

Exploring Protein Structure: Principles and Practice (Learning Materials in Biosciences)

About the Program Bachelor of Arts (BA) The undergraduate major in Molecular and Cell Biology (MCB) focuses on the study of molecular structures and processes of cellular life and their roles in the function, reproduction, and development of living organisms. This covers a broad range of specialized disciplines, such as biochemistry, microbiology, biophysics, molecular biology, genetics, cell physiology, cell anatomy, immunology, and neurobiology. The types of living organisms from which the departmental faculty draws its working materials are as diverse as its disciplinary concentrations, ranging from viruses and microbes through plants, roundworms, annelids, arthropods, and mollusks, to fish, amphibia, and mammals. There are five emphases (concentrations) in MCB: Biochemistry, Biophysics & Structural Biology

Cell Biology, Development & Physiology

Genetics, Genomics, Evolution & Development

Immunology & Molecular Medicine

Neurobiology All of the emphases except Neurobiology have two tracks to choose from. Some tracks only differ slightly and some give a whole different perspective on the emphasis. For help deciding your emphasis please see a staff or peer advisor in MCB! Declaring the Major Students can receive pre-major advising at any time from staff or peer advisors. MCB is not an impacted major. Therefore, the major will accept any interested student who meets the minimum course and GPA requirements and is realistically able to complete the major requirements during the student's time at UC Berkeley. Any student intending to major in MCB must finish declaring or complete MCB conditions to declare by the end of their 6th semester, or during the semester before their graduating term (if this semester is before their 6th semester). In order to declare the MCB major, students must have completed or be enrolled in BIOLOGY 1A/BIOLOGY 1AL (C or better on first Bio 1A midterm) and CHEM 3B (past the early drop deadline), have at least a 2.0 overall GPA, a 2.0 GPA in the courses taken for the major, a 2.0 GPA in any upper division courses taken for the major, and know which emphasis they will declare. Intended MCB students are not required to have completed the math, physics, or Bio 1B requirements at the time of declaration (though these requirements must be met in order to graduate). To start the major declaration process, students must fill out the MCB major declaration form online. Once the declaration form has been processed, students will receive an email with instructions to schedule an appointment to meet with a staff advisor. Advising appointments take place in the Undergraduate Advising Office in 3060 Valley Life Sciences Building. Students should bring a printed copy of their Academic Summary in CalCentral to their advising appointment to discuss their academic plan. See full instructions on the MCB Declaration page. Visit Department Website

College Requirements Undergraduate students must fulfill the following requirements in addition to those required by their major program. For detailed lists of courses that fulfill college requirements, please review the College of Letters & Sciences page in this Guide. For College advising appointments, please

P

visit the L&S Advising Pages. University of California Requirements Entry Level Writing All students who will enter the University of California as freshmen must demonstrate their command of the English language by fulfilling the Entry Level Writing requirement. Fulfillment of this requirement is also a prerequisite to enrollment in all reading and composition courses at UC Berkeley. American History and American Institutions The American History and Institutions requirements are based on the principle that a US resident graduated from an American university, should have an understanding of the history and governmental institutions of the United States. Berkeley Campus Requirement American Cultures All undergraduate students at Cal need to take and pass this course in order to graduate. The requirement offers an exciting intellectual environment centered on the study of race, ethnicity and culture of the United States. AC courses offer students opportunities to be part of research-led, highly accomplished teaching environments, grappling with the complexity of American Culture. College of Letters & Science Essential Skills Requirements Quantitative Reasoning The Quantitative Reasoning requirement is designed to ensure that students graduate with basic understanding and competency in math, statistics, or computer science. The requirement may be satisfied by exam or by taking an approved course. Foreign Language The Foreign Language requirement may be satisfied by demonstrating proficiency in reading comprehension, writing, and conversation in a foreign language equivalent to the second semester college level, either by passing an exam or by completing approved course work. Reading and Composition In order to provide a solid foundation in reading, writing, and critical thinking the College requires two semesters of lower division work in composition in sequence. Students must complete parts A & B reading and composition courses in sequential order by the end of their fourth semester. College of Letters & Science 7 Course Breadth Requirements Breadth Requirements The undergraduate breadth requirements provide Berkeley students with a rich and varied educational experience outside of their major program. As the foundation of a liberal arts education, breadth courses give students a view into the intellectual life of the University while

introducing them to a multitude of perspectives and approaches to research and scholarship. Engaging students in new disciplines and with peers from other majors, the breadth experience strengthens interdisciplinary connections and context that prepares Berkeley graduates to understand and solve the complex issues of their day. Unit Requirements 120 total units

