Department of Biology GRADUATE STUDENT HANDBOOK

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A. INTRODUCTION

The major objectives of the Biology M.S. program are to provide the graduate student with (1) the course work necessary to develop a strong background in a sub discipline of biology, (2) an opportunity to plan, conduct and report on an original research project, (3) an intellectual atmosphere under which faculty and students can exchange ideas, and (4) encouragement to become involved in professional scientific meetings. The goal of the graduate program is to provide educational institutions, government, industry and society with well-prepared, professional biologists.

Program requirements are designed to allow the student's major advisor and Advisory Committee flexibility to create a plan of course work and research around the needs of the individual student, taking into account the student's previous background and future career goals. In addition to departmental requirements, the student must satisfactorily complete all University requirements as set forth in the Graduate Bulletin.

B. ADMISSION POLICIES

University and Departmental requirements for Regular Admission to the graduate program in biology:

- Undergraduate degree with a major in the biological sciences.
- Overall GPA of 3.0
- Biology GPA of 3.0
- GRE General Test Scores
- Statement of interests
- Transcripts
- Three (3) letters of recommendation
- Faculty Advisor Acceptance

A successful applicant will have an undergraduate degree in the biological sciences, including coursework in genetics. In addition, one year of General Chemistry with lab and at least one semester of Organic Chemistry is required for the M.S. in Biology and one year of General Chemistry is required for the M.S. in Conservation Biology. Graduate students granted conditional admission must petition for Regular admission after deficiencies have been removed. Application forms for regular admission are available at Graduate Studies and on the departmental web sites.

C. PROGRESS TOWARD A DEGREE

Graduate students in the Biology Department are expected to complete their Master's degree in 4-5 semesters. To complete the MS degree in a timely fashion, students should adhere closely to the schedule listed below. Plan A graduate students are advised to take a heavy course load during their first 2 semesters so that they can devote more time to data collection, data analysis and thesis writing during summers and semesters 3-5. Students who do not make satisfactory progress toward a degree will not be eligible for departmental support (teaching or research assistantship).

Graduate Program Schedule

Semester	Program Requirements	Form	Plan A cr. hrs.	Plan B cr. hrs.
1	Form Advisory Committee Select course plan	Committee Selection (BIO office) Authorization of Degree (GRAD office)	9	9
2	Complete prospectus Advisory Committee meeting IACUC approval* Reapply for GTA	Feb. 1: Prospectus for Thesis (GRAD office) Feb. 1: Reappointment application (BIO office) IACUC Project Review	9	9
3	Committee meeting		6	9
4	Thesis to committee (March) Oral or written exam Submit thesis Department checkout	Plan A/B Sign-off (GRAD office) Thesis check list (GRAD office) Check list (BIO office) Graduation Application (GRAD office)	6	9
Total			**30**	**36**

*See https://www.cmich.edu/office_provost/ORSP/ComplianceandResearchIntegrity/AnimalSubjects/Pages/default.aspx

1. **Selection of a Major Advisor** -- Major Advisors are assigned as part of the application process. This assignment need not be permanent. If the student's emphasis changes, a new major advisor can be selected. The Graduate Coordinator, Department Chairperson, and Graduate Program Administrator must, however, be notified in writing by the student of any change in major advisor.
2. **Selection of an Advisory Committee** -- Students must select a Advisory Committee in consultation with their advisor during the first semester of course work. The Committee will consist of the student's major advisor and at least two additional members of the graduate faculty. A graduate faculty member from a cognate area may serve as one of three committee members. The Advisory Committee will review and approve the student's course requirements and research program. The Committee will administer a final oral and/or written exam. The graduate student must complete a *Graduate Committee Selection* form (available online).
3. **Selection of Academic Program** -- In consultation with the Advisory Committee, the student must choose a program of course work and decide between pursuing either the Plan A or Plan B degree. An Authorization of Graduate Degree Program (available online) must then be completed in consultation with the advisor, and filed with the College of Graduate Studies and the Biology Department office. This form must be completed by February 1 for students entering in the Fall semester and October 1 for students entering in the Spring semester.

4. **Prospectus –** A draft of the thesis should be completed by the end of the first semester. The prospectus must be approved by the student's major advisor and submitted to the Department Office by February 1 for students entering in the Fall semester and October 1 for students entering in the Spring semester. Students must also complete a Prospectus form (available online) in consultation with their advisor and thesis committee. The Prospectus form and accompanying abstract must be filed with the College of Graduate Studies and the Department of Biology office before thesis research is began. Students cannot enroll in more than 3 thesis credits (BIO 798) unless the Prospectus form is complete. It is understood that some students will continue to revise their prospectus as they progress through their second semester and into the summer.

