DOCTOR OF PHILOSOPHY (PHD) DEGREE IN THE FIELD OF BIOCHEMISTRY AND CELL BIOLOGY

Program Learning Outcomes for the PhD Degree in the field of Biochemistry and Cell Biology

Upon completing the PhD degree in the field of Biochemistry and Cell Biology, students will be able to:

1. Develop a comprehensive knowledge of current and past research accomplishments and techniques in biochemistry and cell biology.
2. Demonstrate independent problem solving and critical thinking skills.
3. Demonstrate effective written, oral, and visual communication skills required to articulate scientific findings and significance via publications, seminars, and a thesis describing independent research.

Requirements for the PhD Degree in the field of Biochemistry and Cell Biology

For general university requirements, please see Doctoral Degrees (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-doctoral-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/). Students pursuing the PhD Degree in the field of Biochemistry and Cell Biology must complete the requirements as listed below.

Course Requirements

Most of the formal course studies will be completed in the first year of residence to allow the students to commence thesis research at the end of their second semester at Rice. During the first year, the BCB Graduate Advisory Committee will advise all graduate students. This committee will determine the formal course program to be taken during the first year in residence. Students are required to have training in biochemistry and cell biology; training in genetics and physical chemistry or biophysics is also beneficial. Students lacking formal training in biochemistry or cell biology are required to take the equivalent background courses during their first year.

The following Rice courses must be taken if students lack these prerequisites in their final undergraduate transcript:

Code	Title	Credit Hours
BIOS 301	BIOCHEMISTRY I	3
BIOS 341	CELL BIOLOGY	3

The requirements listed in the General Announcements (GA) satisfy the minimum requirements for this degree program. In certain instances, courses (or requirements) not officially listed here may be substituted upon approval of the program's academic advisor, or where applicable, the department or program's Director of Graduate Studies. Course substitutions or any exceptions to the stated official curricular requirements must be approved by the Office of Graduate and Postdoctoral Studies (https://graduate.rice.edu/). Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the PhD Degree in the field of Biochemistry and Cell Biology		90

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
BIOS 575	INTRODUCTION TO RESEARCH	1
BIOS 581	GRADUATE SEMINAR IN BIOCHEMISTRY AND CELL BIOLOGY (required in fall semesters through the 5th year of residency)	1 credit hour per year
BIOS 582	GRADUATE SEMINAR IN BIOCHEMISTRY AND CELL BIOLOGY (required in spring semesters through the 5th year of residency)	1 credit hour per year
BIOS 583	MOLECULAR INTERACTIONS [1]	4
BIOS 587	RESEARCH DESIGN, PROPOSAL WRITING, AND PROFESSIONAL DEVELOPMENT [1]	3
BIOS 588	CELLULAR INTERACTIONS [1]	4
BIOS 599	GRADUATE TEACHING IN BIOCHEMISTRY AND CELL BIOLOGY (first semester, second year) [2]	1
BIOS 599	GRADUATE TEACHING IN BIOCHEMISTRY AND CELL BIOLOGY (second semester, second year) [2]	1
BIOS 701	GRADUATE LAB RESEARCH I	2-4
BIOS 702	GRADUATE LAB RESEARCH II	2-4
BIOS 800	BIOCHEMISTRY & CELL BIOLOGY GRADUATE RESEARCH [3]	1-15
UNIV 594	RESPONSIBLE CONDUCT OF RESEARCH	1
Elective Requirements		
Select at least 6 credit hours from the set of 500-level advanced BIOS electives listed below (or select other coursework at the 500-level with departmental approval):		*6*
BIOS 505	PHYSICAL BIOLOGY	
BIOS 510	STEM CELL BIOLOGY	
BIOS 520	MOLECULAR BASIS OF DISEASES	
BIOS 524	MICROBIAL PHYSIOLOGY AND GENETICS	
BIOS 525	PLANT MOLECULAR GENETICS AND DEVELOPMENT	
BIOS 530	LAB MODULE IN NMR SPECTROSCOPY AND MOLECULAR MODELING	
BIOS 535	PRACTICAL X-RAY CRYSTALLOGRAPHY	
BIOS 538	ANALYSIS AND VISUALIZATION OF BIOLOGICAL DATA	
BIOS 543	DEVELOPMENTAL NEUROBIOLOGY	

