

Four-Year Academic Plans for Biochemistry and Molecular Biology (BCMB) Majors

Students navigate through the BCMB Program in a variety of ways depending on their academic preparedness and on their specific interests. The following academic plans represent a few of the many possible paths for completing a BCMB major. We suggest that you discuss your background and your career goals with a BCMB adviser so that you can configure a plan that best supports your educational goals. Note that in the following plans, the term “elective” is used to denote a course that is not required to fulfill a BCMB major requirement. Many BCMB students enroll in electives that are connected to their major. For example, courses such as Biomolecular NMR Spectroscopy (Chem 464), Developmental Biology (Bio 369), Medicinal Organic Chemistry (Chem 443), Phylogenetic Biology and Molecular Evolution (Bio 408), Chromatin Structure and Dynamics (Bio 411), and Neurobiology (Bio 422) attract many BCMB majors. Remember that during your four years at the college, you will need to not only meet your major requirements but also fulfill your general education requirements. Be certain to think carefully about all of the elements of your undergraduate academic plan.

- The first-year core curriculum (Core 120/121) is included in the plans, but you will need to use the slots marked “Elective” and/or the Overseas Program to satisfy your other general education requirements. In particular, you will need to plan carefully to fit in the College’s three-semester foreign language requirement (especially if you do not pass out of part or all of it).
- The plans below assume that you have no advanced placement. If you place out of introductory courses you will have additional room in your schedule for electives and can start on advanced courses for the major earlier. Please refer to the information on Page 4 about this.

Standard BCMB Curricular Plan

Year	Fall	Credits	Spring	Credits
1 st	Core 120 or 121: Words or Numbers	4	Core 120 or 121: Words or Numbers	4
	Chem 110: General Chem I (lecture/lab)	5	Chem 120: General Chem II (lecture/lab)	5
	Math 131: Calculus I (lecture)	4	Math 132: Calculus II (lecture)	4
	←Fall/Spring: Elective or Bio 110: Biological Investigations (4 credits each)→			
2 nd	Chem 210: Organic Chem I (lecture/lab)	5	Chem 220: Organic Chem II (lecture/lab)	5
	Physics 141: Intro. Physics I (lecture/lab)	5	Physics 142: Intro. Physics II (lecture/lab)	5
	Elective	4	Elective	4
	←Fall/Spring: Elective or Bio 202: Biological Core Concepts - Mechanisms (4 credits each)→			
3 rd	Bio 311: Molecular Biology (lecture)	4	Overseas/Off-Campus Program (16 credits) (or remain on-campus and take some of the fourth year spring courses)	
	Bio 312: Molecular Biology Lab	2		
	Chem 330: Structural Biochem (lecture)	4		
	Elective	4		
4 th	Bio 361: Cell Biology (lecture/lab)	5	Chem 335: Metabolic Biochem (lecture)	4
	Elective	4	Chem 336: Biochem Lab	2
	Elective	4	Quantitative Requirement (see Page 3)	4
	Senior Research or Elective	4	Senior Research or Elective	4

Notes:

- This curriculum plan assumes an overseas trip in the spring of the 3rd year. If you do not choose to go on an Overseas or Off-Campus program, you can take the requirements listed for Spring in the 4th year in your 3rd Spring semester.
- It is possible to move the courses listed for Spring in the 4th year to Spring in the 3rd year, allowing for an Overseas/Off-Campus trip in the final semester.
- You are encouraged to take Bio 110 (Biological Investigations) in Fall or Spring of your 1st year, and Bio 202 (Biological Core Concepts – Mechanisms) in Fall or Spring of your 2nd year.

