| Academic Policy Series | 1622.20A |
|---|---|

## ADD, CHANGE OR DELETE UNIT, PROGRAM REQUIREMENTS, OR ACADEMIC POLICIES

**Complete this form consistent with the instructions in Academic Policy 1622.20.** Use the form to add, change, or delete a program or unit or to change program policies. Proposed additions and changes must be consistent with Academic Policies 1100.40 and 1621.10 and any other policies which apply.

### SECTION I: Approvals

| | | | |
|---|---|---|---|
| Department / Program Chair | Date Submitted | Graduate Council Chair | Date |
| College Dean | Date | Faculty Senate Chair | Date |
| Honors College Dean | Date | Provost | Date |
| Core Curriculum Committee | Date | Board of Trustees Approval/Notification Date | |
| University Course and Programs Committee | Date | Arkansas Higher Education Coordinating Board Approval/Notification Date | |

### SECTION II: Profile Data - Required Information and Name Change Information

Academic Unit: ☒ Major/Field of Study ☐ Minor ☐ Other Unit _____ ☐ Policy

Level: ☒ Undergraduate ☐ Graduate ☐ Law Effective Catalog Year 2013

Program changes are effective with the next available catalog. See Academic Policy Series 1622.20

Current Name BS, **Biomedical Engineering**

College, School, Division **ENGR** Department Code **BMEG**

Current Code (6 digit Alpha) **BMEGBS** Proposed Code (6 digit Alpha)
Prior approval from the Office of the Registrar is required.

☐ Interdisciplinary Program CIP Code **14.0501**
Prior assignment from Office of Institutional Research is required.

Proposed Name
When a program name is changed, enrollment of current students reflects the new name.

### SECTION III: Add a New Program/Unit

__ For new program proposals, complete Sections II and VII and use as a cover sheet for a full program proposal as described in 'Criteria and Procedures for Preparing Proposals for New Programs in Arkansas.' ADHE
http://www.adhe.edu/divisions/academicaffairs/Pages/academicaffairs.aspx

☒ Program proposal uses courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____
Fulbright College of Arts & Sciences

### SECTION IV: Eliminate an Existing Program/Unit

Code/Name _____ Effective Catalog Year _____

No new students admitted to program after Term: ___ Year: _____
Allow students in program to complete under this program until Term: ___ Year: _____

### SECTION V: Proposed Changes to an Existing Program or Program Policies

**Insert here a statement of the exact changes to be made: The following changes were made to the 8 semester degree program for Biomedical Engineering:**

1) **Fall Semester Year 1: CHEM 1113 University Chemistry for Engineers I was added as an option.**
2) **Spring Semester Year 2: BMEG 2903/2901L was changed to BMEG 2904.**

3) **Fall Semester Year 3: BMEG 2633 Biomaterials was changed to BMEG 3634 Biomaterials to reflect it being offered in the junior year and a lab being added to the new course.**
4) **Spring Semester Year 4: BMEG/Science Elective option was changed to BMEG Elective.**
5) **Total hours changed from 127 hours to 128 hours.**

Check if either of these boxes apply and provide the necessary signature:

☐ Program change proposal adds courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____

☐ Program change proposal deletes courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: _____

Check all the boxes that apply and complete the required sections of the form:

☐ Change of Name and Code (Complete only sections I, II, V and VII.)
☐ Change Course Requirements: (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☐ Change Delivery Site/Method (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☒ Change Total Hours (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
☐ Change in Program Policies

## SECTION VI: Justification

*Justify this change and state its likely effect on any other degree program (including those outside the school or college). Identify any program or program components (other than courses) to be eliminated if this program is implemented. (Program and course change forms must also be submitted for such related changes.)*

**Item 1 is to accommodate students interested in medical school. Item 2 is for uniformity in the curriculum. Items 3-5 are necessary to satisfy ABET accreditation requirements.**

## SECTION VII: Catalog Text and Format

*In the box below, insert the current catalog text which is to be changed, with changes highlighted with the color yellow. Include all proposed changes identified in Section V. Only changes explicitly stated in Section V will be considered for approval by the University Course and Programs Committee, the Graduate Council and the Faculty Senate. If you are proposing a new program, give proposed text with all of the elements listed below. If you are proposing modified text, include these elements as appropriate.*

**Include the following elements, in order, in the catalog text for proposed undergraduate program(s) or program changes:**

- State complete major/program name
- Briefly define or describe the major/program or discipline.
- Identify typical career goals or paths for graduates. (Optional)
- State admission requirements (if any) for entry or entry into upper/advanced level of major/program.
- Identify location in catalog of university, college/school, and department/program requirements which the student must meet in addition to hours in the major, but do not restate these requirements.
- State course requirements in the major and any allied areas, giving number of hours and specific courses; specify electives or elective areas and give numbers of hours and courses in elective pools or categories; identify any other course requirements.
- State any other requirements (required GPA, internship, exit exam, project, thesis, etc.).
- Identify name and requirements for each concentration (if any).
- Specify whether a minor or other program component is allowed or required and provide details.
- State eight-semester plan requirements

**For minors, state requirements in terms of hours, required courses, electives, etc.**

**For graduate program/units, include elements (as needed) parallel to those listed for undergraduate programs above.**

**For Law School program/units, prepare text consistent with current catalog style.**

**For centers, prepare text consistent with current catalog style.**

**BIOMEDICAL ENGINEERING (BMEG)**

Terry Martin
Interim Head of the Department

Bell Engineering 4183
479-575-7455

FACULTY
• Distinguished Professors Rardin, Saxena, