Bachelor of Arts in Biochemistry

Biochemistry

Biochemistry is the study of life at the level of individual molecules. Biochemistry lies at the intersection of cell biology, physiology, organic chemistry, and physical chemistry. The B.A. Biochemistry major includes one year of biochemistry, as well as upper-division courses in cellular mechanisms and biological physical chemistry.

Undergraduate Admission

Admission to KU

All students applying for admission must send high school and college transcripts to the Office of Admissions. Unless they are college transfer students with at least 24 hours of credit, prospective students must send ACT or SAT scores to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu) for application deadlines and specific admission requirements.

Visit the Office of International Student and Scholar Services (http://www.iss.ku.edu) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of Admissions (http://credittransfer.ku.edu) website.

Admission to the College of Liberal Arts and Sciences

Admission to the College is a different process from admission to a major field. Some CLAS departments have admission requirements. See individual department/program sections for departmental admission requirements.

First- and Second-Year Preparation

Because biology study requires preparation in other sciences, students should begin meeting major requirements in the first year. It is particularly important to take CHEM 130 and CHEM 135 in the first year and, for several majors, to take CHEM 330, CHEM 331, CHEM 335, and CHEM 336 in the second year. Ideally, most majors should also take BIOL 150 and BIOL 152 during the first year, as well as BIOL 105. Students who have taken BIOL 100 and BIOL 102, have earned an A or B in both courses, and have decided to major in a biological science should consult a UBP advisor to request permission to substitute BIOL 100 and BIOL 102 for BIOL 150.

Requirements for the B.A. Major in Biochemistry

In addition to degree and major requirements for all plans and subplans, all students must complete the KU Core.

Major Course Requirements

General Science Requirements (33-36)

Majors must complete the following general science requirements that serve as foundational courses for this major.

Biology Orientation Seminar. Satisfied by:
- BIOL 105 Biology Orientation Seminar

Chemistry I. Satisfied by one of the following:
- CHEM 170 Chemistry for the Chemical Sciences I
- CHEM 130 General Chemistry I

Foundations of Chemistry I, Honors & Foundations of Chemistry I Laboratory, Honors
- CHEM 190 Foundations of Chemistry I, Honors
- CHEM 191 Foundations of Chemistry I Laboratory, Honors

Chemistry II. Satisfied by one of the following:
- CHEM 175 Chemistry for the Chemical Sciences II
- CHEM 135 General Chemistry II

Foundations of Chemistry II, Honors & Foundations of Chemistry II Laboratory, Honors
- CHEM 195 Foundations of Chemistry II, Honors
- CHEM 196 Foundations of Chemistry II Laboratory, Honors

Organic Chemistry I. Satisfied by one of the following:
- CHEM 330 Organic Chemistry I
- CHEM 380 Organic Chemistry I, Honors

Organic Chemistry I Laboratory. Satisfied by:
- CHEM 331 Organic Chemistry I Laboratory

Organic Chemistry II. Satisfied by:
- CHEM 335 Organic Chemistry II

Calculus I and II. Students who plan to attend graduate school should enroll in MATH 125 and MATH 126. Satisfied by one of the following:
- MATH 115 Calculus I
- MATH 116 Calculus II
- MATH 125 Calculus I
- MATH 126 Calculus II

Physics. Satisfied by one of the following options:

Option 1: General Physics I & II
- PHSX 211 General Physics I
- & PHSX 216 General Physics I Laboratory

Option 2: College Physics I & II
- PHSX 212 General Physics II
- & PHSX 236 General Physics II Laboratory

Biology Orientation Seminar
- BIOL 105 Principles of Molecular and Cellular Biology
- BIOL 150 Principles of Molecular and Cellular Biology, Honors

Principles of Organismal Biology. Satisfied by one of the following:
- BIOL 152 Principles of Organismal Biology
- BIOL 153 Principles of Organismal Biology, Honors

Principles of Genetics. Satisfied by one of the following:
- BIOL 350 Principles of Genetics
- BIOL 360 Principles of Genetics, Honors

