

Date Submitted: 10/11/24 1:57 pm

Viewing: **BMEGBS : Biomedical Engineering, Bachelor of Science in Biomedical Engineering**

Last approved: 10/03/24 2:51 pm

Last edit: 12/04/24 6:46 pm

Changes proposed by: tmuldoon

Catalog Pages

Using this Program

[Biomedical Engineering B.S.Bm.E.](#)

[Biomedical Engineering \(BMEG\)](#)

Submitter: User ID: [tmuldoon](#) ~~gdaugher~~ Phone: [5324](#) ~~5454~~

Program Status Active

Academic Level Undergraduate

Type of proposal Major/Field of Study

Select a reason for this modification

Making Minor Changes to an Existing Certificate, Degree or Program (including 15 or fewer hours, admission/graduation requirements, Focused Studies or Tracks)

Are you adding a concentration?
No

Are you adding or modifying a track?
No

Are you adding or modifying a focused study?
No

Effective Catalog Year Fall 2025

In Workflow

1. ENGR Dean Initial
2. Director of Curriculum Review and Program Assessment
3. Registrar Initial
4. Institutional Research
5. BMEG Chair
6. ENGR Curriculum Committee
7. ENGR Faculty
8. ARSC Dean
9. ENGR Dean
10. Global Campus
11. Provost Review
12. Undergraduate Council
13. Faculty Senate
14. Provost Final
15. Registrar Final
16. Catalog Editor Final

Approval Path

1. 11/13/24 8:15 am
Kevin Hall (kdhall): Approved for ENGR Dean Initial
2. 11/18/24 10:28 am
Lisa Kulczak (lkulcza): Rollback to ENGR Dean

College/School

Code

College of Engineering (ENGR)

Department Code

Department of Biomedical Engineering (BMEG)

Program Code

BMEGBS

Degree

Bachelor of Science in Biomedical Engineering

CIP Code

Initial for Director
of Curriculum
Review and
Program
Assessment

3. 11/19/24 10:26 am

Kevin Hall
(kdhall): Approved
for ENGR Dean
Initial

4. 12/04/24 6:49 pm

Lisa Kulczak
(lkulcza):
Approved for
Director of
Curriculum
Review and
Program
Assessment

5. 12/05/24 1:27 pm

Gina Daugherty
(gdaugher):
Approved for
Registrar Initial

6. 12/05/24 2:06 pm

Doug Miles
(dmiles):
Approved for
Institutional
Research

7. 12/05/24 3:07 pm

Jeffrey Wolchok
(jwolchok):
Approved for
BMEG Chair

8. 01/15/25 8:27 am

Manuel Rossetti
(rossetti):
Approved for
ENGR Curriculum
Committee

9. 01/15/25 10:58 am
Kevin Hall
(kdhall): Approved for ENGR Faculty
10. 02/05/25 6:40 am
Christopher Schulte (cschulte):
Approved for ARSC Dean
11. 02/10/25 9:50 am
Kevin Hall
(kdhall): Approved for ENGR Dean
12. 02/10/25 11:17 am
Suzanne Kenner (skenner):
Approved for Global Campus
13. 02/10/25 3:33 pm
Jim Gigantino (jgiganti):
Approved for Provost Review

History

1. Aug 15, 2014 by Leepfrog Administrator (clhelp)
2. Apr 21, 2015 by Stacy Sanchez (slperry)
3. Mar 8, 2016 by Charlie Alison (calison)
4. May 25, 2017 by Charlie Alison (calison)
5. Apr 26, 2018 by Michelle Kim

- (mmkim)
- 6. May 26, 2020 by Lisa Kulczak (lkulcza)
- 7. May 18, 2021 by Jeffrey Wolchok (jwolchok)
- 8. Jan 2, 2024 by Jean Mitchell (jem03)
- 9. Apr 22, 2024 by Gina Daugherty (gdaugher)
- 10. May 8, 2024 by Gina Daugherty (gdaugher)
- 11. Oct 3, 2024 by Jean Mitchell (jem03)

14.0501 - Bioengineering and Biomedical Engineering.

Program Title

Biomedical Engineering, Bachelor of Science in Biomedical Engineering

Program Delivery

Method

On Campus

Is this program interdisciplinary between two or more colleges or schools?

No

Do the proposed changes impact any specific course(s) from another college or school?

