

Program Change Request

Date Submitted: 08/24/21 10:02 am

Viewing: **BMEGMS : Biomedical Engineering,
Master of Science in Biomedical Engineering**

Last approved: 05/19/20 11:39 am

Last edit: 11/05/21 9:56 am

Changes proposed by: kbalacha

Catalog Pages Using
this Program

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

Submitter: User ID: kbalacha Phone:
5-3376

Program Status Active

Academic Level Graduate

Type of proposal Major/Field of Study

Select a reason for this modification

Making Minor Changes to an Existing Certificate or Degree (e.g. changing 15 or fewer hours, changing admission/graduation requirements, adding/changing Focused Study or Track)

Are you adding a concentration?

No Yes

Are you adding or modifying a track?

No

Are you adding or modifying a focused study?

No

Effective Catalog Year Fall 2022

College/School Code

In Workflow

1. ENGR Dean Initial
2. GRAD Dean Initial
3. Director of Curriculum Review and Program Assessment
4. Registrar Initial
5. Institutional Research
6. BMEG Chair
7. ENGR Curriculum Committee
8. ENGR Faculty
9. WCOB Dean
10. EDUC Dean
11. ENGR Dean
12. Global Campus
13. Provost Review
14. University Course and Program Committee
15. Graduate Council
16. Faculty Senate
17. Provost Final
18. Registrar Final
19. Catalog Editor Final

Approval Path

1. 08/31/21 1:24 pm
Kevin Hall (kdhall):
Approved for ENGR
Dean Initial
2. 08/31/21 4:08 pm
Jim Gigantino

College of Engineering (ENGR)

Department Code

Department of Biomedical Engineering (BMEG)

Program Code

BMEGMS

Degree

Master of Science in Biomedical Engineering

CIP Code

(jgiganti): Approved
for GRAD Dean
Initial

3. 09/02/21 11:47 am
Alice Griffin

(agriffin): Approved
for Director of
Curriculum Review
and Program
Assessment

4. 09/11/21 1:45 am
Lisa Kulczak
(lkulcza): Approved
for Registrar Initial

5. 09/11/21 5:38 pm
Doug Miles
(dmiles): Approved
for Institutional
Research

6. 09/14/21 9:00 am
Raj Rao (rajrao):
Approved for BMEG
Chair

7. 10/07/21 1:48 pm
Manuel Rossetti
(rossetti): Approved
for ENGR
Curriculum
Committee

8. 11/05/21 9:57 am
Kevin Hall (kdhall):
Approved for ENGR
Faculty

9. 11/05/21 1:10 pm
Alan Ellstrand
(aellstra): Approved
for WCOB Dean

10. 11/08/21 9:04 am
Matthew Ganio
(msganio):

Approved for EDUC
Dean

11. 12/01/21 10:19 am
Kevin Hall (kdhall):
Approved for ENGR
Dean

12. 12/01/21 10:20 am
Suzanne Kenner
(skenner): Approved
for Global Campus

13. 12/01/21 11:45 am
Ketevan
Mamiseishvili
(kmamisei):
Approved for
Provost Review

14. 12/17/21 5:13 pm
Alice Griffin
(agriffin): Approved
for University
Course and Program
Committee

15. 01/21/22 9:29 am
Jim Gigantino
(jgiganti): Approved
for Graduate
Council

History

1. Apr 26, 2018 by
Kartik Balachandran
(kbalacha)
2. May 19, 2020 by
Kartik Balachandran
(kbalacha)

14.0501 - Bioengineering and Biomedical Engineering.

Program Title

Biomedical Engineering, Master of Science in Biomedical Engineering

Program Delivery

Method

On Campus

Is this program interdisciplinary?

Yes

College(s)/School(s)

College/School Name
College of Engineering (ENGR)

Does this proposal impact any courses from another College/School?