Cell Structure & Function. Satisfied by:
- BIOL 416 Cell Structure and Function

Biochemistry I. Satisfied by:
BIOL 636  Biochemistry I  4
Introductory Biochemistry Laboratory. Satisfied by:

BIOL 637  Introductory Biochemistry Laboratory  2
Biochemistry II. Satisfied by:

BIOL 638  Biochemistry II  3
Advanced Biochemistry Laboratory. Satisfied by:

BIOL 639  Advanced Biochemistry Laboratory  2
Senior Seminar in Biochemistry. Satisfied by:

BIOL 599  Senior Seminar: _____ (Must be taken in senior year.)  1

Biological Physical Chemistry. Satisfied by:

CHEM 510  Biological Physical Chemistry  3

Biochemistry Electives (6)
Satisfied by completing at least 6 hours of biology courses numbered 400 or higher. These courses must be selected in consultation with a biochemistry advisor. No more than 3 hours of BIOL 423 Non-Lab Independent Study and/or BIOL 424 Independent Study (combined) can be applied towards the elective requirement.

Major Hours & Major GPA
While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours
Satisfied by 36 hours of major courses.

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 12 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (http://clas.ku.edu/undergrad/tools/gpa).

Below is a sample 4-year plan for students pursuing the B.A. in Biochemistry. To view the list of courses approved to fulfill KU Core Goals, please visit the KU Core website (http://kucore.ku.edu/courses).

This degree plan assumes students will have the equivalent of MATH 101 or MATH 104, or equivalent prior to the freshman year, fall semester.

Freshman

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ENGL 101 (Goal 2.1 (2 crs req), BA Writing I)¹</td>
<td>3 ENGL 102 (Goal 2.1 (2 crs req), BA Writing II)</td>
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<tr>
<td>Goal 1.1 Critical Thinking</td>
<td>3 MATH 115 or 125 (General Science Requirement)⁴</td>
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<tr>
<td>CHEM 170 or 130 (General Science Requirement, BA Quantitative Req)²</td>
<td>5 CHEM 175 or 135 (General Science Requirement)⁵</td>
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<tr>
<td>BIOL 150 or 151 (Goal 3 Natural Science, BA Lab, Major Requirement)³</td>
<td>4 BIOL 152 or 153 (Major Requirement)</td>
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<tr>
<th>Sophomore</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tr>
<td>Fall</td>
<td>16</td>
<td>15-16</td>
<td></td>
</tr>
<tr>
<td>1st Semester Language (BA Second Language)</td>
<td>5 2nd Semester Language (BA Second Language)</td>
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<tr>
<td>MATH 116 or 126 (General Science Requirement)⁴</td>
<td>3-4 Goal 2.2 Communication</td>
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<tr>
<td>CHEM 330 (General Science Requirement)</td>
<td>3 Goal 3 Social Science</td>
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<tr>
<td>CHEM 331 (General Science Requirement)</td>
<td>2 CHEM 335 (General Science Requirement)⁵, ⁶</td>
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<tr>
<td>BIOL 350 or 360 (Major Requirement)</td>
<td>4 Elective or possible minor course (Total Hours)</td>
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<th>Junior</th>
<th>Hours</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Fall</td>
<td>17-18</td>
<td>17</td>
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</tr>
<tr>
<td>3rd Semester Language (BA Second Language)</td>
<td>4th Semester Language, or 1st semester of Another Language (BA Second Language)</td>
<td>3-5</td>
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<tr>
<td>Goal 4.1 US Diversity (300+ suggested)</td>
<td>3 BIOL 638 (Major Requirement)⁵</td>
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<tr>
<td>BIOL 636 (Major Requirement)⁵</td>
<td>4 BIOL 639 (Major Requirement)⁵</td>
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<td>BIOL 637 (Major Requirement)⁵</td>
<td>2 PHSX 115 (or PHSX 212 and PHSX 236 (General Science Requirement))</td>
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<tr>
<td>PHSX 114 (or PHSX 211 and PHSX 216 (General Science Requirement))</td>
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<th>Senior</th>
<th>Hours</th>
<th>Spring</th>
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<tr>
<td>Fall</td>
<td>16</td>
<td>12-14</td>
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</tr>
<tr>
<td>Goal 3 Humanities (300+ suggested)</td>
<td>3 Goal 4.2 Global Awareness (300+ suggested)</td>
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<tr>
<td>Goal 5 Social Responsibility &amp; Ethics</td>
<td>3 BIOL Elective 400+ (Major Requirement)⁷</td>
<td>3</td>
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<tr>
<td>BIOL Elective 400+ (Major Requirement)⁷</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
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<tr>
<td>BIOL 416 (Major Requirement)⁵</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
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<td></td>
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<tr>
<td>CHEM 510 (Major Requirement)⁵</td>
<td>3 BIOL 599 (Major Requirement and Goal 6)⁸</td>
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| Total Hours: 121-125 |

