

CON Bio Med Engr Biomedical Engineering

Under Review | Fall 2024

Proposal Information

Status Active	Workflow Status In Progress	
	Faculty Senate, Faculty Senate	expand ▲
	Waiting for Approval Faculty Senate Approval	
	Rick Holmes	
	Nancy Middlebrook	
	Changes <ul style="list-style-type: none">• Department• Concentration Requirements• Concentration Description• Proposed Effective Term and Year• Concentration Justification	
	Show All ▼	

Proposal Information

Proposed		Proposed
Sponsoring faculty/staff member ⓘ		Sponsoring faculty/staff email
Christina Salas/Yvone Nelson		nelsony@unm.edu
Existing		Existing
Sponsoring faculty/staff member ⓘ		Sponsoring faculty/staff email
College School of Engineering	Proposed	Campus
	Department	Main Campus
	Interdisciplinary: Engineering	
	Existing	
	Department	
	Electrical & Computer Engineering	

Effective Term and Year

Proposed
Proposed Effective Term and Year
Fall 2024

Existing
Proposed Effective Term and Year
Fall 2006

Justification

Proposed
Concentration Justification

We are proposing edits and format changes to clarify program information and requirements due to formatting lost when the catalog was updated.

Existing
Concentration Justification

Associated Forms

Select any associated course forms that exist

Select any associated program forms that exist

Program Information

Degree Name

PhD Engineering - Doctor of Philosophy in Engineering

Degree Type

Doctor of Philosophy

Program Type

Doctoral

Program Description

No Parent Selected

Degree Hours

66

Minimum Major Hours

Degree Requirements

- Complete all of the following
 - Earn at least 48 credits from the following types of courses:
The minimum amount of coursework required for the Doctor of Philosophy degree is 24 credit hours beyond the master's degree or 48 credit hours beyond the bachelor's degree. This requirement is exclusive of dissertation or master's thesis. These are minimum requirements; ordinarily, more than the 48 credit hours are necessary. The program of each student is an individual matter planned by the committee on studies.
 - See Concentration below for specific requirements.
 - Earn at least 18 credits from the following:
 - BME699 - Dissertation (3 - 12)

Grand Total Credits: 66

Concentration Information

Concentration Title

Biomedical Engineering

Program Level

Graduate

Concentration Requirements

Biomedical Engineering Core

~~1-7~~

7

Total Credits

- Complete ~~1~~ **all** of the following
 - Complete the following:
 - BME547 - Biomedical Engineering Research Practices (3)
 - BME558 - Methods of Analysis in Bioengineering (3)
 - ~~BME567 - Biomedical Engineering Seminar (1)~~
 - Earn at least 1 credits from the following:
 - BME567 - Biomedical Engineering Seminar (1)
 - BME 567 must be taken for at least one semester, to a maximum of 8 credit hours total

Emphasis core

~~9-30~~

9

Total Credits

- Complete 1 of the following
 - Bioinformatics**
 - Complete all of the following
 - Earn at least ~~30~~ **9** credits from the following types of courses:
Bioinformatics **courses:** Students ~~must~~ **BME518** complete the **Introduction M.S. to in Bioinformatics**
Biomedical **(3) Engineering** concentration **CS521** in Bioinformatics. **Data Mining** see **Techniques**
the **(3) Bioinformatics** Concentration **CS527** Catalog entry **Principles for** requirements. **Artificially**
Intelligent Machines (3) ▪ CS529 - Introduction to Machine Learning (3) ▪ CS564 - Introduction to
Database Management (3)
 - **Select 6-8 additional credits from the following Biology and Life Science courses for a total of 18**
credits satisfying the Bioinformatics Concentration: ▪ BME517 - Applied Biology for Biomedical
Engineers (3) ▪ BIOL351 - General Microbiology (3) ▪ BIOM507 - Advanced Molecular Biology (4) ▪
BIOM508 - Advanced Cell Biology (4) ▪ BIOM509 - Principles of Neurobiology (3) ▪ BIOM510 -
Physiology (3) ▪ BIOM514 - Immunobiology (3) ▪ BIOM515 - Cancer Biology (3)
 - Biomaterials, Biomechanics and Tissue Engineering**
 - Complete the following:
 - BME572 - Biomaterials Engineering (3)
 - BME575 - Biomechanics (3)
 - BME579 - Tissue Engineering (3)
 - Molecular and Cellular Systems**
 - Complete the following:
 - BME517 - Applied Biology for Biomedical Engineers (3)
 - BME544 - Thermodynamics of Biological Systems (3)
 - BME556 - Protein and Nucleic Acid Engineering (3)

Electives

~~18~~

32

Total Credits

- Earn at least ~~18~~ **32** credits from the following types of courses:
Elective ~~courses~~ **course credits must bring the degree total to the minimum requirement of 48 hours. Students**
completing the Bioinformatics Concentration only need 23 elective credits to meet the minimum 48 total credits. At

least 9 of ~~elective these credits~~ credit hours must be from courses offered in the School of Engineering. Any non-BME electives taken for the satisfaction of degree requirements must be technical in nature and further the study of BME subject areas. Electives must be approved by the faculty advisor and confirmed by the Graduate Program Director. Course offerings from Computer Science, Mathematics, Physics, Chemistry, Biology, or other departments in the School of Engineering are typically approved as electives, however, students may propose electives from any department.

Grand Total Credits: ~~28~~ 48

Proposed

Concentration Description

The Biomedical Engineering program offers a Doctor of Philosophy (Ph.D.) in Engineering concentration in Biomedical Engineering with an option to earn a Master of Science (M.S.) in Biomedical Engineering en route. The Ph.D. program in Biomedical Engineering prepares students for careers in solving engineering problems in health care, biomedical research, bioinformatics, and biotechnology. Areas of current faculty research include biomaterials, biomechanics, nanobiotechnology, nanomedicine, bioanalytical microsystems, patient-care devices, tissue engineering, flow cytometry, disease processes, clinical translation, bioinformatics and medical informatics, and molecular and cellular systems. Instruction includes five core courses, a seminar and numerous electives taught by Affiliated Faculty and others within the School of Engineering, School of Medicine, College of Arts and Sciences, and College of Pharmacy.

In addition to the general requirements specified in the Graduate Program section of this Catalog, students must also complete the Biomedical Engineering core, selected emphasis core, and elective courses described below. Equivalent graduate-level courses taken at other institutions may be used to satisfy one or more of the Biomedical Engineering and emphasis core requirements, as approved by the student's Graduate Advisor or Curriculum Committee.

Students must pass the Qualifying Examination before applying for Candidacy or proceeding to the Doctoral Comprehensive Exam. Upon successfully passing the Doctoral Comprehensive Exam and successful review of their application by program faculty and the Dean of Graduate Studies, students are admitted to Candidacy for the doctoral degree. For successful completion of the program requirements, all candidates must pass a Final Examination (Defense of Dissertation).

Admission Requirements

Successful applicants to the program usually have a bachelor's degree in the physical sciences or engineering. All incoming students should meet a minimum level of math competency indicated by a passing grade in Calculus II (MATH 1522) and Applied Ordinary Differential Equations (MATH 316). If needed, incoming students who are otherwise qualified may take MATH 316 during their first semester and pass with a grade of "B" or better.

The Admissions Committee makes admissions decisions on a case-by-case basis, with special consideration of scholastic proficiency in one or more of the following subject areas:

- * Molecular and Cellular Biology
- * Chemistry and Organic Chemistry
- * Calculus and Ordinary Differential Equations
- * Thermodynamics
- * Calculus-based Physics
- * Biochemistry or Biomolecular Engineering
- * Informatics and Computer Science

Students who have not passed courses in one or more of these subject areas may be asked to enroll in non-degree status while completing undergraduate courses to address deficiencies in their background. General admission requirements described in the Graduate Program section of this Catalog also apply.

Application Process

Details of applying to the Ph.D. program are found at the Biomedical Engineering program website. Applications to the degree program are submitted online.

Existing

Concentration Description

Doctor of Philosophy in Engineering concentration in Biomedical Engineering

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