Yes

College(s)/School(s)

College/School Name
Walton College of Business (WCOB)
College of Education and Health Professions (EDUC)

What are the total hours needed to complete the program? 30

Program Requirements and Description

Requirements

Admission to Degree Program: Admission to the M.S.B.M.E. is a two-step process. First, the prospective student must be admitted to graduate standing by the University of Arkansas Graduate School (see "The Graduate School: Objectives, Regulations, Degrees" in this catalog or visit grad.uark.edu for details). Second, the student must be admitted to the Department of Biomedical Engineering on the basis of academic transcripts, standardized test scores, three letters of recommendation and a statement of purpose. Students with a non-engineering degree or a non-ABET-accredited engineering degree must demonstrate completion of the Minimum Admission Criteria for non-Engineering Majors prior to being admitted. Complete details for admission may be obtained in the applicable program section from the [Biomedical Engineering website](#) as well as in the BMEG graduate program handbook. A general summary of admission requirements is given below:

- A B.S. or M.S. degree in engineering or engineering equivalent or completion of the minimum admission criteria for non-engineering majors (see below) with a GPA of at least 3.0.
- A GPA of 3.0 or higher on the last 60 hours of the baccalaureate degree.
- A GRE score of 302 or above (verbal and quantitative).
- A TOEFL score of at least 213 (computer-based) or 80 (internet based). This requirement is waived for applicants whose native language is English or who earn a bachelor's or master's degree from a U.S. institution.

A member of the faculty who is eligible (graduate status of group III or higher) must agree to serve as the Major Adviser to the prospective student.

Minimum Admission Criteria for non-Engineering Majors: Prior to gaining admission into the M.S.B.M.E. program, students with a non-engineering degree or a non-ABET-accredited engineering degree must demonstrate completion of the following coursework with a GPA of at least 3.0: 3 courses in Mathematics (selected from Calculus I, Calculus II, Calculus III, Linear Algebra, and/or Differential Equations), 2 courses of university-level Biology, 2 courses of university-level Chemistry, and 2 courses of university-level (calculus-based) Physics. In addition, students will be required to enroll and complete one of the following courses to provide adequate background in Engineering Design ([BMEG 2904](#) Biomedical Instrumentation, [BMEG 3634](#) Biomaterials, [BMEG 3124](#) Biomedical Signals and Systems, or [BMEG 3824](#) Biomolecular Engineering). Students should consult the Graduate Coordinator for a complete list of courses that satisfy the Minimum Admission Criteria. Complete details for admission may be obtained in the applicable program section from the [Biomedical Engineering website](#) as well as in the BMEG graduate program handbook.

Requirements for M.S. Degree in Biomedical Engineering: Both thesis and non-thesis options are available for the M.S.B.M.E. degree. In general, students pursuing the thesis option are supported by research or teaching assistantships and conduct research under the guidance of a major adviser. Students pursuing the non-thesis options are typically not sponsored. For either option, all course work must be approved by the student's program advisory committee. The cumulative grade-point average on all graduate courses presented for the degree must be at least 3.0. A general summary of degree requirements is given below. More detailed information may be obtained from the [Biomedical Engineering website](#) as well as in the BMEG graduate program handbook. Students should also be aware of Graduate School requirements with regard to [master's degrees](#).

Biomedical Engineering Thesis Option: 24 hours of graduate-level course work, including 5 hours of Biomedical Engineering Graduate Core as identified below, at least 10 additional hours of graduate-level classes in Biomedical Engineering, and 6 hours of research resulting in a written master's thesis. Candidates must pass a comprehensive final examination that will include an oral defense of the master's thesis. The examination is prepared and administered by the student's master's thesis committee. All coursework must be at the 5000 level or above unless a request has been approved to use 4000-level courses for graduate credit.

Biomedical Engineering Non-thesis Option: 30 hours of graduate-level course work including 5 hours of Biomedical Engineering Graduate Core as identified below, at least 10 additional hours of graduate-level classes in Biomedical Engineering. Candidates must pass a comprehensive written final examination. The examination is prepared and administered by the student's Program Advisory Committee. All coursework must be at the 5000 level or above unless a request has been approved to use 4000-level courses for graduate credit.

Biomedical Engineering Graduate Core

BMEG 5103	Design and Analysis of Experiments in Biomedical Research	3
BMEG 5801	Graduate Seminar I	1
BMEG 5811	Graduate Seminar II	1

Accelerated M.S.B.M.E. Degree

High-achieving current undergraduate students seeking a B.S.B.M.E. degree at the University of Arkansas who choose to pursue graduate studies in BMEG may participate in the accelerated M.S.B.M.E. program. Eligible

students may take up to 12 credit hours of 5000-level courses as BMEG or science electives for their bachelor's degree and those hours will also count towards their M.S.B.M.E. degree. The total of 12 credit hours of graduate courses taken as an undergraduate student must be taken during the final 12-month period of their undergraduate degree.