¹ The BA requires completion of two courses of collegiate-level writing instruction. Students who test out of Composition will still need to complete ENGL 102 (or equivalent) and one additional Goal 2.1 course.
² CHEM 170/CHEM 130 and BIOL 150 require a Math ACT score of 26+, a comparable SAT or KU Math Placement Exam score, or credit for a MATH 101 or MATH 104 equivalent course.
³ Concurrent or prior enrollment in CHEM 170/CHEM 130 is required.
MATH 125 and MATH 126 are recommended for students who plan to attend graduate school. MATH 125 requires MATH 103 or MATH 104, with a grade of C- or higher; or 3 years of college preparatory mathematics including trigonometry, with a score of 28 or higher on the ACT Mathematics exam.

CHEM 175/CHEM 135 and CHEM 335 and BIOL 638 and BIOL 639 are offered only in spring; BIOL 416, BIOL 636, and BIOL 637 and CHEM 510 are only in fall.

Most medical schools require the full CHEM 330, CHEM 331, CHEM 335, and CHEM 336 sequence.

6 hours of BIOL 400+ electives required. Consult a biochemistry advisor to select major electives.

BIOL 599 is approved to satisfy Goal 6. This goal can also be fulfilled by completion of an approved educational experience, or an approved integration of courses and/or experiences. See your advisor for more information.

Visit this website (https://collegeadvising.ku.edu/sites/collegeadvising.ku.edu/files/docs/BA.QuantityReasoning.pdf) for a list of courses that fulfill the BA Quantitative Reasoning Requirement.

* BIOL 105: Biology Orientation Seminar (1 hour online course) is required for the major. It can be taken the summer prior to your freshman year.

Please note:

All students in the College of Liberal Arts and Sciences are required to completed 120 total hours of which 45 hours must be at the Jr/Sr (300+) level.

The same course cannot be used to fulfill more than one KU Core Goal. However, overlap of a KU Core course with a major or degree-specific requirement is allowed. Overlapping is recommended to allow more opportunities to explore other majors and/or minors.

**Departmental Honors**

Undergraduate majors are eligible to graduate with honors in biology if they fulfill the following requirements:

1. Complete all course work required for the appropriate degree in biology.
2. Achieve a minimum grade-point average of 3.25 overall and 3.5 in the major.
3. Complete BIOL 499 Introduction to Honors Research with a grade of B or higher.
4. Complete BIOL 699 Biology Honors Research Colloquium with a grade of B or higher.
5. Complete an independent research project under the supervision of a faculty member in an area appropriate to the degree sought.
6. Submit an honors thesis to the honors committee once the research is complete and present the results of the completed research at the honors research symposium.

Students majoring in Human Biology with Anthropology, Applied Behavioral Science, Psychology, or Speech-Language-Hearing concentrations will follow the honors requirements for their respective concentration department.

Specific guidelines and intent forms are available in the Undergraduate Biology Program office and online (http://www.kuub.ku.edu). Candidates must declare their intent to graduate with honors at least 2 semesters before graduation.

**Study Abroad**

Consult an advisor at least 4 months before undertaking study abroad. Consult the Office of Study Abroad (http://www.studyabroad.ku.edu), 108 Lippincott Hall, for information about study in one of the many countries (e.g., Scotland, Australia, Switzerland) with special arrangements with KU.