D. ACADEMIC PROGRAM FOR M.S. DEGREE

1. **Plan A degree requirements**

   a. Course requirements – At least 30 semester hours of approved graduate course work must be completed; 15 of these hours must be at the 600 level or above. These 30 hours must include BIO 500, BIO 630, 6 hours of Thesis (BIO 798) and 1 hour of Seminar (BIO 730). Up to 9 hours of Thesis credits can be applied towards the degree. No more than 1/3 of the student's graduate course work may be earned in unspecified content courses, i.e., BIO 594, 597, 610, 620 unless approval is given. Up to 10 hours may be earned in cognate areas. Candidates for this degree may transfer a maximum of 15 credit hours of approved graduate credit from other institutions. All degree requirements must be completed within seven years after admission to the program.

   b. Thesis requirements -- The Biology Department requires that a prospectus, as well as Prospectus form (https://www.cmich.edu/colleges/cgs/GSNewandCurrentStudents/GSApplicationsandForms/Pages/Thesis_Doctoral_Projects_and_Dissertations.aspx), signed by all members of the student's Thesis Advisory Committee be on file in the Biology office before the student enrolls in Thesis (BIO 798).

   All graduate students using vertebrates in their research must have IACUC approval for the use and care of animals before any work can begin. See https://www.cmich.edu/office_provost/ORSP/ComplianceandResearchIntegrity/AnimalSubjects/Pages/default.aspx

   All graduate students using humans in their research must have IRB approval of their research before any work can begin. See https://www.cmich.edu/office_provost/ORSP/ComplianceandResearchIntegrity/HumanSubjects/Pages/default.aspx

   A Preparation Guide for Thesis, Field Study, or Dissertation compiled by the College of Graduate Studies is available online at: https://www.cmich.edu/colleges/cgs/GSNewandCurrentStudents/GSApplicationsandForms/Pages/Thesis_Doctoral_Projects_and_Dissertations.aspx

   Students should present near-final drafts of the thesis to each member of their committee at least two weeks prior to the expected date of the final oral examination.

   c. Final oral examination -- The examination committee consists of the Advisory Committee, but any member of the graduate faculty can attend the examination. The examination generally includes the student's defense of his thesis work, but any

aspect of the student's graduate program is open for discussion. This exam should generally be scheduled during fall or winter semester, when committee members are available. The Plan A & B Completion Approval Form (available online) must be completed and distributed upon completion of the final oral examination.

d. An electronic copy of your thesis needs to be submitted to the College of Graduate Studies. For instructions on submitting your thesis please visit this link: https://www.cmich.edu/colleges/cgs/GSNewandCurrentStudents/GSApplicationsandForms/Pages/Thesis_Doctoral_Projects_and_Dissertations.aspx

   The College of Graduate Studies will review your project, save the document as a PDF, and forward it to the Park Library for uploading into the University's CONDOR (CMU Online Digital Object Repository).

   Bound copies of thesis are not required but an option. Please contact Printing Services at 989-774-3216 to inquire about having your thesis bound and added to the Libraries' collection:

e. Upon completion of all degree requirements the departmental Checkout List (available online) must be completed and on file in the Department of Biology office.

2. **Plan B degree requirements**

Plan B consists primarily of course work, requires no thesis, but must include additional significant evidence of scholarship, such as research, independent study, internships, or practicum, or creative/artistic work appropriate to the field of discipline.

a. Course requirements – At least 36 semester hours of approved graduate course work must be completed with at least 15 of these hours at the 600 level or above. Up to 10 hours may be in one or more cognate areas. No more than 1/3 of the student's graduate course work may be earned in unspecified content courses, i.e. BIO 594, 597, 610, 620. A course in statistics is recommended. Candidates for this degree may transfer a maximum of 15 credit hours of approved graduate credit from other institutions. All degree requirements must be completed within seven years after admission to the program. Credit earned in BIO 798 (Thesis) may not be applied to this degree.

b. Final examination -- The content and type of final examination for the Plan B student will be determined by the Advisory Committee at the time that the Authorization for the Graduate Degree Program form is completed. It may be an oral or written examination and it may cover course and/or research material. This exam should generally be scheduled during fall or winter semester, when committee members are available. The Plan A & B Completion Approval Form (available online) must be completed upon completion of the examination.

c. Upon completion of all degree requirements the departmental Checkout List (available online) must be completed and on file in the Department of Biology office.

3. **M.S. in Conservation Biology**

The Biology: Conservation Biology program is designed to prepare students for career opportunities with state and federal agencies and conservation organizations. Course requirements follow those of Plan A or Plan B with the following additions. In addition to

the Plan A required courses above, Conservation Concentration students must complete a course in Conservation Biology (BIO 680) and Population Biology (BIO 650) as well as a community ecology course.

E. ACADEMIC STANDARDS

Graduate students are expected to maintain a 3.0 or better GPA in their graduate program. If semester GPA falls below a 3.0, Graduate Studies will place the student on academic probation. A GPA below 3.0 for two consecutive semesters is sufficient justification for removing a student from degree candidacy or for removing financial assistance.

F. ACADEMIC LOAD

The normal academic load for a graduate assistant is 6-10 hours. Graduate teaching assistants and research assistantships must be registered for at least 6 hours of graduate credit during each term they hold an appointment.

G. RESPONSIBILITES OF THE GRADUATE STUDENT

1. Read the departmental Graduate Handbook and university Graduate Bulletin.
2. Complete required courses maintaining a GPA> 3.0.
3. Submit a prospectus of thesis research to the Biology Department (Plan A).
4. If you are a graduate teaching assistant, you must apply for reappointment each year (February 1).
5. Attend all Biology department seminars.
6. Present a Biology department seminar on your thesis research (Plan A).
7. Meet regularly with your major advisor and thesis committee.

H. RESPONSIBILITIES OF THE MAJOR ADVISOR

The graduate advisor is responsible for all phases of the student's program of study. It is of the utmost importance that a good channel of communication be open between the advisor and student. All problems and questions should be brought to the attention of the advisor first before seeking assistance elsewhere.

1. Read the graduate handbook.
2. Acquaint students with your laboratory and its policies.
3. Discuss overall program of study and course requirements with graduate students.
4. Discuss your expectations regarding thesis research projects, time table, publication, etc.
5. Help graduate students choose a thesis committee.
6. Assist with experimental protocol, data analysis, scientific writing, and seminar preparation.
7. Encourage students to attend professional meetings.
8. **Meet regularly with graduate students to assess progress.**

I. FINANCIAL ASSISTANCE

1. Graduate Assistantships

Both research and teaching assistantships are available through the Biology Department each academic year. Tuition for up to 20 credits per year is waived for full-time graduate assistants.

Research Assistantships: Individual faculty members offer students summer and academic year RA's funded through grants and contracts.

Teaching Assistantships: New and returning graduate students must apply for teaching assistantships. Application deadline for teaching assistantships (available online) is generally February 1 for the following academic year. Applications can, however, be placed on file at any time. Generally, students may be awarded graduate teaching assistantships for a maximum of four semesters, excluding summers. Minimum requirements for appointment or reappointment as a GTA are provided online.

2. Graduate Fellowships

The University offers a limited number of graduate fellowships and Biology graduate students are encouraged to apply for these fellowships. Tuition for up to 24 hours per year is waived for graduate fellowships. Applications for graduate fellowships are available from the College of Graduate Studies (available online). Applications for fellowships awarded through federal agencies can be obtained through the Office of Research and Graduate Programs, Foust 251, 989-774-6777.

3. Scholarships

The Biology Department offers numerous scholarships that can be used to support graduate student research and classes. Please visit the site below:
https://www.cmich.edu/colleges/cst/biology/Pages/Biology-Scholarships.aspx

4. Funding to support research

Graduate students can request financial assistance for research expenses from the College of Graduate studies. Applications and instructions are available on the site below:
https://www.cmich.edu/office_provost/ORSP/StudentResources/Pages/default.aspx

5. Funding to support travel

If a graduate student is planning to travel to regional, national or international meeting to present results of CMU research, funding is available from the College of Graduate Studies, the College of Science and Technology, and the Department of Biology. Applications and instructions are available on the site below:

https://www.cmich.edu/colleges/cst/biology/Pages/Forms-for-Biology-Graduate-Students.aspx

J. CMU BIOLOGY GRADUATE STUDENT ASSOCIATION

The CMU-BGSA welcomes all biology graduate students. This informal organization meets as necessary to discuss problems that affect the biology graduate student, especially in regard to curricula, available equipment for research, faculty proceedings, and faculty-student interaction. New biology graduate students are encouraged to attend

the meetings to help acquaint them with other students and to become familiar with the programs in the department.

K. CMU Policies

You should familiarize yourself with CMU's policies on Academic Integrity and Research Integrity, which can be found at:

https://www.cmich.edu/colleges/CCFA/CCFABroadcastandCinematicArts/CCFABCAAcademics/Documents/ACADEMIC_INTEGRITY_POLICY.pdf#search=academic%20integrity

https://www.cmich.edu/office_provost/ORSP/ComplianceandResearchIntegrity/Documents/Integrity.pdf

BIOLOGY DEPARTMENT – FULL GRADUATE FACULTY
(ELIGIBLE TO SERVE AS GRADUATE ADVISORY COMMITTEE CHAIRS)

ELIZABETH ALM, Professor, Ph D., University of Illinois. microbial Ecology, Environmental Microbiology.

ROBERT E. BAILEY, Professor, Ph.D., Indiana University. Quaternary paleoecology, ecological systems analysis, environmental impact assessment.

HUNTER CARRICK, Professor, Ph.D., University of Michigan. How human activities alter water, and ultimately how this influences the health and biogeochemistry of natural ecosystems (nutrient cycling, productivity, gas exchange).

GREG COLORES, Associate Professor, Ph.D., University of Colorado. Microbial Ecology, Soil Microbiology, Biodegradation.

CYNTHIA DAMER, Professor, Ph.D., University of Virginia. Cell biology, genetics, microscopy.

JOANNE DANNENHOFFER, Professor, Ph.D., University of Wisconsin. Molecular biology, biochemistry, genetics and microscopy applied to studies of protein deposition in maize endosperm and phloem proteins.

PETER DIJKSTRA, Assistant Professor, Ph.D., University of Groningen. Behavioral ecology, animal physiology, endocrinology, evolution.

TRACY GALAROWICZ, Professor and Chair, Ph.D. University of Illinois. Fish Ecology and Management.

THOMAS M. GEHRING, Professor, Ph.D., Purdue University. GIS applications, landscape ecology, management of wildlife-human conflicts, predator-prey ecology, and wildlife conservation.

STEVEN W. GORSICH, Associate Professor, Ph.D., University of Utah. Genetics, cell biology, and molecular biology of yeast mitochondria maintenance and stress tolerance.

PHILIP L. HERTZLER, Professor and Graduate Coordinator, Ph.D., University of California, Davis. Developmental biology of aquatic and marine invertebrates.

STEPHEN J. JURIS, Associate Professor, Ph.D., University of Michigan. Toxin biochemistry, molecular mechanisms of bacterial pathogenesis, cellular biology of host-pathogen interactions.

XANTHA KARP, Assistant Professor, Ph.D., Professor, Columbia University. Genetics, Developmental Biology, Cell Biology.

JONATHAN KELTY, Associate Professor, Ph.D., Miami University, Oxford Ohio, Neurobiology, neural control of respiration, environmental physiology.

PETER S. KOURTEV, Associate Professor, Ph.D., Rutgers, The State University of New Jersey. Structure and function of microbial communities in the environment.

DERIC LEARMAN, Assistant Professor, Ph.D., Virginia Tech, Geomicrobiology, Microbiology, Molecular Mechanisms.

DEBRA LINTON, Associate Professor, Ph.D., Rutgers, The State University of New Jersey. Ecology, Biology education.

ERIC W. LINTON, Associate Professor, Ph.D., Rutgers, The State University of New Jersey. Bioinformatics, eukaryotic microbiology and systematics.

ANDREW MAHON, Associate Professor, Ph.D., Old Dominion University. Molecular ecology and systematics.

SCOTT McNAUGHT, Professor, Ph.D., University of Michigan. Director, Michigan Water Research Center. Limnology, zooplankton and larval fish ecology, statistics.

ANNA MONFILS, Associate Professor, Ph.D., Michigan State University. Plant Biology, Botany and Systematics.

KIRSTEN E. NICHOLSON, Associate Professor and Curator of Natural History, Ph.D, University of Miami. Evolution and systematics of vertebrates, particularly reptiles and amphibians; museum studies.

CHARLES E. NOVITSKI, Associate Professor, Ph.D., California Institute of Technology. Eukaryotic molecular biology, recombinant DNA technology, plant nematode development.

KEVIN PANGLE, Assistant Professor, Ph.D., Michigan State University. Predator-prey interactions, Phenotypic plasticity, and Great Lakes food webs.

JOHN I. SCHEIDE, Associate Professor, Ph.D., Louisiana State University. Mechanism and regulation of ion transport in cells and tissues of vertebrate and invertebrate species.

JENNIFER SCHISA, Professor, Ph.D., SUNY at Stony Brook. Genetics, molecular biology, and microscopy applied to studies of germ cells in the nematode, *C. elegans*.

NANCY SEEFELT, Ph.D., Michigan State University, Ecology and evolution of vertebrates, museum studies.

MICHELLE L. STEINHILB, Associate Professor, Ph.D., University of Michigan. Genetic models of human neurodegenerative disease, cellular and molecular neurobiology.

BRAD SWANSON, Professor, Ph.D., Purdue University. Ecology, molecular ecology, conservation biology, population genetics, population dynamics, animal behavior.

DON UZARSKI, Professor, Ph.D., Michigan State University. Wetland Ecology, Great Lakes Ecology, Nutrient Cycling, Ecosystem Ecology.

DAELYN WOOLNOUGH, Research Assistant Professor, Ph.D., Iowa State University. Spatial Ecology and Conservation Ecology.

DAVID ZANATTA, Associate Professor, Ph.D., University of Toronto. Molecular ecology and conservation biology in aquatic systems.