BIOS 547	EXPERIMENTAL BIOLOGY AND THE FUTURE OF MEDICINE	
BIOS 550	VIRUSES AND INFECTIOUS DISEASES	
BIOS 551	MOLECULAR AND CELLULAR BIOPHYSICS	
BIOS 552	STRUCTURAL BIOLOGY	
BIOS 553	MICROBIOLOGY: THE MOLECULAR BASIS FOR INFECTIOUS DISEASES AND THEIR TREATMENT	
BIOS 555	MOLECULAR MEMBRANE BIOLOGY	
BIOS 560	CANCER BIOLOGY	
BIOS 570	COMPUTATION WITH BIOLOGICAL DATA	
Thesis Requirement		
Completion and public defense of a thesis		
Additional Coursework as Approved by Department		
Total Credit Hours		**Minimum of 90**

Footnotes and Additional Information

1 Students generally complete BIOS 583, BIOS 587, and BIOS 588 in their first year, and will be responsible for the content of these courses in their admission to candidacy examination.

2 Students gain teaching experience by serving as discussion leaders and graders in two undergraduate courses during their second year (BIOS 599); additional teaching experiences are available on an individual basis.

3 Students are required to enroll in at least 9 hours of BIOS 800 during all semesters of residency after the first 2 semesters.

Evaluation of Progress in Graduate Study

The BCB Graduate Advising Committee evaluates each student's undergraduate record and recommends coursework based on the requirements. Thesis advisors may require additional courses.

At the end of each semester of the first year, the department chair, in consultation with the faculty, reviews student performance in the formal coursework. Students must maintain at least a B average (GPA ≥ 3.00), perform satisfactorily in BIOS 701/BIOS 702, and demonstrate outstanding motivation and potential for research. Thesis lab assignments are made based on student and faculty preferences following research rotations.

Evaluation after the first year includes:

- Ongoing review of research progress by the thesis advisor; satisfactory research progress will be indicated by a grade of "S" in BIOS 800 each semester.
- A yearly research progress assessment by the student's Research Progress Review Committee.
- Presentation of research progress at least once a year in seminar format (BIOS 581/BIOS 582) starting in the fourth semester and continuing through the 5th year.
- Completion of a written and oral admission to candidacy examination before the start of the fifth semester.
- Defense of the PhD thesis research and text in a final public seminar presentation and oral examination attended by the student's Thesis Committee.

Policies for the PhD Degree in the field of Biochemistry and Cell Biology

Biochemistry and Cell Biology Graduate Program Handbook

The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, Biochemistry and Cell Biology publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2023_24/Biochemistry_Cell_Biology_Graduate_Handbook.pdf

Admission

Applicants for graduate study in the Biochemistry and Cell Biology Program must have:

- BA or BS degree in biochemistry, biology, chemistry, chemical engineering, physics, or some equivalent
- High levels of intellectual strength and motivation, as indicated by academic record and recommendations

Although the department offers an MS degree in Biochemistry and Cell Biology, the department admits students who intend to pursue the PhD program. For general university requirements, see Graduate Degrees (https://ga.rice.edu/graduate-students/academic-opportunities/degrees/).

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the PhD degree in the field of Biochemistry and Cell Biology should be aware of the following departmental transfer credit guidelines:

- Requests for transfer credit will be considered by the program director on an individual case-by-case basis.

Additional Information

For additional information, please see the BioSciences website: https://biosciences.rice.edu/

Opportunities for the PhD Degree in the field of Biochemistry and Cell Biology

All full-time Biochemistry and Cell Biology graduate students receive funding and full tuition waivers as specified in their offer letters. Information about Student Resources, Attendance at Scientific Conferences, Internships, Graduate Students Awards, the Graduate Student Association, etc. can be found in the Biochemistry and Cell Biology Graduate Program Handbook online at the department website: https://gradhandbooks.rice.edu/2018_19/Biochemistry_Cell_Biology_Graduate_Handbook.pdf

Additional Information

For additional information, please see the BioSciences website: https://biosciences.rice.edu/