Biochemistry and Molecular Biology, BS

The curriculum for the BS with a major in biochemistry and molecular biology is identical to the BA degree in the first two years of study to maximize student flexibility.

Requirements

The Bachelor of Science with a major in biochemistry and molecular biology requires a minimum of 120 s.h., including at least 70 s.h. of work for the major. Students must maintain a grade-point average (GPA) of at least 2.00 in all courses for the major and in all UI courses for the major. They must also complete the College of Liberal Arts and Sciences GE CLAS Core.

All students majoring in biochemistry and molecular biology are initially placed in the Bachelor of Arts degree program. Students in good academic standing can switch to the Bachelor of Science degree program after completing one semester of organic chemistry (CHEM:2210 Organic Chemistry I or CHEM:2230 Organic Chemistry I for Majors). Students who wish to change their degree program to the Bachelor of Science should contact the College of Liberal Arts and Sciences [clas-undergrad@uiowa.edu].

The biochemistry and molecular biology major for the Bachelor of Science degree is intended primarily for students planning careers in research. The BS program prepares students to pursue graduate degrees, such as an MS, PhD, or a combined MD/PhD, or to work as research technicians. The BS program requires 12 sh. or more in science and laboratory electives than the BA program.

Qualified students may graduate with honors in the biochemistry and molecular biology major; see "Honors in the Major" under Honors [p. 2] in this section of the catalog.

The BS with a major in biochemistry and molecular biology requires the following coursework.

Requirements	Hours
Common Requirements	52-53
Additional Requirements	18

Common Requirements

Students complete the following during their first three years.

Course #	Title	Hours
All of these:		
BMB:3120 & BMB:3130	Biochemistry and Molecular Biology I and Biochemistry and Molecular Biology II	6
BMB:3140	Experimental Biochemistry	3
BMB:4240	Biophysics and Advanced Biochemistry	3
BIOL:1411 & BIOL:1412	Foundations of Biology and Diversity of Form and Function	8
CHEM:1110 & CHEM:1120	Principles of Chemistry I and Principles of Chemistry II	8
CHEM:2210 or CHEM:2230	Organic Chemistry I Organic Chemistry I for Majors	3
CHEM:2220 or CHEM:2240	Organic Chemistry II Organic Chemistry II for Majors	3
CHEM:2410 or CHEM:2420	Organic Chemistry Laboratory Organic Chemistry Laboratory for Majors	3
MATH:1850 or MATH:1550 or MATH:1460	Calculus I Engineering Calculus I Calculus for the Biological Sciences	4
PHYS:1511 or PHYS:1611	College Physics I Introductory Physics I	4
PHYS:1512 or PHYS:1612	College Physics II Introductory Physics II	4
One of these:		
BIOS:4120	Introduction to Biostatistics	3
MATH:1560	Engineering Calculus II	4
MATH:1860	Calculus II	4
STAT:3510	Biostatistics	3

Additional Requirements

In addition to the common requirements listed, students must complete the following.

Course #	Title	Hours
One of these:		
CHEM:4430	Principles of Physical Chemistry	3
CHEM:4431	Chemical Thermodynamics	3
CHEM:4432	Quantum Mechanics and Chemical Kinetics	3
One of these options:		
BMB:4999	Advanced Undergraduate Biochemistry Research	6
Advanced laboratory courses		6
And:		
Advanced science electives as listed in the student handbook.		9

Students are encouraged to begin research by taking BMB:3993 Undergraduate Biochemistry Research, which has no prerequisites. The course involves experience in an active biochemistry and molecular biology research lab, which must be arranged ahead of time with a supervising faculty member. Students may make arrangements directly with the faculty member, or they may request assistance from an undergraduate advisor. Credit earned in BMB:3993 does not count toward the major, but it does count toward the minimum of 120 s.h. required to graduate.

Before students register for BMB:4999 Advanced Undergraduate Biochemistry Research, they must have completed BMB:3120 Biochemistry and Molecular Biology I, BMB:3130 Biochemistry and Molecular Biology II, BMB:3140 Experimental Biochemistry, and BMB:3150 Development of Senior Research Project, with a grade of B-minus or higher in each course. Students are required to have prior research experience, such as in BMB:3993 Undergraduate Biochemistry Research, URES:3992 Undergraduate Research and Creative Projects, URES:3994 Undergraduate Research and Creative

Projects, or HONR:3994 Honors Research Practicum, and permission of the instructor. Students can only count 6 s.h. in BMB:4999 toward their requirements for the degree.