BCMB Curricular Plan with a Fall Overseas Program

Year	Fall	Credits	Spring	Credits
1 st	Core 120 or 121: Words or Numbers	4	Core 120 or 121: Words or Numbers	4
	Chem 110: General Chem I (lecture/lab)	5	Chem 120: General Chem II (lecture/lab)	5
	Math 131: Calculus I (lecture)	4	Math 132: Calculus II (lecture)	4
	Bio 110: Biological Investigations (lab)	4	Bio 202: Mechanisms (lecture)	4
2 nd	Chem 210: Organic Chem I (lecture/lab)	5	Chem 220: Organic Chem II (lecture/lab)	5
	Physics 141: Intro. Physics I (lecture/lab)	5	Physics 142: Intro. Physics II (lecture/lab)	5
	Bio 311: Molecular Biology (lecture)	4	Elective	4
	Bio 312: Molecular Biology Lab	2	Elective	4
3 rd	Overseas/Off-Campus Program (16 credits)		Quantitative Requirement (see Page 3)	4
			BCMB 410: BCMB Seminar	1
			Elective	4
			Elective	4
4 th	Bio 361: Cell Biology (lecture/lab)	5	Chem 335: Metabolic Biochem (lecture)	4
	Chem 330: Structural Biochem (lecture)	4	Chem 336: Biochem Lab	2
	Elective	4	Elective	4
	Senior Research or Elective	4	Senior Research or Elective	4

Notes:

- It is possible to swap the 3rd and 4th years if you intend to go Overseas in the Fall of your 4th year.

BCMB Curricular Plan for Students taking part in the Berlin Overseas Program

Year	Fall	Credits	Spring	Credits
1 st	Core 120 or 121: Words or Numbers	4	Core 120 or 121: Words or Numbers	4
	Chem 110: General Chem I (lecture/lab)	5	Chem 120: General Chem II (lecture/lab)	5
	Math 131: Calculus I (lecture)	4	Math 132: Calculus II (lecture)	4
	←Fall/Spring: Elective or Bio 110: Biological Investigations (4 credits each)→			
2 nd	Chem 210: Organic Chem I (lecture/lab)	5	Chem 220: Organic Chem II (lecture/lab)	5
	Physics 141: Intro. Physics I (lecture/lab)	5	Physics 142: Intro. Physics II (lecture/lab)	5
	Elective	4	Elective	4
	←Fall/Spring: Elective or Bio 202: Biological Core Concepts - Mechanisms (4 credits each)→			
3 rd	Berlin Overseas Program (16 credits) (including Chem 330: Structural Biochem 4)		Chem 335: Metabolic Biochem (lecture)	4
			Chem 336: Biochem Lab	2
			Quantitative Requirement (see Page 3)	4
			BCMB 410: BCMB Seminar	1
4 th	Bio 311: Molecular Biology (lecture)	4	Elective	4
	Bio 312: Molecular Biology Lab	2	Elective	4
	Bio 361: Cell Biology (lecture/lab)	5	Elective	4
	Senior Research or Elective	4	Senior Research or Elective	4

Notes:

- It is possible to swap the 3rd and 4th years if you intend to go to Berlin in the Fall of your 4th year.
- In addition to taking Chem 330 (which is a requirement for the BCMB major), students on the Berlin program also take classes that satisfy the creative arts, culture/power/identity, and historical perspectives requirements. In addition, like all overseas study programs, it will satisfy the global perspectives general education requirement.

Three-Year Curricular Plan for the BCMB Major

It is technically possible to satisfy the requirements for the BCMB major in three years. As 128 credits are required to graduate from Lewis & Clark College, the three-year plan below is intended for students who start the major after their first year, for transfer students, and for those coming in with a large number of credits from Advanced Placement/International Baccalaureate exams. In particular, transfer students will need to consult with the BCMB director to determine which requirements for the major have already been fulfilled by previous coursework.

Year	Fall	Credits	Spring	Credits
1 st	Chem 110: General Chem I (lecture/lab)	5	Chem 120: General Chem II (lecture/lab)	5
	Math 131: Calculus I (lecture)	4	Math 132: Calculus II (lecture)	4
	Bio 110: Biological Investigations (lab)	4	Bio 202: Mechanisms (lecture)	4
	Elective	4	Elective	4
2 nd	Chem 210: Organic Chem I (lecture/lab)	5	Chem 220: Organic Chem II (lecture/lab)	5
	Physics 141: Intro. Physics I (lecture/lab)	5	Physics 142: Intro. Physics II (lecture/lab)	5
	Bio 311: Molecular Biology (lecture)	4	BCMB 410: BCMB Seminar	1
	Bio 312: Molecular Biology Lab	2	Elective	4
3 rd	Bio 361: Cell Biology (lecture/lab)	5	Chem 335: Metabolic Biochem (lecture)	4
	Chem 330: Structural Biochem (lecture)	4	Chem 336: Biochem Lab	2
	Elective	4	Quantitative Requirement (see below)	4
	Senior Research or Elective	4	Senior Research or Elective	4