Once fully admitted to the M.S.B.M.E. program, students will request that up to 12 hours of 5000-level or above courses taken in the final 12-month period of their undergraduate degree count toward their graduate degree, if these courses were taken on the Fayetteville campus of the University of Arkansas. Students then take an additional 18 credit hours of approved BMEG graduate-level courses (including BMEG 600V Master's Thesis if required) in order to complete their M.S.B.M.E. degree as per their intended M.S.B.M.E program (i.e. Thesis options, Non-thesis option or Healthcare Entrepreneurship option).

Biomedical engineering undergraduate students interested in the accelerated M.S.B.M.E. degree should apply to the program prior to starting the second-to-last semester of their undergraduate program. To be eligible, students must have a 3.5 cumulative GPA or higher and submit the normal application materials required by the graduate school for the M.S.B.M.E. degree program. For students that have a cumulative GPA of 3.5 or higher, the submission of GRE scores is waived.

Students should also be aware of Graduate School requirements with regard to master's degrees.

Are Similar Programs available in the area?

No

Estimated Student Demand for Program 50

Scheduled Program Review Date 2025-2026

Program Goals and Objectives

Program Goals and Objectives

Program goals are broad general statements of what the program intends to accomplish and describes what a student will be able to do after completing the program. The program goals are linked to the mission of the university and the new strategic plan of the College of Engineering (COE).

Accordingly, the program goals of the MS and PhD programs in Biomedical Engineering 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-master's or Ph.D. studies.
2. Utilizing their advanced engineering education in creating new knowledge or enabling technologies for improvement of human health and healthcare.
3. Continuously upgrading their knowledge in their chosen specialty by initiating self-directed learning.

Learning Outcomes

Learning Outcomes

Student Learning Outcomes are defined in terms of the knowledge, skills, and abilities that students will know and be able to do as a result of completing a program. These student learning outcomes are directly linked to the accomplishment of the program goals.

The graduates of the MS and PhD programs in Biomedical Engineering will either be capable of the following or possess the following attributes:

1. Conceiving, designing, analyzing, and implementing systems, processes and experiments related to improving human health and healthcare.
2. Functioning in multidisciplinary teams to find effective solutions to complex technical problems and/or the design of new products and processes to improve human health and health care.
3. Using modern analytical, simulation, and diagnostic tools and techniques used in healthcare industry.
4. In-depth and up-to-date knowledge within a specialized field in Biomedical Engineering.
5. An understanding of ethical and professional responsibility
6. To effectively communicate their findings/ideas to a technical and non-technical audience

The prescribed outcomes of the MSBME are met through the curriculum followed by the students.

Description and justification of the request

Description of specific change	Justification for this change
Adding an accelerated M.S.B.M.E. option.	To allow high achieving undergraduate students to complete an accelerated M.S.B.M.E. degree.

Upload attachments

Reviewer Comments

Alice Griffin (agriffin) (09/02/21 11:32 am): Changed type of proposal back to "Major Field of Study." A minor type of proposal is referencing an academic minor.

Alice Griffin (agriffin) (09/02/21 11:35 am): ATTENTION REGISTRAR: Please change the response for adding a concentration to "no" so that the major program of study CIM block can be cleared. A concentration CIM block has already been created.

Alice Griffin (agriffin) (09/02/21 11:38 am): Program changes can only become effective with the next catalog publication date. Only new programs can become effective mid-year.

Alice Griffin (agriffin) (09/02/21 11:47 am): ATTENTION: This minor program change will require campus approval since it is related to the admission process of the program.

Lisa Kulczak (lkulcza) (09/10/21 12:18 pm): Adjusted concentration question to No; concentration already exists.

Kevin Hall (kdhall) (11/05/21 9:56 am): In the Program Requirements and Description Section: (1) add a description of the Healthcare Entrepreneurship Option; you refer to it in the new "Accelerated MSBME Degree" language - but do not show it with the Thesis/Non-Thesis options. (2) Clarify the statement (in the description of the accelerated MSBME, 2nd paragraph) "...if these courses were taken on the Fayetteville campus of the University of Arkansas". Does this imply that none of these 12 hours can be distance courses from Global Campus? (3) I've clarified that BMEG 600V Master's Thesis applies only "when required" - in the 2nd paragraph of the description of the accelerated program (the language implied it is required across-the-board).