Teacher Licensure

Students interested in teaching in elementary and/or secondary schools should seek admission to the Teacher Education Program (TEP) in the College of Education.

To qualify for licensure in secondary teaching, students in the TEP complete a degree in education as well as a related College of Liberal Arts and Sciences degree. See Apply on the College of Education website for details on requirements and deadlines for applying to the College of Education and about TEP choices of majors leading to licensure.

Combined Programs

BS/PhD

The combined Bachelor of Science/Doctor of Philosophy in the biochemistry and molecular biology program permits students to transition into the PhD program during their senior year and to count 12 s.h. of credit toward both the BS and PhD requirements. The combined program provides a research-intensive experience and shortens the training time for students interested in pursuing independent biochemistry and molecular biology research careers. Students in the program typically receive financial support during the second half of their senior year and throughout their PhD study.

Students must be pursuing a Bachelor of Science with a major in biochemistry and molecular biology, and by the beginning of their senior year they must have:

- 108 s.h. of undergraduate credit;
- a minimum grade-point average of 3.50;
- completed four semesters of research experience (summer research counts as one semester); and
- completed BMB:3120 Biochemistry and Molecular Biology I, BMB:3130 Biochemistry and Molecular Biology II, and BMB:3140 Experimental Biochemistry.

Students interested in the combined program should speak with their academic advisor and the biochemistry and molecular biology honors advisor during their first year or at the beginning of their sophomore year. A separate application to each degree program is required. Applicants must be admitted to both programs before they may be admitted to the combined degree program. For more information, contact the Department of Biochemistry and Molecular Biology.

Honors

Honors in the Major

Students have the opportunity to graduate with honors in the major. They must maintain a cumulative University of Iowa grade-point average (GPA) of at least 3.33 and a GPA of at least 3.33 in coursework for the major. They must earn 6 s.h. in BMB:4999 Advanced Undergraduate Biochemistry Research and present their research results as a written manuscript and in an oral presentation given at the Lata Undergraduate Research Symposium.

University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program.

Membership in the UI Honors Program is not required to earn honors in the biochemistry and molecular biology major.

Career Advancement

Biochemistry and molecular biology graduates with bachelor's degrees often work as research assistants in industry, government, academia, or health services; teach in secondary schools; or go on to advanced study in medicine, dentistry, or other areas. The program offers solid preparation for careers in biochemistry, medicine, biology, chemistry, dentistry, research, or related sciences. About one-third of biochemistry and molecular biology majors go on to study medicine; others enter graduate programs or professional degree programs.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the university's Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Before the third semester begins: CHEM:1110 Principles of Chemistry I, CHEM:1120 Principles of Chemistry II, and two semesters of advanced math (e.g., Calculus I, Calculus II, or Biostatistics).

Before the fifth semester begins: BIOL:1411 Foundations of Biology, BIOL:1412 Diversity of Form and Function, CHEM:2210 Organic Chemistry I or CHEM:2230 Organic Chemistry I for Majors, CHEM:2220 Organic Chemistry II or CHEM:2240 Organic Chemistry II for Majors, and CHEM:2410 Organic Chemistry Laboratory or CHEM:2420 Organic Chemistry Laboratory for Majors.

Before the seventh semester begins: PHYS:1611 Introductory Physics I or PHYS:1511 College Physics I, PHYS:1612 Introductory Physics II or PHYS:1512 College Physics II, BMB:3150 Development of Senior Research Project, one semester of BMB:3993 Undergraduate Biochemistry Research for students planning to take BMB:4999 Advanced Undergraduate Biochemistry Research, BMB:3120 Biochemistry and Molecular Biology I, BMB:3130 Biochemistry and Molecular Biology II, BMB:3140 Experimental Biochemistry, two science electives, and at least 90 s.h. earned toward the degree.

Before or during the eighth semester: BMB:4240 Biophysics and Advanced Biochemistry or CHEM:4430 Principles of Physical Chemistry or CHEM:4431 Chemical Thermodynamics or CHEM:4432 Quantum Mechanics and Chemical Kinetics, a science elective, and at least 2–3 s.h. (total of 6 s.h.) of BMB:4999 Advanced Undergraduate Biochemistry Research. Enrollment in all remaining

coursework in the major, all remaining GE CLAS Core courses, and a minimum of 120 of s.h. to graduate.

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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This sample plan is currently being reviewed and will be added at a later date.