

# BIOMEDICAL ENGINEERING MINOR

## Description

This minor is for engineering majors ONLY.

The College of Engineering enables its students to participate in this approved minor subject to the following conditions:

1. A minor will not reduce or alter the existing course or degree requirements for students electing to pursue a minor.
2. A student's minor program must be organized and approved by an advisor prior to the submission of the senior check to the department chair or head.
3. The minor must be approved by the advisor, the department chair or head, the Dean, and the cognizant program offering the minor.
4. The College of Engineering will follow the "Plan A/B" format of the College of Arts and Sciences in which a student pursuing a single minor must complete the "Plan A" requirements. A student pursuing a double (or greater) minor must fulfill either the "Plan A" or "Plan B" requirements for both minors depending on which plan is offered by the cognizant department.
5. Minors on the Lincoln or Omaha campuses may be added by approval of the College of Engineering Curriculum Committee and faculty.

## College Requirements

### College Admission

#### College Entrance Requirements

Students must have high school credit for (one unit is equal to one high school year):

1. Mathematics – 4 units: 2 of algebra, 1 of geometry, and 1 of precalculus and trigonometry
2. English – 4 units
3. Natural sciences – 3 units that must include 1 unit of physics and 1 unit of chemistry (chemistry requirement waived for students in construction management and computer science)
4. Foreign language – 2 units of a single foreign language
5. Social studies – 3 units
6. Students having a composite ACT score of 28 or greater (or equivalent SAT score) will be admitted to the College of Engineering even if they lack any one of the following: trigonometry, chemistry, or physics.
7. Students having an ACT score of 19 or less in English (or equivalent SAT score) must take ENGL 150 Writing and Inquiry or ENGL 151 Writing and Argument.

A total of 16 units is required for admission.

Students must have an ACT (enhanced) score of 24 or greater (or equivalent SAT). Students who lack entrance requirements may be admitted based on ACT scores, high school rank and credits, or may be admitted to pre-engineering status in the Exploratory and Pre-Professional Advising Center. Pre-engineering students are advised within the Exploratory and Pre-Professional Advising Center.

Students for whom English is not their language of nurture must meet the minimum English proficiency requirements of the University.

Students who lack entrance units may complete precollege training by Independent Study through the University of Nebraska–Lincoln Office of On-line and Distance Education, in summer courses, or as a part of their first or second semester course loads while in the Exploratory and Pre-Professional Advising Center or other Colleges at Nebraska.

Students should consult their advisor, their department chair, or Engineering Student Services if they have questions on current policies.

### Other Admission Requirements

Students who transfer to the University of Nebraska–Lincoln from other accredited colleges or universities and wish to be admitted to the College of Engineering (COE) must meet COE freshman entrance requirements and have a minimum cumulative GPA of 2.5 and be calculus-ready. Students not meeting either of these requirements must enroll in the Explore Center or another University college until they meet COE admission requirements. Students transferring from UNO, UNL, or UNK to the College of Engineering must be in good academic standing with their institution.

The COE accepts courses for transfer for which a C or better grade was received. Although the University of Nebraska–Lincoln accepts D grades from the University of Nebraska at Kearney and at Omaha, not all majors in the COE accept such low grades. Students must conform to the requirements of their intended major and, in any case, are strongly encouraged to repeat courses with a grade of C- or less.

All transfer students must adopt the curricular requirements of the undergraduate catalog current at the time of transfer to the COE—not that in use when they entered the University of Nebraska–Lincoln. Upon admission to Nebraska, students wishing to pursue degree programs in the COE will be classified and subject to the policies defined in the subsequent section.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 in order to be readmitted to COE.

## College Degree Requirements

### Grade Rules

#### Grade Appeals

In the event of a dispute involving any college policies or grades, the student should appeal to his/her instructor and appropriate department chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal his/her case through the College Academic Appeals Committee on his/her campus.

## Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at Nebraska in the College of Engineering. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

## Requirements for Minor Offered by Department

A biomedical engineering minor coupled with a degree from the College of Engineering can lead to a wide variety of careers, including medical research in industry and government, academics, and professional medical practice. The biomedical engineering minor, with carefully chosen electives, can prepare students for many biomedical engineering applications including biomaterials, biomechanics, biosensors, ergonomics, medical imaging, rehabilitation, robotics, systems biology, and tissue engineering.

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### Required Core Courses

LIFE 120	Fundamentals of Biology I	4
& LIFE 120L	and Fundamentals of Biology I laboratory	

Prereqs: high school biology, high school chemistry or CHEM 109A/CHEM 109L or parallel. Parallel registration in LIFE 120L.

BIOS 213	Human Physiology	4
& BIOS 213L	and Human Physiology Laboratory	

Prereqs: BIOS 101 & BIOS 101L or LIFE 120 & LIFE 120L or equivalent; parallel BIOS 213L.

BSEN 317	Introduction to Biomedical Engineering	3
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Prereqs: PHYS 211, MATH 221 or parallel and one semester of biology.

### Track Electives

Select 9 hours of electives (courses must be from at least two tracks)	9
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Total Credit Hours	20
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### Track A: Biomaterials and Cellular Interactions

BSEN 416	Introduction to Biomaterials	3
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BSEN 418	Tissue Engineering	3
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CHME 476	Micro/Nano systems for Engineering and Life Sciences	3
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CHME 496	Advanced Topics in Chemical Engineering Computation	3
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MECH 437	Biomedical Device Design	3
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MECH 438	Mechanics of Biomaterials	3
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MECH 498	Research (Advanced Biomaterials)	3
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MECH 498	Research (Introduction to Cell Mechanics)	3
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### Track B: Biomechanics

BSEN 412	Rehabilitation Engineering	3
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BSEN 492	Special Topics (Ergonomics)	3
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MECH 436	Introduction to Continuum Biomechanics	3
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### Track C: Medical Imaging and Signal Processing (Imaging and Information)

BSEN 311	Biomedical Signal and System Analysis	3
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BSEN 414	Medical Imaging Systems	3
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ECEN 304	Signals and Systems I	3
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ECEN 450	Bioinformatics	3
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ECEN 453	Computational and Systems Biology	3
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ECEN 463	Digital Signal Processing	3
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To add courses to tracks, instructors should send their syllabus to the BME Oversight Committee who will make the recommendation to add courses to tracks. **NOTE:** Courses need to have a significant medical/biological component to be considered.

## Grade Rules

### Pass/No Pass

No course taken Pass/No Pass will be counted toward the minor.