Quantitative Elective

You can satisfy the quantitative advanced elective within the BCMB major by taking one of the following three courses:

- Chem 310: Physical Chemistry: Thermodynamics and Kinetics
- Math 255: Statistical Concepts and Methods
- Phys 390: Biomedical Imaging

BCMB 410: Biochemistry/Molecular Biology Seminar

BCMB seminar meets once a week during the spring semester. All BCMB majors must take this as a course at least once (it can be repeated) and, even if you are not enrolled, you should consider attending seminars that seem interesting. BCMB seminar brings in outside speakers to talk about their careers, experiences, and research, and also provides an opportunity for BCMB students (such as senior thesis students) to present their own research work.

Course Work in Physics

Most BCMB majors take the Physics 141/142 introductory sequence in physics. Students with a strong mathematics background frequently take Physics 151 instead of Physics 141. Although it is possible to take Physics 152 instead of Physics 142 to satisfy the BCMB major requirements, the material covered in Physics 142 is more appropriate for BCMB majors.

Overseas Study

For the majority of BCMB majors, the best semester to study overseas is the spring semester of their junior year. This is particularly true for students who anticipate completing a thesis during their senior year (BCMB 496: Senior Research). If a fall semester overseas program is selected, students should consider

enrolling during their second year in either Bio 311/312 or Bio 361. Otherwise, concurrent enrollment in Bio 311/312, Bio 361, and Chem 330 will be required.

Double Majors

About ten percent of BCMB majors complete a second major. BCMB students have completed second majors in many different disciplines including Mathematics and Computer Science, International Affairs, Psychology, Hispanic Studies, and Sociology and Anthropology. Completion of a double major requires very careful academic planning and students are advised to work closely with a faculty adviser from each of their major disciplines.

Senior Research

More than 50% of BCMB majors elect to do independent research at some point during their time at Lewis & Clark College, and roughly 20% of BCMB majors undertake a year-long senior research thesis project. Thesis research is not a requirement for the major, but it is a requirement (along with a GPA in the major of 3.5 or higher) to be eligible to graduate with honors in the major. Thesis research is a rewarding, but time-intensive, activity so students who want to carry out a thesis project are encouraged to try to satisfy most of their major requirements before their senior year to provide space in their schedule to carry out the project. If you are interested in doing a thesis you should begin discussing this with your faculty advisor well before your final year at the College.

Advanced Placement Credit in Biology, Chemistry, Mathematics, and Physics

Biology: If you have an AP Biology score of 4 or 5, or an IB Biology score of 7, you will receive four credits that apply to the 128 credits that you need to graduate. As the introductory biology courses are very different than the AP/IB curriculum, you will still need to take Bio 110 and Bio 202.

Chemistry: If you have an AP Chemistry score of 4, or an IB Chemistry score of 5, you are exempt from taking Chem 110 and should plan on enrolling in Chem 120 in the spring semester. If you received an AP Chemistry score of 5, or an IB Chemistry score of 6 or 7, you are exempt from taking both semesters of General Chemistry (Chem 110 and 120) and can enroll in Organic Chemistry (Chem 210). However, the Chemistry Department recommends that you consult with Dr. Louis Kuo (kuo@lclark.edu) before registering for Organic Chemistry (Chem 210).

Mathematics: If you have an AP Calculus AB score of 4 or 5, or an IB Mathematics HL score of 5, 6, or 7, you are exempt from taking Math 131 and should register for Math 132. If you have an AP Calculus BC score of 4 or 5 you are exempt from taking both Math 131 and Math 132. We encourage students who arrive having completed their calculus requirement to continue their study of mathematics during their time at the college. We recommend enrolling in at least one or the following courses offered by the Department of Mathematics Sciences: Statistical Concepts and Methods (Math 255), Discrete Mathematics (Math 215), Linear Algebra (Math 225), Differential Equations (Math 235).

Physics: If you have an AP Physics C score of 5 you are exempt from taking Physics 141 and should register for Physics 142 in the spring semester. If you have an IB Physics score of 7 you should consult with the Physics Department Chair (Dr. Bethe Scalettar, bethe@lclark.edu) for equivalency and placement. If you have an IB Physics score of 5 or 6 you receive credit toward the 128 credits that you need to graduate, but should still take Physics 141 (or Physics 151).