Bioprocess Engineering

The Master of Bioprocess Engineering (MBPE) degree is 9-month degree program designed to prepare graduates for meaningful careers in Bioprocess Engineering spanning the biopharmaceutical, industrial biotech, and food tech industries (and beyond). These include ways to produce bio-based chemicals and fuels, proteins, pharmaceuticals, and other high-value biologics; how to design and/or operate appropriate unit operations (e.g., fermentation systems), mammalian-cell culture systems, and instrumentation to monitor and control biotechnological processes; and how to apply and test bioproduct separation and purification technologies. The MBPE program has access to state-of-the-art bioprocessing equipment both on campus and at the Advanced Biofuels and Bioproducts Process Demonstration Unit (ABPDU), which is part of the Lawrence Berkeley National Laboratory funded by US DOE. Emphasis on translating fundamentals into practical applications across the bench, pilot, and commercial production scales offers an integrated didactic experience. As a result, you will be able to immediately apply hands-on skills and knowledge to develop, design, and scale-up bio-based processes and products from concept through commercialization.

Industrial Advisory Board

- Paul Hill, Amyris
- Ashley Hesslein, Bayer Pharmaceuticals
- Paul Wu, Bayer Pharmaceuticals
- Marcella Yu, Boehringer Ingelheim
- Brian Kelley, Vir Biotechnology
- Jay Keasling, UC Berkeley

MBPE admissions requirements include a background in Chemical Engineering (B.S.) and an undergraduate biochemistry/molecular biology course equivalent to BIO ENG 11 or MCELLBI 102. Candidates from other backgrounds will be reviewed on a case-by-case basis with focus on a strong foundation to undergo the MBPE program. We are open to working with the motivated applicant (either graduating senior student or industry worker) who wishes to complete appropriate coursework during the summer prior to joining the program.

Applying for Graduate Admission

Thank you for considering UC Berkeley for graduate study! UC Berkeley offers more than 120 graduate programs representing the breadth and depth of interdisciplinary scholarship. The Graduate Division hosts a complete list (https://grad.berkeley.edu/admissions/choosing-your-program/list/) of graduate academic programs, departments, degrees offered, and application deadlines can be found on the Graduate Division website.

Prospective students must submit an online application to be considered for admission, in addition to any supplemental materials specific to the program for which they are applying. The online application and steps to take to apply can be found on the Graduate Division website (https://grad.berkeley.edu/admissions/steps-to-apply/).

Admission Requirements

The minimum graduate admission requirements are:

1. A bachelor's degree or recognized equivalent from an accredited institution;
2. A satisfactory scholastic average, usually a minimum grade-point average (GPA) of 3.0 (B) on a 4.0 scale; and
3. Enough undergraduate training to do graduate work in your chosen field.

For a list of requirements to complete your graduate application, please see the Graduate Division's Admissions Requirements page (https://grad.berkeley.edu/admissions/steps-to-apply/requirements/). It is also important to check with the program or department of interest, as they may have additional requirements specific to their program of study and degree. Department contact information can be found here (https://guide.berkeley.edu/graduate/degree-programs/).

Where to apply?

Visit the Berkeley Graduate Division application page (http://grad.berkeley.edu/admissions/apply/).

Required Courses

Master of Bioprocess Engineering degree candidates will be required to complete a minimum of 28 core units over two semesters. This includes a Biochemical Engineering lecture and laboratory series covering 1) cells and the production of biomolecules; and 2) the recovery, separations, and purification of biomolecules, respectively. This foundational series is complemented by required coursework in Good Manufacturing Practice (GMP), Quality by Design (QbD), statistical experimental design, and a Bioprocess Industry seminar series to ensure that you graduate with the necessary skill set and exposure to begin or continue your career in the bioprocess industries.

CHM ENG 170A	Biochemical Engineering	4
CHM ENG 170B	Biochemical Engineering	4
CHM ENG C170L	Biochemical Engineering Laboratory	3
CHM ENG 275	Advanced Bioprocess Engineering	3
CHM ENG 275L	Advanced Bioprocess Engineering Laboratory	4
CHM ENG 298	Seminar in Chemical Engineering	1
CHM ENG 298B	Seminar in Bioprocess Engineering (Students are required to take 2 units; 1 unit in fall and 1 unit in spring)	1

The curriculum also allows room to personalize your MBPE education and experience by choosing electives from a wide variety of approved options offered by the Department and across campus:

Elective Courses

CHM ENG 180	Chemical Engineering Economics	3
CHM ENG 274	Biomolecular Engineering	3
BIO ENG 124	Basic Principles of Drug Delivery	3
BIO ENG 133	Course Not Available	3
CHEM C130	Biophysical Chemistry: Physical Principles and the Molecules of Life	4
CHEM 135	Chemical Biology	3
CHEM C230	Protein Chemistry, Enzymology, and Bio-organic Chemistry	2
CHEM C271A	Chemical Biology I - Structure, Synthesis and Function of Biomolecules	1
CHEM C271B	Chemical Biology II - Enzyme Reaction Mechanisms	1

CHEM C271C	Chemical Biology III - Contemporary Topics in Chemical Biology	1
IND ENG 185	Course Not Available	
MCELLBI 38	Stem Cell Biology, Ethics and Societal Impact	3
MCELLBI 88	Immunotherapy of Cancer: Success and Failures	2
MCELLBI C95B	Course Not Available	2
MCELLBI 104	Genetics, Genomics, and Cell Biology	4
MCELLBI 110	Molecular Biology: Macromolecular Synthesis and Cellular Function	4
MCELLBI C112	General Microbiology	4
MCELLBI C116	Microbial Diversity	3
MCELLBI 130	Course Not Available	4
MCELLBI 133L	Physiology and Cell Biology Laboratory	4
MCELLBI 150	Molecular Immunology	4
NUSCTX 115	Course Not Available	
PB HLTH W236A	Course Not Available	3

Upon completion of the Master of Bioprocess Engineering program, you will be prepared for a role as an Associate Scientist or Bioprocess Engineer in the biopharmaceutical, industrial biotech, or food tech industries.

The CHM ENG 298B Seminar in Bioprocess Engineering provides an interactive interface for students, bioprocess industry experts, and the MBPE program. This 80-min weekly seminar pairs our students with industry partners to discuss relevant bio-based technologies, processes, and products spanning the biopharmaceutical, industrial biotech, and food tech industries (and beyond).