Biology PhD, Ecology, Evolution and Behavior Emphasis

The doctoral program emphasizes empirical and theoretical approaches to biological research. Students are required to integrate basic skills in biology with focal studies in an emphasis area. The program is designed to provide research experience and training appropriate for advanced positions in academic research and teaching, government and public agencies, and industry.

Admission Requirements

Applicants must meet the general graduate admission requirements of the Graduate School, described in the UMSL catalog. Students are considered for admission to the graduate program in Biology only after they have formally applied for admission through the Graduate School. Applications may be completed on-line.

In addition to Graduate School admission requirements, applicants to the Ph.D. in Biology program must submit three letters of recommendation submitted from individuals able to comment on academic potential (such as faculty members at previously attended colleges or universities) and transcripts of all postsecondary academic work. We encourage GRE scores (Verbal, Quantitative, and Analytical) to be sent as well; however these are not required. Admission to the Ph.D. program normally requires a minimum grade point average overall and in biology courses of 3.0 (where A=4.0). Applicants from countries where English is not a primary language are required to meet the language requirements set by UMSL Global. Scores must be submitted before admission can be decided.

Applicants should have a bachelor's or M.S. degree from an accredited United States college or university or evidence of equivalent training at an accredited institution outside the United States. They should have the appropriate background for graduate work in biology, including courses in genetics, biochemistry, and evolution. Courses in organic chemistry, college physics, and calculus are expected. Students admitted to the Ph.D. program who have not met all the prerequisites may be required to make up deficiencies before admission to candidacy. The deficiencies will be decided during orientation meetings prior to the start of the second semester.

Degree Requirements

In addition to the general requirements of the Graduate School, the basic requirements for the Ph.D. degree in Biology include 60 graduate credit hours. At least 30 of the 60 hours must be taken at the 5000 or 6000 level. With the explicit consent of the graduate committee, students may take for graduate credit up to 3 credit hours of 3000 level courses in allied departments. Courses in biology at the 3000 level and below are not available for graduate credit. At least 31 of the 60 hours must be taken while in residence at the University of Missouri-St. Louis. Graduate credit for course work transferred from another program is subject to approval by the graduate committee and by the Graduate School. Graduate courses taken elsewhere will be considered for transfer credit during orientation meetings conducted prior to the start of the second semester of enrollment.

The requirements for all Ph.D. students include:

Coursework

- At least 30 credits of course work, including the following required courses (20 credits total)

BIOL 6889	Graduate Seminar	6
BIOL 5178 & BIOL 5179	Introduction to Graduate Research in Biology and Ethical Issues in Biology (to be taken in first year)	2
BIOL 5436	Advanced Applied Bioinformatics	3
BIOL 4122	Biostatistics	3
BIOL 5012	Advanced Genetics	3
BIOL 5302	Advanced Evolution	3
Total Hours		**20**

- Up to 30 credits of graduate research (BIOL 6905)

The maximum number of credit hours that may be applied toward the 60-hour requirement is limited as stated below:

- BIOL 6889, Graduate Seminar: 10 hours
- BIOL 6905, Graduate Research: 30 hours

The department also offers five 1-credit journal-club-style classes, focusing on different topics. A maximum of six credits from this group of courses can be applied towards the degree:

BIOL 5059	Topics in Ecology, Evolution, and Systematics	1
BIOL 5069	Topics in Cellular and Molecular Biology	1
BIOL 5079	Topics in Floristic Taxonomy	1
BIOL 5089	Topics in Animal Behavior	1
BIOL 5099	Biology Colloquium	1

Emphasis areas

Each Ph.D. student should select one of three emphasis areas, and choose at least six credit hours of appropriate elective courses to fit this area in consultation with their advisor. These emphases include Ecology, Evolution, and Behavior (EEB), Cellular and Molecular Biology (CMB), or Integrative Biology (IB), which would involve a combination of coursework from both of the previous emphases. Other courses may be included as electives with prior approval of the program coordinator.