Yes

College(s)/School(s)

College/School Name
Fulbright College of Arts and Sciences (ARSC)

What are the total hours needed to complete the program? 128

Program Requirements and Description

Requirements

Technical Options in Biomedical Engineering

Each student in biomedical engineering is required to complete nine semester hours of biomedical engineering technical electives. Biomedical engineering technical elective courses must be selected from a faculty-approved list of courses found in the department's Undergraduate Advising Handbook, which is available on the [department's website](#). Elective courses are chosen with the aid of an academic adviser to better prepare for employment or further study in areas such as:

Bioengineering

Pharmaceutical manufacturing or pharmacology

Biomedical device design

Medicine

Business

Law

Technical Elective Course

Each student in biomedical engineering is required to complete three semester hours of upper level science electives. Upper level (3000 and above) science electives will be chosen from courses in mathematics, engineering, and the sciences with the approval of their adviser. The department maintains a list of approved upper level science electives that may be found in the department's Undergraduate Advising Handbook, which is available on the [department's website](#).

8-Semester Plan

Biomedical Engineering B.S.Bm.E.

Eight-Semester Degree Program

The following section contains the list of courses required for the Bachelor of Science in Biomedical Engineering degree and a suggested sequence for students who enter the College through the Freshman Engineering Program. Not all courses are offered every semester, so students who deviate from the suggested sequence must pay careful attention to course scheduling and course prerequisites. Students wishing to follow the eight-semester degree plan should see the [Eight-Semester Degree Policy](#) in the Academic Regulations chapter for university requirements of the program.

First Year	Units
	FallSpring
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1) ¹	4
CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture)	3
GNEG 11101 Introduction to Engineering I	1
Select one of the following to satisfy General Education Outcome 4.2:	
HIST 20003 History of the American People to 1877 (ACTS Equivalency = HIST 2113)	3
or HIST 20103 History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 20003 American National Government (ACTS Equivalency = PLSC 2003)	
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)	3
Freshman Science Elective with lab ²	4
MATH 25004 Calculus II	4
PHYS 20304 University Physics I (ACTS Equivalency = PHYS 2034)	4
GNEG 11201 Introduction to Engineering II	1
Year Total:	14 16
Second Year	Units
	FallSpring
Sophomore Science Elective with lab ³	4
BMEG 26104 Introduction to Biomedical Engineering	4
MATH 30803 Linear Algebra	3
Satisfies General Education Outcome 3.4:	
BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture)	4
& BIOL 10101 Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)	
BMEG 28103 Biomechanical Engineering	3
BMEG 28203 Biomechanical Engineering Laboratory	1

BMEG 29004 Biomedical Instrumentation (with Lab)	4
MATH 25804 Elementary Differential Equations	4
BIOL 25473 Cell Biology	3
Fine Arts State Minimum Core Elective (Satisfies General Education Outcome 3.1) ⁴	3
Year Total:	15 17

Third Year

Units
FallSpring

BMEG 36304 Biomaterials (with Lab)	4
BMEG 31204 Biomedical Signals and Systems (with Lab)	4
CHEG 23103 Thermodynamics of Single-Component Systems or MEEG 24003 Thermodynamics	3
CHEM 36053 Organic Chemistry I & CHEM 36051 Organic Chemistry I Laboratory or CHEM 26103 and CHEM 26101	4
Social Sciences State Minimum Core Elective (Satisfies General Education Outcomes 3.3 and 4.1) ⁵	3
BMEG 36503 Biomedical Modeling and Numerical Methods	3
BMEG 38204 Biomolecular Engineering (with Lab)	4
BMEG 38001 Clinical Observations and Needs Finding	1
CHEG 21303 Fluid Mechanics or MEEG 35003 Mechanics of Fluids	3
BIOL 24103 Human Physiology (ACTS Equivalency = BIOL 2414 Lecture) & BIOL 24101 Human Physiology Laboratory (ACTS Equivalency = BIOL 2414 Lab)	4
STAT 28233 Biostatistics or MATH 21003 Principles of Statistics (ACTS Equivalency = MATH 2103)	3
Year Total:	18 18

Fourth Year

Units
FallSpring

BMEG 48103 Biomedical Engineering Design I	3
BMEG 46203 Biomedical Transport Phenomena	3
BMEG Elective	3
Science Elective	3
Social Sciences State Minimum Core Elective (Satisfies General Education Outcome 3.3) ⁶	3
BMEG 48203 Biomedical Engineering Design II (Satisfies General Education Outcome 6.1)	3
BMEG Elective	3
BMEG Elective	3
Social Sciences State Minimum Core Elective (Satisfies General Education Outcome 3.3) ⁶	3
Humanities State Minimum Core Elective (Satisfies General Education Outcomes 3.2 and 5.1) ⁷	3
Year Total:	15 15

Total Units in Sequence:

1

Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for [MATH 24004](#).

2

The Freshman Science Elective must be chosen from either [CHEM 14203/CHEM 14201](#) or [PHYS 20404](#).

3

The Sophomore Science Elective must be either [PHYS 20404](#) or [CHEM 14203/CHEM 14201](#). (Whichever was not chosen as the Freshman Engineering Science Elective).

