BS Bioengineering Bioengineering

Under Review | Fall 2026

Proposal Information

Workflow Status

In Progress

Faculty Senate Approval, Faculty Senate

expand

Waiting for Approval | Faculty Senate Approval

Nancy Middlebrook

Theresa Sherman

Proposal Information

Sponsoring faculty/staff member

Darryl Dickerson

Sponsoring faculty/staff email

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College

School of Engineering

Department

Chemical & Biological Engineering

Campus

Main Campus

Effective Term and Year

Proposed Effective Term and Year

Fall 2026

Justification

Program Justification

The Chemical and Biological Engineering Department (CBE) proposes a Bachelor of Science in Bioengineering (BioE) program, a field that applies math and science to design and evaluate bio-industrial, bioenergy, environmental, biomedical, and healthcare systems. Despite the growing importance of bioengineering, New Mexico lacks an undergraduate program in this discipline, disadvantaging local students compared to peers in neighboring states and nationwide. The CBE Department, with its expertise in chemical and biological engineering and an existing graduate biomedical engineering program, is well-suited to launch this initiative, aligning with its goal to provide top-tier education and research in both chemical and bioengineering. The proposed program also supports UNM's mission and strategic plan. After consulting with relevant departments and reviewing UNM's catalog, we confirmed that this BioE program would be unique within the university's offerings.

Program Category and Level

Program Category
Degree

Program Level
Undergraduate

Degree, Minor, or Certificate Name
Bioengineering

Certificate or Degree Type
Bachelor of Science

Degree/Certificate Level
Undergraduate

Proposed CIP Code
14.0501

Proposed CIP Title
Biomedical/Medical Engineering.

Is this program also offered online?
No

New program courses

Composition of new program

Existing courses	Revised courses	New Courses	Total Credits
90	18	17	125

New Degrees/Certificates Only

Pre-proposal Executive Summary

- BioE Executive Summary Submitted.docx
- BS in BioEngineering_11_11_24.pdf

Program Duplication
We have discussed our program with all relevant departments and also explored the UNM offerings via the online catalog and websites. These discussions and research confirmed that the proposed BioE program does not duplicate any UNM program.

Correspondence

Pre-proposal Approved?
Approved

Associate Provost Memo

- BS in BioEngineering_11_11_24 (2).pdf

Proposal File Upload

- Full Proposal for Bachelor of Science in Bioengineering.pdf

HED Submission Documents

- HED Undergrad Degree Form BioE DD.docx

File Uploads

Document uploads

Associated Kuali Forms

Select any associated course forms that exist

CBE 252 - Quantitative Processes in Bioengineering (3)
CBE 254 - Computing for Bioengineering (3)
CBE 320L - Bioengineering Laboratory I: Introduction to Experimentation (3)
CBE 321L - Bioengineering Laboratory II (3)
CBE 322 - Bioengineering Instrumentation (3)
CBE 420L - Bioengineering Lab III (1)
CBE 421L - Bioengineering Laboratory IV (1)

Select any associated program forms that exist

Shared Credit and Dual Degree information

Interdepartmental Program

No

Catalog Information

Program Description

Mission Statement

The Bachelor of Science in Bioengineering (B.S. BioE) program in the Department of Chemical and Biological Engineering provides a comprehensive education that prepares students to become skilled, responsible, and successful professionals or post-graduate scholars. Through a blend of academic, research, and service activities, the program fosters a supportive environment for a diverse student body, welcoming varied ages, genders, ethnicities, and educational backgrounds.

Introduction

Bioengineering equips students with skills to apply scientific and mathematical principles to design, develop, and assess bio-industrial, bioenergy, environmental, biomedical, and healthcare systems. The field's diverse applications and the flexibility of bioengineering education enable graduates to excel in emerging areas. UNM's bioengineering curriculum offers strong foundations in mathematics, physics, chemistry, and engineering, integrated with core bioengineering principles such as thermodynamics, transport phenomena, chemical reaction engineering, design, and process control.

Undergraduate bioengineering students benefit significantly from faculty-led research in key bioengineering areas, enriching laboratory courses and hands-on learning experiences. Many students engage in individualized research projects, with additional opportunities available through nearby national labs. This practical exposure enhances learning, preparing students to be competitive upon graduation. Faculty research activities also drive curriculum innovation, ensuring courses remain aligned with state-of-the-art knowledge and practices.

Graduates with a B.S. BioE have opportunities in diverse fields, including:

1. Biomedical Imaging and Bioinstrumentation
2. Biomechanics
3. Biomaterials
4. Genetic Engineering and Synthetic Biology
5. Cell and Tissue Engineering
6. Biosensors and Bioelectronics
7. Computational Bioengineering
8. Biomolecular Engineering

These fields are essential today, and the program equips graduates to excel in them. Additionally, a bioengineering undergraduate degree provides a strong foundation for advanced studies, including graduate programs and professional degrees in medicine, business, or law.

