Bachelor of Arts (BA) Degree with a Major in Biosciences and a Major Concentration in Biochemistry

Program Learning Outcomes for the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry

Upon completing the BA degree with a major in Biosciences and a major concentration in Biochemistry, students will be able to:

1. Demonstrate a broad knowledge of core concepts in biology.
2. Demonstrate an advanced understanding of biochemistry.
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.

Requirements for the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry

For general university requirements, see Graduation Requirements. Students pursuing the BA degree with a major in Biosciences and a major concentration in Biochemistry must complete:

- A minimum of 62 credit hours to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 26 credit hours taken at the 300-level or above.
- Core courses common to all major concentrations.
- The requirements for the major concentration in Biochemistry. When students declare the major in Biosciences, students must additionally identify and declare one of the four major concentrations, either in:
  - Biochemistry (p. 1), or
  - Cell Biology and Genetics (https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/cell-biology-and-genetics-ba/#requirementstext), or
  - Ecology and Evolutionary Biology (https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/ecology-and-evolutionary-biology-ba/#requirementstext), or

Because of the common core requirements, it is possible for students to change their major concentration at any time, even after initially declaring the major. To do so, please contact the Office of the Registrar.

The BA degree emphasizes broad foundational knowledge of biology with in depth exposure to the subfield of biochemistry. Biosciences majors are strongly encouraged to pursue their research interests through independent research experiences. The BA degree program offers greater flexibility than the BS due to fewer required independent research courses as detailed below.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major’s academic advisor, or where applicable, the department’s Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major’s Official Certifier. 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 Major in Biosciences and a Major Concentration in Biochemistry | Minimum of 62
|      | Total Credit Hours Required for the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry | 120

Degree Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td><strong>Core Requirements</strong></td>
<td></td>
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<tr>
<td></td>
<td><strong>Non-Biology Courses</strong></td>
<td></td>
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<tr>
<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I</td>
<td>3</td>
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<tr>
<td>or CHEM 111</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY I</td>
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<tr>
<td>CHEM 123</td>
<td>GENERAL CHEMISTRY LABORATORY I</td>
<td>1</td>
</tr>
<tr>
<td>or CHEM 113</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I</td>
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<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
<td>3</td>
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<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
<td></td>
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<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
<td>3</td>
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<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
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<tr>
<td>PHYS 125</td>
<td>GENERAL PHYSICS (WITH LAB)</td>
<td>4</td>
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<tr>
<td>STAT 305</td>
<td>INTRODUCTION TO STATISTICS FOR BIOSCIENCES</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>Core Lecture Courses</strong></td>
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</tr>
<tr>
<td>BIOS 201</td>
<td>INTRODUCTORY BIOLOGY I</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 202</td>
<td>INTRODUCTORY BIOLOGY II</td>
<td>3</td>
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</tbody>
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Elective Lecture Course

Select 1 elective course from lecture courses offered by the Wiess School of Natural Sciences or the George R. Brown School of Engineering at the 200-level or above.
2 courses from the following:

**Elective Laboratory Courses**

**Core Requirements**

- **Non-Biology Courses**
  - CHEM 122 GENERAL CHEMISTRY II 
  - CHEM 124 GENERAL CHEMISTRY LABORATORY II
  - CHEM 211 ORGANIC CHEMISTRY I
  & CHEM 213 ORGANIC CHEMISTRY DISCUSSION
  - PHYS 126 GENERAL PHYSICS II (WITH LAB)  

- **Lecture Courses**
  - BIOS 301 BIOCHEMISTRY I
  - BIOS 302 BIOCHEMISTRY II
  - BIOS 352 PHYSICAL CHEMISTRY FOR THE BIOSCIENCES

- **Elective Lecture Courses in Biochemistry**
  Select 2 courses from the following:

