitted to the M.S. Program Academic Advisor by the last day of classes each semester.
- The four additional courses may be taken before the final year, but upper level elective courses taken to fulfill the B.A. or B.S. degrees will not fulfill the M.S. degree requirement.

Academic Standing

Letter grades are given for graduate coursework and will be recorded on the permanent transcript. The M.S. Program Committee will conduct a mid-year review of all current Masters students (generally in January) and a year-end review after the second semester. Students not making adequate progress in research, coursework or teaching may be dismissed from the program.

Courses fulfilling the advanced course requirements for the B.A./M.S. program

020.304 Cellular and Molecular Neuroscience
 020.307 Enzymes, Metabolism, and Metabolic Disorders
 020.310/610 Developmental Neurobiology
 020.311 Enzymes and Proteins
 020.312/612 Introduction to the Human Brain
 020.317/614 Signaling in Development and Disease

020.322 Cellular and Molecular Biology of Sensation
020.324 DNA Microarray Technology (Bioinformatics)
020.325 Introduction to the Protein World
020.326 The Sugar Code: The Sweet Side of Life (formerly Intro to Glycobiology)
020.327 Molecular Biology of Extremophiles
020.328 Adopt a Genome: Genomics and sequence analyses*
020.329 The Microbial World
020.331/630 Human Genetics
020.332 Photosynthesis by Land and Aquatic Organisms (Plant Biochemistry)
020.333 Adaptations of Plants to Their Environments
020.334 Planets, Life and the Universe
020.335 Landmarks in Biochemical Research
020.336 Stem Cell Biology (in Development and Disease)
020.342 Proteins
020.344 Virology
020.346 Immunobiology
020.347 AIDS
020.349 Microbial Pathogenesis (Epidemics and Pandemics)
020.352 Topics in Virology and Bacteriology
020.353 Examining Alternative Health Strategies
020.365 Introduction to the Human Skeleton
020.366 Human Evolution
020.367 Primate Behavior and Ecology
020.368 Mammalian Evolution
020.370/670 Emerging Strategies and Applications in Biomedical Research
020.374 Comparative Animal Physiology
020.375 Human Anatomy
020.376/606 Molecular Evolution
020.379 Evolution
020.380 Eukaryotic Molecular Biology
020.383 Molecular Biology of Aging
020.629 Principles of Cancer Biology (Human Cancer Biology and Treatment)
020.634 Chromatin and Transcription
020.637 Genomes and Development
020.638 Regulation and Mechanisms of the Cell Cycle
020.639 Macromolecular Assemblies in Biology
020.642 Proteins: Structure, Folding, and Interaction with Partners
020.646 Biological Spectroscopy
020.651 Retroviruses
020.665 Advanced Biochemistry
020.667 Bioconjugate Techniques
020.668 Advanced Molecular Biology
020.674 Grad Biophysical Chemistry
020.676 Functional Interpretation of Biological Structures
020.680 Molecular Basis of Drug Discovery
020.682 Molecular Recognition and Signaling

020.686 Advanced Cell Biology
020.731 Sem: Molecular Morphogenesis
020.735 Sem: Membrane Trafficking
020.738 Sem: Biological Spectroscopy
020.739 Sem: Topics in Biochemistry

B. Teaching Requirement

Teaching is an integral component of the Master's degree. The teaching requirement can only be fulfilled as a Teaching Assistant for a combination of a biology laboratory and lecture course each semester (fall and spring). For the lecture courses, these duties include participation in examination proctoring and grading of exams and weekly assignments. For the lab courses, these duties include participation in practice labs, teaching one lab section, and grading lab and lecture assignments. If the requirement is not met satisfactorily, a student may be required to teach additional semesters. The teaching assistants will be evaluated by the supervising course instructors. Students may not hold other jobs during the Masters year, including serving as a TA for an additional course beyond the teaching requirement. The requirements of the Masters year are rigorous, and successful completion of the thesis project depends upon having enough hours to spend in the lab.

C. Course Registration and Graduation Clearance

To register for Fall, Intersession and Spring courses, students must meet with Dr. Robert Horner each semester before registration to have their coursework approved. Students should check with Dr. Robert Horner by the end of January to be cleared for May graduation, or by the end of September for December graduation.

D. Thesis and Presentation

The mentored research program culminates in the preparation of a written report (approximately 20 pages) of the research project in the form of a thesis. This report, to be completed by the end of the research year, is first submitted to the research mentor. The mentor will meet with the student to discuss the content and writing, and will request revisions if necessary. This process continues until the mentor approves the report, by submitting a Readers' Letter to Dr. Horner. A sample Readers' Letter is available on the Masters Program website. The student then submits the report to Dr. Horner. Dr. Horner and the student's mentor comprise the two-member Thesis Committee, and are responsible for approval of the final thesis. At the end of the spring semester, each B.A./M.S. student who has just completed the research year will make an oral presentation of the work. The final oral presentation will be twenty minutes in length, with ten minutes set aside afterwards for questions from the audience. Students should model their presentations after those given by Ph.D. and post-doctoral students in the weekly Biology Progress Reports. The written report and oral presentation are evaluated by the Thesis Committee. Passing performance, as judged by the committee, is required for the M.S. degree. The committee's evaluation of the final report and presentation is independent of the evaluations made by the research mentor for purposes of assigning credit hours for work during the research year,

and the committee's evaluation does not affect the credit hours the student receives for research. A student who does not receive a passing evaluation for the final report and presentation will not be awarded the M.S. degree, but may nevertheless receive a B.A. in Biology or a B.S. in Molecular and Cellular Biology if the requirements for these degrees have been fulfilled.

