

BACHELOR OF SCIENCE (BS) DEGREE / MASTER OF SCIENCE (MS) DEGREE / DOCTOR OF PHILOSOPHY (PHD) DEGREE IN THE FIELD OF BIOCHEMISTRY AND CELL BIOLOGY

Program Learning Outcomes for the BS/MS/PhD Accelerated Degree Program in the field of Biochemistry and Cell Biology

Upon completing the Bachelor's degree requirements for this program, students majoring in Biosciences will be able to:

1. Demonstrate a comprehensive knowledge of core concepts in biology.
2. Demonstrate an advanced understanding of the science pertaining to the major concentration: biochemistry, *or* cell biology and genetics, *or* (for students pursuing the integrative biology major concentration), at least two of the following: biochemistry, cell biology and genetics, or ecology and evolutionary biology.
3. Demonstrate the ability to access scientific literature in the biological sciences and to use critical thinking skills to evaluate primary and secondary sources of biological research.
4. Demonstrate the ability to apply the process of science, including designing experiments and/or building mathematical models, and collecting, analyzing, and interpreting data.
5. Demonstrate effective oral, written, and visual communication skills, including communicating science to diverse audiences.

Students completing the MS degree requirements will be able to:

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

Students completing the PhD degree requirements 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 the effective written, oral, and visual communication skills required to articulate scientific findings and significance via a thesis describing independent research, publications, and seminars.

Requirements for the BS/MS/PhD Accelerated Degree Program in the field of Biochemistry and Cell Biology

Requirements for the Bachelor of Science (BS) Degree with a Major in Biosciences

For general university requirements, see [Graduation Requirements \(https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/\)](https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the accelerated BS/MS/PhD degree program in the field of Biochemistry and Cell Biology must complete all of the requirements for a BS Degree with a Major in Biosciences and a

- Major Concentration in Biochemistry (<https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/biochemistry-ba/#requirementstext>), *or*
- Major Concentration in Cell Biology and Genetics (<https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/cell-biology-and-genetics-ba/#requirementstext>), *or*
- Major Concentration in Integrative Biology (<https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/integrative-biology-ba/#requirementstext>).

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

The MS degree is a thesis master's degree. For general university requirements, please see [Thesis Master's Degrees \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-thesis-masters-degrees/\)](https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-thesis-masters-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see [All Graduate Students \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/\)](https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/).

The BS/MS/PhD Committee will advise students pursuing the BS/MS completion and will approve their formal course program during their final two years in the BS/MS program. Students who wish to pursue the BS/MS program must select the MS thesis advisor by the end of their second year, when they declare their major, to provide the opportunity to begin a project that will form the basis of the MS thesis.

Summary

Degree Requirements

Footnotes and Additional Information

Students will be responsible for the content of these courses in their MS defense (which also serves as the Admission to PhD Candidacy examination).

Progress reviews with the MS thesis committee occur at the end of the junior year and the early spring of the senior year. Students who wish to continue to the PhD after the MS should include a section on their proposed PhD research project in the senior year progress review, indicating their future goals and aims. This future work section should also be included in the MS thesis and may be part of the discussion with the thesis committee following the defense. The MS thesis will be submitted and public oral defense will occur in the summer following graduation at the end of the senior year with completion of the BS requirements. MS candidates continuing to the PhD must maintain a GPA ≥ 3.00 , complete a thesis, and make a public oral defense that includes a private examination by their MS thesis committee. Students

who complete the MS requirements with a GPA \geq 2.67 but less than 3.00 must defend their thesis to complete the MS degree, but will not be admitted to the PhD program.

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

For general university requirements, please see [Doctoral Degrees \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-doctoral-degrees/\)](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 \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/\)](https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/).

The following are required for admission to the PhD portion of the accelerated BS/MS/PhD degree program:

- Successful completion of the MS thesis and oral defense, which will serve as the admission to candidacy examination for all PhD candidates in this program;
- an overall GPA \geq 3.00 for the BS-MS degree courses.

Students who are in good academic standing in the BS/MS portion and have passed their MS final oral examination may begin their doctoral studies the summer following graduation with the approval of their PhD mentor and the Department Chair.

Summary

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Evaluation of Progress in the PhD Phase of the Accelerated BS/MS/PhD Degree Program

The Graduate Advisory Committee evaluates each student's record and recommends any further coursework based on the requirements and on the interests of the student. Thesis advisors may require additional courses. At the end of each semester, the department chair, in consultation with the faculty, reviews student performance in the formal coursework. Students must maintain at least a B grade average (GPA \geq 3.00), perform satisfactorily in their research efforts, and demonstrate outstanding motivation and potential for research.

Evaluation during the PhD phase of the program includes:

- The MS thesis and its oral defense constitute the admission to candidacy examination
- Ongoing review of research progress by the thesis advisor; satisfactory research progress will be indicated by a grade of "S" in 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 (or) starting in the first year of PhD study and continuing until the fifth year of the doctoral program; attendance is required in all semesters of residency.
- 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 BS/MS/PhD Accelerated Degree Program 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/2024_25/Biochemistry_Cell_Biology_Graduate_Handbook.pdf.

Admission

Qualified Rice University undergraduates can apply to enroll in the Biochemistry and Cell Biology BS/MS/PhD accelerated program in the spring of their sophomore year. Students who are strong candidates for this program typically join a Rice research lab to start research on a project with one of the Biochemistry and Cell Biology Graduate Program research faculty as advisor prior to applying. Upon acceptance, depending on course load, financial aid status, and other variables, program participants may then start taking required graduate course requirements at the same time as their upper-level undergraduate degree course requirements. Students pursuing this program should be aware that there could be financial aid implications, should the conversion of undergraduate coursework to that of graduate level reduce their earned undergraduate credit for any semester below that of full-time undergraduate status (12 hours). Advisors for the program can assist in this determination.

Laboratory research performed in undergraduate and graduate research courses is presented as the MS thesis in the summer following graduation and provides the basis for the PhD thesis work. As a result, the graduate careers of these students will be accelerated by an anticipated 1-2 years, and such students may be able to obtain their PhD degree approximately 3 years after obtaining their BS/MS degrees. If circumstances require, students may stop at the BS or MS level if they meet all the requirements for the respective degrees.

Criteria for selection include academic performance (GPA \geq 3.50), motivation, previous research experience, and personal qualities. Enrollment is limited, and the Biochemistry and Cell Biology BS/MS/PhD Committee will select applicants for admission.

Additional Information

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

Opportunities for the BS/MS/PhD Accelerated Degree Program in the field of Biochemistry and Cell Biology

Information about Student Resources, Attendance at Scientific Conferences, Internships, Graduate Student Awards, the Graduate Student Association, etc. can be found in the Biochemistry and Cell Biology Graduate Program Handbook online at the department website: <https://biosciences.rice.edu/biochemistry-and-cell-biology-graduate-program/>.

Additional Information

For additional information, please see BioSciences website: [https://
biosciences.rice.edu/](https://biosciences.rice.edu/).