  - BIOE 464 EXTRACELLULAR MATRIX
  - BIOS 300 PARADIGMS IN BIOCHEMISTRY AND CELL BIOLOGY
  - BIOS 334 EVOLUTION
  - BIOS 340 INTEGRATIVE ANIMAL PHYSIOLOGY
  - BIOS 341 CELL BIOLOGY
  - BIOS 344 MOLECULAR BIOLOGY AND GENETICS
  - BIOS 368 CONCEIVING AND MISCONCEIVING THE MONSTROUS IN FICTION AND IN ART, IN MEDICINE AND IN BIOSCIENCE
  - BIOS 372 IMMUNOLOGY
  - BIOS 385 FUNDAMENTALS OF CELLULAR AND MOLECULAR NEUROSCIENCE
  - BIOS 390 TRANSFER CREDIT IN BIOCHEMISTRY AND CELL BIOLOGY
  - BIOS 405 PHYSICAL BIOLOGY
  - BIOS 410 STEM CELL BIOLOGY
  - BIOS 420 MOLECULAR BASIS OF DISEASES
  - BIOS 424 MICROBIOLOGY AND BIOTECHNOLOGY
  - BIOS 425 PLANT MOLECULAR GENETICS AND DEVELOPMENT
  - BIOS 447 EXPERIMENTAL BIOLOGY AND THE FUTURE OF MEDICINE
  - BIOS 449 ADVANCED CELL AND MOLECULAR NEUROSCIENCE
  - BIOS 450 VIRUSES AND INFECTIOUS DISEASES
  - BIOS 460 CANCER BIOLOGY
  - BIOS 470 COMPUTATION WITH BIOLOGICAL DATA
  - BIOS 481 MOLECULAR BIOPHYSICS I
  - BIOS 482 STRUCTURAL BIOLOGY

**Capstone Requirement**

- Select 1 course from the following:

  - BIOS 310 INDEPENDENT RESEARCH FOR BIOSCIENCES UNDERGRADUATES
  - BIOS 313 EXPERIMENTAL SYNTHETIC BIOLOGY
  - BIOS 318 MICROBIOLOGY LABORATORY
  - BIOS 333 BIONNOVATION STUDIO: FROM BASIC RESEARCH AND IDEATION TO TECHNOLOGY DEVELOPMENT
  - BIOS 393 LABORATORY TRANSFER CREDIT IN BIOSCIENCES
  - BIOS 415 EXPERIMENTAL PHYSIOLOGY

**Total Credit Hours Required for the Major in Biosciences and Major Concentration in Biochemistry**

Minimum of 62

**Additional Credit Hours to Complete Degree Requirements**

- University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/)

**Total Credit Hours**

120

**Footnotes and Additional Information**

* Note: University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying major requirements may additionally meet distribution requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

1 CHEM 151 may be substituted for CHEM 121 or CHEM 111; CHEM 153 may be substituted for CHEM 123 or CHEM 113.
2 PHYS 101 and PHYS 103 or PHYS 111 may be substituted for PHYS 125.
3 STAT 280 may be substituted for STAT 305.
4 Students must select 1 elective course (3 credit hours) from courses offered by the Wiess School of Natural Sciences or the George R. Brown School of Engineering at the 200-level or above, designated as a lecture course. Courses offered by the Wiess School of Natural Sciences or the George R. Brown School of Engineering include the following subject codes: ASTR, BIOE, BIOS, CAAM, CEVE, CHBE, CHEM, COMP, DSCI, ELEC, ENGL, ESCI, GLHT, HEAL, KINE, MATH, MECH, MSNE, NEUR, NSCI, PHYS, RCEL, and STAT.
CHEM 152 may be substituted for CHEM 122 or CHEM 112; CHEM 154 may be substituted for CHEM 124 or CHEM 114.

PHYS 102 and PHYS 104 or PHYS 112 may be substituted for PHYS 126.

BIOS 310 must be taken for at least 3 credit hours to fulfill an Elective Laboratory Requirement.

The Capstone Requirement is in addition to the other lecture course requirements. The same course may not be used to satisfy more than one requirement for this major and/or major concentration.

Policies for the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry

Advising
Rice University policies are governed primarily by the General Announcements; students are encouraged to look there first for academic policies. Advising information specific to the Department of Biosciences can be found at the department website by clicking on the tab for Undergraduate Studies: https://biosciences.rice.edu/.

Program Restrictions and Exclusions
Students pursuing the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry should be aware of the following program restrictions:

• Students pursuing the major in Biosciences may pursue only one major concentration within the major.
• Students pursuing the major in Biosciences and a major concentration in Biochemistry may not additionally declare the minor in Biochemistry and Cell Biology.

Transfer Credit
For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university’s official list of transfer credit advisors on their website: https://oaa.rice.edu. Students are encouraged to meet with their academic program's transfer credit advisor when considering transfer credit possibilities.

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

Opportunities for the BA Degree with a Major in Biosciences and a Major Concentration in Biochemistry

Academic Honors
The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/). Some departments have department-specific Honors awards or designations.

Departmental Honors
Instructions on applying for the Distinction in Research and Creative Work award from the Department of BioSciences can be found at the department website, by clicking on the link for Undergraduate Studies, at: https://biosciences.rice.edu/.

Research in the BioSciences
Research is highly encouraged for all biosciences majors, and there are many opportunities for independent research at Rice. Information about research for credit and research internships specific to the Department of BioSciences can be found at the department website, by clicking on the link for Undergraduate Studies, at: https://biosciences.rice.edu/.

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