Thesis Format

The Graduate Board has strict rules for the format and submission of the thesis. Failure to comply with these rules may result in rejection of your thesis. To learn about these requirements governing document margins, abstract content, and fees, you will need to visit the MSE Library's website at:

<http://www.library.jhu.edu/services/cbo>

and read BOTH of the following documents:

- a) "Dissertations and Master's Essays"
- b) "Guidelines for the Preparation of Dissertations and Theses"

Dates for submission of all items needed to graduate are:

Graduate Board Deadlines

For students planning to complete in December 2011

September 30 th	Application for Graduation due to Registrar and Title of thesis submitted to Joan Miller
October 28 th	Initial draft of entire thesis submitted to research mentor and Dr. Horner by 4 pm.
Nov. 16 th	All materials (reader's letter and thesis) must be submitted to Dr. Horner by 4 pm.
Nov. 17 th	Thesis must be submitted to the Commercial Binding Office by 4:00 pm. Receipt for submission must be given to MS Program Coordinator.
Dec. 5 th	Final Oral Presentation

For students planning to complete in May 2012

February 13 th	Application for Graduation due to Registrar and Title of thesis submitted to Joan Miller
March 23 rd	Initial draft of entire thesis submitted to research mentor and Dr. Horner
April 11 th	All materials (reader's letter and thesis) must be submitted to Dr. Horner by 4:00pm. Note: Reader's letter must be dated April 1st.
April 12 th	Thesis must be submitted to the Commercial Binding Office by 4:00 pm. Receipt for submission must be given to MS Program Coordinator.
May 7 th , 8 th	Final Oral Presentation

May 25th

Graduation and MS Program Luncheon

E. Application for Graduation

An application for graduation must be completed online. Please see the Registrar's website commencement information for this form.

F. Readers' Letter

The readers' letter is written to Dr. Horner from the student's research mentor. This letter, which must be on departmental letterhead and dated April 1, 2012, must indicate that the mentor is satisfied with the written thesis. A sample readers' letter is available on the Masters Program website. Please see the Deadlines section for when this letter is due to Dr. Horner.

G. Academic Integrity

Students in the Master program are governed by the Graduate Board's Policies on Academic Integrity and Student Conduct (reproduced below). Students are honor-bound to report violation of these policies to the appropriate faculty member(s). If the matter cannot be mutually settled by the faculty member (and/or departmental chair) and the student, an ad-hoc ethics board is to be convened by the Dean of the Graduate School. This board will consist of a minimum of three members, (at least two faculty members and at least one graduate student).

Academic Integrity

In all aspects of their work, students assume an obligation to conduct themselves in a manner appropriate to the Johns Hopkins University's mission as an institution of higher education. A student must refrain from acts that he or she knows, or under the circumstances has reason to know, may impair the academic integrity of the University. Violations of academic integrity include, but are not limited to: cheating, plagiarism; submitting as one's own the same or substantially similar work of another; knowingly furnishing false information to any agent of the University for inclusion in the academic records; dishonesty in discharging teaching assistant duties; falsification; forgery.

Student Conduct

The university expects all students to respect the rights of others, and to refrain from behavior that impairs the University's mission of teaching, research/scholarship, and outreach to the local, national, and international community. Violations of appropriate student conduct may include, but are not limited to: harassment behavior (physical or verbal); intimidation or verbal abuse; actions that are a danger to one's own personal safety or that may harm others, and actions that destroy, impair, or wrongfully appropriate property.

Students are expected to know and abide by University policies governing student conduct and academic integrity. Those who impair the University's mission are subject to

expulsion. Refer to your divisional academic policies and procedures for specific information.

H. Health Insurance

It is University policy that all full-time students maintain adequate health insurance coverage. As a full-time student, you must either purchase the University plan or sign a waiver indicating you have health insurance coverage comparable to the University plan (International Students are required to purchase the University plan). Details about the student health plan offered by the University are available on the Registrar's website.

I. Disclaimer

This booklet presents current (September 2011) guidelines and practices for the BA/MS Program. The Program Committee and Department Chair reserve the right to modify requirements, create new ones and otherwise alter graduate program practices without advance notice.

SAMPLE SCHEDULE

Fall	Intersession	Spring	Summer
020.401	020.552*	020.402	990.892**
020.551		020.553	
2 Approved Bio Electives		2 Approved Bio Electives	

* All students are required to register and be in residence during the Intersession.

** Summer research is only required for students who have worked in their present research lab for less than two semesters. Students will receive a grade for this research, however, the grade and credits will not appear on the official transcript or fulfill the research credit requirements toward the MS degree.

MS Program Directory

Beverly Wendland	Department Chair	(410)516- 4693	Mudd 122	bwendland@jhu.edu
Robert Horner	Senior Lecturer	410-516- 8067	Macaulay 313	rdhorner@jhu.edu
Rebecca Pearlman	Lecturer	410-516- 3379	Macaulay 305	pearlman@jhu.edu
Samer Hattar Trina Schroer Haiqing Zhao	Masters Program Committee	410-516- 4231 410-516- 5373 410-516- 7391	Mudd 227 Mudd 220 Mudd 224A	shattar@jhu.edu schroer@jhu.edu hzhao@jhu.edu
Joan Miller	Academic Affairs Administrator	410-516- 5502	Mudd 144	joan@jhu.edu
Jessica Kastner	Academic Program Coordinator	410-516- 4704	Mudd 144	jess.kastner@jhu.edu