Ecology, Evolution and Behavior Electives

BIOL 5192	Community Ecology	3
BIOL 5312	Theory of Systematics	3
BIOL 6102	Advanced Topics in Behavioral Ecology	3
BIOL 6182	Advanced Population Biology	3
BIOL 6502	Advanced Evolution of Cognition	3

Cellular and Molecular Biology Electives

BIOL 6442	Advanced Developmental Biology	3
BIOL 6550	Advanced Bacterial Pathogenesis	3
BIOL 6602	Advanced Molecular Biology	3
BIOL 6608	Advanced Synthetic Biology	3

BIOL 6615	Advanced Biotechnology Laboratory II	4
BIOL 6622	Advanced Cellular Basis of Disease	3
BIOL 6632	Advanced Nucleic Acid Structure and Function	3
BIOL 6642	Advanced Plant Biology and Biotechnology	3
BIOL 6652	Advanced Virology	3

Integrative Biology Electives

BIOL 5192	Community Ecology	3
BIOL 5312	Theory of Systematics	3
BIOL 6102	Advanced Topics in Behavioral Ecology	3
BIOL 6182	Advanced Population Biology	3
BIOL 6502	Advanced Evolution of Cognition	3
BIOL 6608	Advanced Synthetic Biology	3
BIOL 6615	Advanced Biotechnology Laboratory II	4
BIOL 6622	Advanced Cellular Basis of Disease	3
BIOL 6632	Advanced Nucleic Acid Structure and Function	3
BIOL 6642	Advanced Plant Biology and Biotechnology	3
BIOL 6652	Advanced Virology	3

Maintenance of Status

All students are expected to maintain a GPA of 3.0 or better. To maintain their status in the program, normally students will meet formally each year with their thesis committee, or if that has not been formed yet, with their dissertation advisor.

Identifying a Dissertation Advisor

All PhD students must identify a dissertation advisor, via mutual consent between the student and the advisor. Students entering the program with an agreement in hand may join the lab in their first semester (this is more common for the EEB emphasis). Alternatively, students entering the program may rotate through three labs to identify a permanent lab and advisor (more common for the CMB emphasis). Additionally, students are expected to work with their advisor to assemble their dissertation committee by the end of the 2nd year.

In the event that a student's interest changes or the dissertation advisor feels the student's direction no longer falls with his/her area of expertise, the student and advisor should discuss whether a change of advisor is warranted. The graduate director must be notified in writing of any change in advisors. If a student or advisor is uncomfortable discussing the issue directly with the other, he/she is encouraged to meet with the director of the graduate program. If a student is unable to identify an advisor, they may be dismissed from the PhD program, typically with the option of completing an MS degree.

Qualifying Examination

All students must pass a qualifying examination, consisting of a written and oral component, which will normally be taken in the fall semester of the third year of graduate school. When a candidate has prior graduate experience or an especially strong undergraduate preparation, the examination may be taken earlier. Alternatively, those who require extra time due to a high load of language classes or missing prerequisite courses may petition for a one-time extension.

Admission to Candidacy

To be admitted to candidacy, students must satisfy the requirements of the Graduate School, which includes passing all qualifying examinations and completing all required course work.

Dissertation Proposal

All students must defend orally a written dissertation proposal to their dissertation committee. After successful defense, the proposal must be submitted to the director of graduate studies in biology and approved by the Graduate School. The proposal is to be successfully defended by the end of the sixth semester.

Dissertation

A dissertation embodying the results of original research shall be submitted to and approved by the Department of Biology and the Graduate School. The general regulations of the Graduate School concerning the preparation of the dissertation must be met. These rules include a public oral defense of the written dissertation. Dissertations are to be presented in a style appropriate for one or more publications in scientific journals.

Teaching

At least one semester of supervised teaching is required of all doctoral students.