PhD in Biochemistry

Degree Requirements

Along with courses and seminars, students embark on lab rotations, dissertation research, qualifying and comprehensive exams and committee meetings, culminating in the dissertation defense. Prior to successfully completing the comprehensive examination, a student must complete nine credit hours per semester, or four per summer, to remain a full-time graduate student. Following successful completion of both parts of the comprehensive exam, each student should register for a minimum of two hours of thesis/dissertation research per semester (or one in summer) to maintain continuous enrollment. More than the minimum may be needed to obtain the 72 credit hours required by the MU Graduate School (http://gradschool.missouri.edu) for completion of the PhD.

Core Course Work

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIOCHM 8240</td>
<td>Introduction to Graduate Biochemistry I</td>
<td>4</td>
</tr>
<tr>
<td>BIOCHM 8260</td>
<td>Macromolecular Systems Integration</td>
<td>4</td>
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</table>

Elective Course Work

PhD students are required to take two additional 8000/9000-level science courses. The following are recommended and pre-approved:

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<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>BIOCHM 9430</td>
<td>Molecular Biology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOCHM 9432</td>
<td>Molecular Biology II</td>
<td>4</td>
</tr>
<tr>
<td>BIOCHM 8430</td>
<td>Physical Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHM 8432</td>
<td>Enzymology and Metabolic Regulation</td>
<td>3</td>
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Ethics Seminar

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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BioCHM 8060</td>
<td>Ethical Conduct of Research</td>
<td>1</td>
</tr>
</tbody>
</table>

* All graduate students are required to earn a grade of B or better.
# A student who earns a grade of C or lower in any of these courses must retake the course.

Department Seminars

Students are expected to attend all department seminars (http://www.biochem.missouri.edu/news-events/seminars).

Teaching Experience

An important part of graduate education is learning to communicate effectively as a teacher. Two semesters enrolled in BIOCHM 9001 helps prepare the students for their teaching assistant experience which consists of one semester in an undergraduate laboratory or lecture venue. This is a required component of PhD degrees and typically is performed in the second year of graduate study. Students must satisfy this teaching experience requirement with a grade of B or better to remain in good standing as a graduate student in Biochemistry. This teaching experience usually involves assisting a faculty member in one of several courses and interacting with the students fairly extensively. The Biochemistry Department also offers a Zahler Fellowship for graduate students interested in teaching as a career. Missouri requires that students whose first language is not English demonstrate adequate oral proficiency before assisting in teaching.

Qualifying Process

Students who have earned grades of B or better in the required courses of BIOCHM 8240 Introduction to Graduate Biochemistry I and BIOCHM 8260 Macromolecular Systems Integration and are in good standing academically (cumulative GPA 3.0) should take the oral qualifying exam in May after their second semester. Failure to complete the oral qualifying exam by June of the second year will result in dismissal from the PhD program. Students who have received a C in a core course must retake the course and receive a grade of B or better to remain in the PhD program, even after passing the oral qualifying exam.

Comprehensive Examination Process

Students who have passed the qualifying exam should complete the written comprehensive exam within the next one to two semesters (by May of their second year). This examination involves writing a proposal for doctoral research in the format of a federal postdoctoral fellowship application. The student must then orally defend the proposal before his/her doctoral program committee plus a member of the graduate education committee. This is designed to assess the student’s ability to think critically about science and to communicate effectively both in writing and in an oral presentation.

Dissertation Requirements

BIOCHM 9087

Students should enroll in the first round of the one-hour seminar BIOCHM 9087 during the first semester. BIOCHM 9087 in the fall semester is designed to teach the fundamental techniques of oral presentation of scientific information, slide preparation, computer graphics, overhead preparation, etc., as well as research-compliance training. Students should complete three additional semesters of BIOCHM 9087 in spring semesters for a total of four credit hours. A student’s first spring BIOCHM 9087 seminar is devoted to a presentation of the proposed dissertation research. The second should provide an update of research progress or a review of major journal papers in the student’s research area. The third should be a practice for the dissertation defense. The student’s thesis committee is expected to attend these presentations at the invitation of the student. A meeting with the doctoral program committee (DPC) can be arranged after the seminar presentation and may serve as the required annual meeting.

Thesis/Dissertation Research

BIOCHM 9900

Prior to successfully completing the comprehensive examination, a student must complete nine credit hours per semester, or four per summer, to remain a full-time graduate student. Following successful completion of both parts of the comprehensive exam, each student should register for a minimum of two hours of thesis/dissertation research per semester (or one in summer) to maintain continuous enrollment. More than the minimum may be needed to obtain the 72 credit hours required by the MU Graduate School (http://gradschool.missouri.edu) for completion of the Ph.D.

Research Rotations

Starting in the fall semester of the first year, each student completes three laboratory rotations with the aim of identifying a lab in which to conduct PhD thesis research. By the end of the second semester, most students have chosen their labs. Each rotation should be conducted for a period of at least eight weeks. Two rotations are performed in the first semester, with the second rotation ending Dec. 31. The third rotation begins Jan. 1 or soon after. One-half of the student’s time and effort should be directed toward the rotation project and the other half toward course work. The rotation laboratory should serve as an academic
home, and the student should participate in all usual laboratory activities, including weekly group meetings.

**Admissions**

Biochemistry Graduate Admissions Support  
117 Schweitzer Hall  
Columbia, MO 65211  
(573) 882-4846, (800) 647-2414  
gradprogram@missouri.edu

Applicants are required to meet two sets of minimum qualifications for admission: the requirements of the PhD in Biochemistry program (http://gradstudies.missouri.edu/academics/programs/biochemistry/doctorate.php) and the minimum requirements of the Graduate School (http://gradschool.missouri.edu/admissions/eligibility-process/minimum-requirements.php). Because requirements vary, you must refer to a degree program's graduate admission page to learn about specific admission criteria, application deadlines, eligibility and application process. Before official admission to the University of Missouri, your application materials will be reviewed by both the Graduate School and the degree program to which you've applied.