

BIOCHEMISTRY AND MOLECULAR BIOLOGY MAJOR

Interdisciplinary Major

The biochemistry and molecular biology (BMB) major is a rigorous interdisciplinary program that allows students to gain a broad foundation in concepts and techniques essential for success at the interface between biology and chemistry. Students completing the BMB major will be prepared for a variety of career opportunities, including biomedical research, a range of health professions, and post-graduate education. This program is jointly administered by representatives of the Biology and Chemistry Departments.

Course Descriptions

Descriptions of the courses required for the BMB major can be found in the Biology and Chemistry Department catalog sections.

Biochemistry and Molecular Biology Requirements

The BMB major requires six courses in biology, six courses in chemistry, the General or College Physics sequence, Differential and Integral Calculus, and a BMB Senior Capstone Experience for a total of 70 credits.

Code	Title	Credits	Notes
Biology Courses		24	
BIO 111 & BIO 113	General Biology I with Lab and General Biology I Lab		
BIO 112 & BIO 114	General Biology II with Lab and General Biology II Lab		
BIO 205	Cell & Molecular Biology with Lab		
BIO 409	Biochemistry with Lab		
BIO 200-400 (Approved Elective at the 200-400 Level) ¹			
BIO 300-400 (Approved Elective at the 300-400 Level) ¹			
Chemistry Courses		26	
CHE 120 & CHE 122	Chem Principles Org Molecules with Lab and Chemical Principals Orgnc Molecules Lab		
CHE 140 & CHE 142	Reactions of Organic Molecules with Lab and Reactions of Organic Molecules Lab		
CHE 220 & CHE 222	Quantitative Chemical Analysis with Lab and Quantitative Chemical Analysis Lab		
CHE 303	Chem of Biological Compounds with Lab		
CHE 305	Chemical Thermodynamics/Kinetics w/Lab (recommended)		
or CHE 306	Quantum Chem & Spectro with Lab		
CHE 200-400 (Approved Elective at the 200-400 Level)			
CHE 392	Junior Seminar (2 credits)		
Physics Courses - PHY 101/PHY 102 or PHY 111/PHY 112		8	
PHY 101 & PHY 102	College Physics I with Lab and College Physics II with Lab		
PHY 111 & PHY 112	General Physics I with Lab and General Physics II with Lab		
Mathematics Courses		8-12	
MAT 111	Differential Calculus (or MAT 106 & MAT 107)		
MAT 112	Integral Calculus		

Senior Capstone Experience (BMB SCE)	2-4
Total Credits	68-74

¹ BIO 409 Biochemistry with Lab does not count.

Majoring or Minor in Biology and Chemistry

Due to the interdisciplinary nature of the biochemistry and molecular biology major, students who major in BMB cannot double major or minor in chemistry or biology.

Seminar Requirements

All junior BMB majors will participate in CHE Junior seminar which focuses on

1. understanding contemporary moral/societal issues in chemistry with an emphasis on sustainability science literacy, and
2. introducing grant writing and the principles of an effective research proposal with the presentation of an integrative research proposal being the culmination of seminar.

This will count as the W3 within the major. Therefore, at the end of this course, the following "4 Cs" will have been practiced and mastered: Critical thinking and problem solving, Communication, Collaboration, and Creativity and innovation.

Senior Capstone Experience

For the senior capstone experience, students will either be advised by a Biology or Chemistry faculty member. Students will be able to choose from two different options to complete the SCE which includes an experimental project or a written monograph on a topic of their choosing. Senior capstone students will be assigned to a faculty advisor by the Program Chair in consultation with program faculty. Seniors present the results of their project in a poster session that is open to the College community. The program has a set of Senior Capstone Experience Guidelines that are distributed to both junior and senior BMB majors each Fall. Students must enroll in BMB SCE in their final semester to obtain credit for the Senior Capstone Experience. The Senior Capstone Experience receives a letter grade (A to F).

Internship and Research Opportunities

BMB majors are strongly encouraged to participate in internships during their undergraduate education. These experiences afford students the opportunity to enhance their understanding of biochemical concepts, gain additional laboratory experience, and/or network with other scientists and professionals. Internships may be located on or off-campus and may occur at any point during the academic year. Students wishing to earn course credit for an internship must gain approval from the BMB program chairs prior to beginning the internship. A number of stipend-bearing internships and research opportunities exist for BMB majors. Summer on-campus research projects as well as summer and semester-long off-campus internships not only provide additional laboratory experience, but also allow students the opportunity to explore, in depth, areas of biochemistry and molecular biology not covered in the core curriculum. Off-campus and on-campus internships may or may not bear credit.

Distribution Courses

To aid in course planning, students should consult the Distribution Requirements section of the catalog.

Advanced Placement Credit

Students are instructed to consult either the Biology or Chemistry Department catalog section to determine the policy on Advanced Placement or IB credit.

Transfer Credit

Students are instructed to consult either the Biology or Chemistry Department catalog section to determine the policy on transfer credit.

Prerequisites

To enroll in any course, a student must complete and pass all prerequisites.

Based on these academic requirements, below is a typical plan of study for students wishing to complete the BMB major in four years. Given the flexibility in the proposed curriculum, this plan can be condensed to three years to accommodate students who begin the major late, desire to graduate in three years or choose to study abroad.

Typical Four-Year Plan

First Year		
Fall	Credits Spring	Credits
BIO 111	4 BIO 112	4
CHE 120	4 CHE 140	4
FYS 101	4 Two distribution courses	8
Distribution course	4	
	16	16
Second Year		
Fall	Credits Spring	Credits
BIO 209 (or approved 200-level BIO)	4 BIO 209 (or approved BIO elective)	4
CHE 220	4 MAT 112 or 107	4
MAT 111 or 106	4 Two distribution courses	8
Distribution course	4	
	16	16
Third Year		
Fall	Credits Spring	Credits
BIO 409	4 CHE 303	4
PHY 101 or 111	4 PHY 102 or 112	4
BIO Elective 200-400	4 Chemistry Junior Seminar	2
Distribution course	4 Distribution course	4
	Elective	4
	16	18
Fourth Year		
Fall	Credits Spring	Credits
Approved BIO elective (one at 300-400 level)	4 CHE 306 (or CHE Elective)	4
CHE 305 (or CHE Elective)	4 BMB SCE	4
Two electives	8 Two electives	8
	16	16
Total Credits 130		

Daniel May (Chemistry), Co-Program Chair
 Mindy Reynolds (Biology), Co-Program Chair
 Jennifer Wanat (Biology)

Major

- Biochemistry and Molecular Biology Major (p. 1)
- Biology Major (<https://catalog.washcoll.edu/catalog/departments-programs/biology/biology-major/>)
- Chemistry ACS-certified Major (<https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-acs-certified-major/>)
- Chemistry Non-ACS certified Major (<https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-non-acs-certified-major/>)

Minor

- Biology Minor (<https://catalog.washcoll.edu/catalog/departments-programs/biology/biology-minor/>)
- Chemistry Minor (<https://catalog.washcoll.edu/catalog/departments-programs/chemistry/chemistry-minor/>)