Bioengineering graduates advance in their careers or post-graduate paths by:

- Meeting or exceeding professional expectations,
- Successfully pursuing advanced studies,
- Taking on leadership roles within their professions or communities.

Admissions Requirements

The general criteria for admission into School of Engineering will be applied to students wishing to study Bioengineering.

Graduation Requirements

Overview of Curriculum

125 credit hours

UNM General Education Requirements (31 credits)

- Bioengineering students complete the full UNM General Education curriculum with a combination of required STEM courses and student-selected breadth courses.
- Specified by the Bioengineering Degree
    - Area 1: Writing & Communication: ENGL 1120 (Composition II)
    - Area 2: Mathematics
    - Area 3: Physical and Natural Sciences
- Selected by the Student (15 credits)
    - Area 4: Social & Behavioral Sciences (3)
    - Area 5: Humanities / Second Language (6)
    - Area 6: Creative and Fine Arts (3)
    - Area 7: Student Choice (3)

Mathematics and Basic Science (30 credits)

- MATH 1512 Calculus I (4)
- MATH 1522 Calculus II (4)
- MATH 2531 Calculus III (4)
- MATH 316 Applied Ordinary Differential Equations (3)
- PHYS 1310 Calculus-Based Physics I (3)
- PHYS 1320 Calculus-Based Physics II (3)
- CHEM 1215/L General Chemistry I + Lab (4)
- CHEM 1225/L General Chemistry II + Lab (4)
- BIOL 2101 Principles of Biology: Molecules to Cells (3)
- BIOL 2101L Biology Lab (1)

Bioengineering Fundamentals (35 credits)

- CBE 101 Introduction to Chemical and Biological Engineering (1)
- CBE 102 Addressing Societal Challenges Using Engineering Tools (1)
- CBE 252 Quantitative Processes in Bioengineering (3)
- BIOL 2210 Human Anatomy & Physiology I (3)
- CBE 254 Introduction to Programming for Bioengineering (3)
- CBE 302 Chemical & Bioengineering Thermodynamics (3)
- CBE 311 Introduction to Transport Phenomena (3)
- CBE 331 Mass Transfer (3)
- CHEM 301 Organic Chemistry (3)
- CHEM 302 Organic Chemistry (3)
- CBE 486 Introduction to Statistics & Design of Experiments (3)
- BIOC 423 Introductory Biochemistry (3)
- Professional/Technical Fundamentals (3 credits): At least three credits from the following courses: CE 202 Engineering Statics (3), CE 302 Mechanics of Materials (3), BIOL 2305 Microbiology for Health Sciences (4), BIOL 301C Molecular and Cellular Biology (4), BIOL 302C Genes to Genomes: Lecture and Laboratory (4)

Bioengineering Discovery and Practice (33 credits)

- CBE 320L Bioengineering Laboratory I (3)
- CBE 321L Bioengineering Laboratory II (3)
- CBE 420L Bioengineering Laboratory III (1)
- CBE 421L Bioengineering Laboratory IV (1)
- CBE 451 Senior Seminar (1)

- CBE 493L Chemical & Bioengineering Design (3)
- CBE 494L Advanced Chemical & Bioengineering Design (3)
- Professional/Technical Electives (18 credits): Students complete at least 18 credits of upper-division technical electives.

Professional Credential/Licensure Program Information

License/Certification associated with program

No

Professional Accrediting Bodies

Accreditation Board for Engineering and Technology (https://www.abet.org/)

Degree Information

Degree Hours

125

Minimum Major Hours

35

Degree Requirements

Requirements

- Complete all of the following
  - Earned a minimum grade of C in each of the following:
    - CBE101 - Introduction to Chemical and Biological Engineering (1)
    - MATH1512 - Calculus I (4)
    - BIOL2101 - Principles of Biology: Molecules to Cells (3)
    - BIOL2103L - Principles of Biology: Introductory Laboratory (1)
    - ENGL1120 - Composition II (3)
    - CBE102 - Addressing Societal Challenges using the Tools of Chemical and Biological Engineering (1)
    - CHEM1225L - General Chemistry II for STEM Majors Laboratory (1)
    - MATH1522 - Calculus II (4)
    - PHYS1310 - Calculus-Based Physics I (3)
    - BIOL2210 - Human Anatomy and Physiology I (3)
    - MATH2531 - Calculus III (4)
    - PHYS1320 - Calculus-Based Physics II (3)
    - CBE302 - Chemical Engineering Thermodynamics (3)
    - CHEM301 - Organic Chemistry (3)
    - MATH316 - Applied Ordinary Differential Equations (3)
    - CBE311 - Introduction to Transport Phenomena (3)
    - CHEM302 - Organic Chemistry (3)
    - CBE486 - Introduction to Statistics and Design of Experiments (3)
    - BIOC423 - Introductory Biochemistry (3)
    - CBE321 - Mass Transfer (3)
    - CBE451 - Senior Seminar (1)
    - CBE493L - Chemical Engineering Design (3)
    - CBE494L - Advanced Chemical Engineering Design (3)
    - CBE472 - Biomaterials Engineering (3)
    - CHEM1215 - General Chemistry I for STEM Majors (3)
    - CHEM1225 - General Chemistry II for STEM Majors (3)
    - CHEM1215L - General Chemistry I for STEM Majors Laboratory (1)
  - Earned a minimum grade of C in at least 1 of the following:
    - CE202 - Engineering Statics (3)
    - CE302 - Mechanics of Materials (3)
    - BIOL2305 - Microbiology for Health Sciences (4)
    - BIOL301C - Molecular and Cellular Biology (4)
    - BIOL302C - Genes to Genomes: Lecture and Laboratory (4)
  - Earned a minimum grade of C- in each of the following:
    - CBE252 - Quantitative Processes in Bioengineering (3)
    - CBE254 - Computing for Bioengineering (3)
    - CBE320L - Bioengineering Laboratory I: Introduction to Experimentation (3)
    - CBE321L - Bioengineering Laboratory II (3)
    - CBE322 - Bioengineering Instrumentation (3)
    - CBE420L - Bioengineering Lab III (1)
    - CBE421L - Bioengineering Laboratory IV (1)
  - Earn at least 15 credits from the following types of courses:
    General Education. Additional coursework to meet remaining University requirements. In addition to the program-specific requirements outlined here, all undergraduate students are required to fulfill UNM's General

Education Program requirements and other general undergraduate degree requirements to earn a minimum of 120 credits. In some instances, courses included in an undergraduate degree program's requirement may also fulfill a General Education requirement. Please review the General Education Program in this Catalog for General Education information.

- Earn at least 18 credits from the following types of courses:
  Professional/Technical Electives may be selected from approved list of upper-division (300-level and above) courses. Professional/Technical Electives may not be taken with the Credit/No Credit ("CR/NC") grading option. BIOL 492/592 – Introductory Mathematical Biology (3) BME 556 – Protein and Nucleic Acid Engineering (3) BME 558 – Methods of Analysis in Bioengineering (3) BME 575 – Biomechanics (3) BME 581 – Colloidal Nanocrystals for Biomedical Applications (3) CBE 371 – Introduction to Materials Engineering (3) CBE 412/512 – Characterization Methods for Nanostructures (3) CBE 417/517 – Applied Biology for Biomedical Engineers (3) CBE 477/577 – Electrochemical Engineering (3) CBE 479/579 – Tissue Engineering (3) CBE 499 – Selected Topics: Chemistry & Physics of Nanoscale (3) CBE 499 – Selected Topics: Kinetics of Chemical Processes (3) CBE 499 – Selected Topics: Surface & Interfacial Phenomena (3) CBE 499 – Selected Topics: Synthetic Cells & Organelles (3) CBE 499 – Selected Topics: Thermodynamics of Biological Systems (3) CE 202 – Engineering Statics (3) CE 302 – Mechanics of Materials (3) CE 335 – Environmental and Water Resources Engineering (3) CE 431/531 – Physical-Chemical Water and Wastewater Treatment (3) CE 433/533 – Environmental Microbiology (3) CE 436/536 – Biological Wastewater Treatment (3) CE 438/538 – Sustainable Engineering (3) CHEM 303L – Organic Chemistry Lab (1) CHEM 304L – Organic Chemistry Lab (1) CHEM 471 – Advanced Topics: Physics of Biomaterials (3) CHEM 471 – Advanced Topics: Chemistry & Physics of Nanoscale (3) ECE 314L – Signals and Systems (4)

Grand Total Credits: 125 - 126

Concentrations

Program Concentrations

Code	Title

Concentration Required
No

Emphases

Emphasis required
No

Emphasis Hours

Emphasis Rules

No Rules

Sample Degree Plan

Sample Degree Plan Upload

- BioE Undergrad Standard - Submitted Nov 2025.xlsx

Program Learning Outcomes

Learning Outcomes

The University of New Mexico's (UNM) Bioengineering program has several learning objectives, including:

- **Problem-solving**: Students learn to identify, formulate, and solve complex engineering problems
- **Engineering design**: Students apply engineering design to create solutions that meet needs while considering public health, safety, and welfare
- **Communication**: Students learn to communicate effectively with a variety of audiences
- **Ethics**: Students learn to recognize ethical and professional responsibilities in engineering situations
- **Teamwork**: Students learn to function effectively on a team, providing leadership, establishing goals, and planning tasks
- **Experimentation**: Students learn to develop and conduct appropriate experimentation, analyze and interpret data, and draw conclusions
- **Lifelong learning**: Students learn to acquire and apply new knowledge as needed

Registrar Office Only

CM Program Code	**BANP**	**Banner Program Code**	**Major Code**
BS Bioengineering			

Online Program Code	**Online Major Code**	**Pre-major Program Code**	**Pre-major Major Code**

CIP Code	**Concentration Inheritance**
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Catalog	**Catalog Activation Date**

Notes

MR, 8/20/25: Per Steven Graves, Darryl Dickerson is the primary lead and should be the "proposer" of the form.