4

The Fine Arts Elective courses which satisfy General Education Outcome 3.1 include: [ARCH 10003](#), [ARHS 10003](#), [COMM 10003](#), [DANC 10003](#), [LARC 10003](#), [MUSC 10003](#), [MUSC 100H3](#), [MUSC 10103](#), [MUSC 101H3](#), [MLIT 13303](#), [THTR 1003](#), [THTR 10103](#), or [THTR 101H3](#).

5

The Social Sciences Elective courses which satisfy General Education Outcomes 3.3 and 4.1 include: [ANTH 10203](#), [COMM 10203](#), [HDFS 14003](#), [HDFS 24103](#), [HIST 11193](#), [HIST 11293](#), [HIST 20903](#), [HUMN 111H4](#), [HUMN 211H4](#), [INST 2013](#), [INST 28103](#), [INST 281H3](#), [PLSC 20103](#), [PLSC 28103](#), [PLSC 281H3](#), [RESM 28503](#), [SOC 10103](#), [SOC 201H3](#), or [SOC 20103](#).

6

The Social Sciences Elective courses which satisfy General Education Outcome 3.3 include: [AGEC 11003](#), [AGEC 21003](#), [ANTH 10203](#), [COMM 10203](#), [ECON 21003](#), [ECON 22003](#), [ECON 21403](#), [EDST 20003](#), [HDFS 14003](#), [HDFS 24103](#), [HDFS 26003](#), [HIST 11193](#), [HIST 111H3](#), [HIST 11293](#), [HIST 112H3](#), [HIST 20003](#), [HIST 20103](#), [HIST 20903](#), [HUMN 111H4](#), [HUMN 112H4](#), [INST 28103](#), [INST 281H3](#), [PLSC 20003](#), [PLSC 20103](#), [PLSC 21003](#), [PLSC 28103](#), [PLSC 281H3](#), [PSYC 20003](#), [RESM 28503](#), [SOC 10103](#), [SOC 101H3](#), or [SOC 20103](#). Note, courses cannot be counted twice in degree requirements.

7

The Humanities Elective courses which satisfy General Education Outcomes 3.2 and 5.1 include: [CLST 10003](#), [CLST 100H3](#), [CLST 10103](#), [HUMN 112H4](#), [PHIL 20003](#), [PHIL 200H3](#), [PHIL 21003](#).

Are Similar Programs available in the area?

No

Estimated Student Demand for Program 60 per year

Scheduled Program Review Date

2025-2026

Program Goals and Objectives

Program Goals and Objectives

The Program Education Objectives of the undergraduate BMEG program at the University of Arkansas, Fayetteville are to produce graduates that are capable of:

1. Succeeding in practice at the interface between life science and engineering, or in other professional activities, or in post-baccalaureate studies.
2. Utilizing their engineering education/experience in creating new knowledge or enabling technologies for improvement of human health and healthcare.
3. Conducting themselves with high standards of professional ethics and integrity
4. Being aware of the limits of their knowledge and initiate self-directed learning to create future professional opportunities for themselves in biomedical engineering.

Learning Outcomes

Learning Outcomes

Completion of the degree requirements provides for the following educational outcomes:

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- an ability to communicate effectively with a range of audiences
- an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

These educational outcomes are experienced within the context of biology and physiology appropriate to solving problems at the interface of engineering and biology.

Description and justification of the request

Description of specific change	Justification for this change
Student may take either STAT 28233 (Biostatistics) OR MATH 21003 (Principles of Statistics) to satisfy BMEGBS statistics requirements.	Requested to broaden the available courses to satisfy department statistics requirement. Both courses are sufficiently similar in

Description of specific change	Justification for this change
This request is to ADD MATH 21003 as an option.	content. This change has been approved by the BMEG faculty.
Students may take either CHEM 36053 / CHEM 36051 (Organic Chemistry 1 with lab) OR CHEM 26103 / CHEM 26101 (Organic Physiological Chemistry with lab) to satisfy BMEGBS organic chemistry requirements.	Requested to broaden the available courses to satisfy department organic chemistry requirement and provide flexibility for students on the premedical track. Both courses cover the necessary requirements for the BMEGBS degree. This change has been approved by the BMEG faculty
This request is to ADD CHEM 26103 / 26103 as an option.	

Upload
attachments

Reviewer

Comments

Lisa Kulczak (lkulcza) (11/18/24 10:23 am): Updated submitter information and effective date.

Lisa Kulczak (lkulcza) (11/18/24 10:28 am): Rollback: If the department is requesting to add the MATH course and the other CHEM course combination, should that not be reflected in the 8-semester plan?

Kevin Hall (kdhall) (11/19/24 10:25 am): Added MATH and CHEM options in 8-semester plan.

Key: 473