Of the 120 units, 36 must be upper division units

Of the 36 upper division units, 6 must be taken in courses offered outside your major department Residence Requirements For units to be considered in "residence," you must be registered in courses on the Berkeley campus as a student in the College of Letters & Science. Most students automatically fulfill the residence requirement by attending classes here for four years. In general, there is no need to be concerned about this requirement, unless you go abroad for a semester or year or want to take courses at another institution or through UC Extension during your senior year. In these cases, you should make an appointment to meet an adviser to determine how you can meet the Senior Residence Requirement. Note: Courses taken through UC Extension do not count toward residence. Senior Residence Requirement After you become a senior (with 90 semester units earned toward your BA degree), you must complete at least 24 of the remaining 30 units in residence in at least two semesters. To count as residence, a semester must consist of at least 6 passed units. Intercampus Visitor, EAP, and UC Berkeley-Washington Program (UCDC) units are excluded. You may use a Berkeley Summer Session to satisfy one semester of the Senior Residence requirement, provided that you successfully complete 6 units of course work in the Summer Session and that you have been enrolled previously in the college. Modified Senior Residence Requirement Participants in the UC Education Abroad Program (EAP), Berkeley Summer Abroad, or the UC Berkeley Washington Program (UCDC) may meet a Modified Senior Residence requirement by completing 24 (excluding EAP) of their final 60 semester units in residence. At least 12 of these 24 units must be completed after you have completed 90 units. Upper Division Residence Requirement You must complete in residence a minimum of 18 units of upper division courses (excluding UCEAP units), 12 of which must satisfy the requirements for your major.

Student Learning Goals Mission The Department of Molecular and Cell Biology (MCB) is a large department that is subdivided into five divisions: Biochemistry, Biophysics & Structural Biology (BBS); Cell Biology, Development & Physiology (CDP); Genetics, Genomics, Evolution and Development (GGED); Immunology and Molecular Medicine (IMM); and Neurobiology (NEU). All MCB students complete the same lower-division coursework to gain critical training in biology,

mathematics, chemistry, and physics (except for BBS track 2 Biological Chemistry, please see the MCB website for details). Most lower-division coursework is completed before the major declaration. Upon declaring the major, MCB students choose an emphasis and track, which determines the upper-division core courses they will take and elective choices from which they will choose. Students can choose among several areas of specialization; emphases are broadly defined along divisional lines and allow students to focus on a more defined topic within MCB. MCB students who elect to participate in independent research may choose from sponsoring research laboratories within any MCB division, or in laboratories outside the department (other Berkeley departments, LBNL, CHORI, UCSF, biotechnology companies). The MCB major provides excellent preparation for many careers and post-baccalaureate training programs, including graduate programs and health-related professional programs (e.g., medicine, dentistry, optometry, pharmacy), science writing, law school, biotechnology, teaching, and academic research. Learning Goals for the Major Describe basic biological concepts and principles. Appreciate the different levels of biological organization, from molecules to ecosystems. Understand that biology has a chemical, physical, and mathematical basis. Explain the importance of the scientific method to understanding natural phenomena. Effectively communicate scientific data and ideas, both orally and in writing. Critically evaluate data, develop a hypothesis, and design experiments to address an interesting and novel problem. Demonstrate advanced knowledge in a specialized field of molecular and cell biology.

Major Map Major Maps help undergraduate students discover academic, co-curricular, and discovery opportunities at UC Berkeley based on intended major or field of interest. Developed by the Division of Undergraduate Education in collaboration with academic departments, these experience maps will help you: Explore your major and gain a better understanding of your field of study

Connect with people and programs that inspire and sustain your creativity, drive, curiosity and success

Discover opportunities for independent inquiry, enterprise, and creative expression

Engage locally and globally to broaden your perspectives and change the world

Reflect on your academic career and prepare for life after Berkeley Use the major map below as a guide to planning your undergraduate journey and designing your own unique Berkeley experience. View the Molecular and Cell Biology Major Map PDF.

Reference

[Bayesian Structural Equation Modeling \(Methodology in the Social Sciences\)](#)

[Argument-Based Validation in Testing and Assessment \(Quantitative Applications in the Social Sciences Book 184\)](#)