

BIOLOGICAL ENGINEERING - MINOR

Biological engineers are instrumental in driving fields such as tissue engineering, personalized medicine, sustainable biofuels, pharmaceuticals, biotechnology, biomaterials and therapeutics. A biological engineering minor prepares students to approach these fields from a biochemical engineering perspective.

Students first complete fundamental courses on topics such as mass and energy balances and transport and then pick from a wide array of more advanced biological engineering classes to suite their individual interests.

A minor in biological engineering can be earned in conjunction with any CU Boulder engineering major.

Requirements

Course Requirements

The biological engineering minor requires a minimum of 18 credit hours, distributed as follows:

Code	Title	Credit Hours
Required Courses		
CHEN 2120 or BMEN 2100	Chemical Engineering Material and Energy Balances Biomedical Engineering Principles and Methods	3
CHEN 3210 or BMEN 3010	Chemical Engineering Heat and Mass Transfer Biotransport	4
Electives		
Choose 11-12 credits from any of the following:		11-12
BCHM 4611	Principles of Biochemistry	
BMEN 2010	Biomaterials	
BIEN 3800	Fundamentals of Biotechnology	
BIEN 4010	Biological Engineering Senior Thesis 1	
BIEN 4020	Biological Engineering Senior Thesis 2	
BIEN 4520	Biological Process and Product Design	
BIEN 4530	Biological Engineering Design Project	
BIEN 4801	Pharmaceutical Biotechnology	
BIEN 4802	Tissue Engineering and Biofabrication	
BIEN 4803	Metabolic Engineering	
BIEN 4804	Protein and Enzyme Engineering	
BIEN 4805	Biomaterials	
BIEN 4806	Immunoengineering	
BIEN 4810	Biological Engineering Laboratory	
BIEN 4820	Biochemical Separations	
BIEN 4830	Biokinetics and Reactor Design	
BIEN 4838	Special Topics in Biological Engineering	
Total Credit Hours		18-19

- Relevant independent study coursework can be petitioned.
- 5000-level BIEN courses are allowed where undergraduate students are eligible to enroll.
- Prior coursework may be transferred from other institutions with approval.
- At least 9 credit hours need to be taken on the CU Boulder campus, at least 6 credits of which must be at the upper-division level.

Grade Requirements

A grade point average (GPA) of 2.000 or better is required in the courses that are used to satisfy the requirements for this minor. Each individual course that is counted towards these requirements must be passed with a C- or better.

Plan(s) of Study

Year Two

Fall Semester		Credit Hours
CHEN 2120 or BMEN 2000	Chemical Engineering Material and Energy Balances or Introduction to Biomedical Engineering	3
Credit Hours		3

Year Three

Fall Semester		Credit Hours
CHEN 3210 or BMEN 3010	Chemical Engineering Heat and Mass Transfer or Biotransport	4
Elective ¹		3
Credit Hours		7

Spring Semester

Elective ¹	Credit Hours
	3

Year Four		Credit Hours
Fall Semester		
Elective ¹		3
Credit Hours		3

Spring Semester		Credit Hours
Elective ¹		2
Credit Hours		2
Total Credit Hours		18

¹ This is a sample distribution of electives. A total of at least 11 credit hours of approved electives must be completed for the minor and the actual distribution may look different depending on actual courses chosen.

Additional guidelines regarding the requirements: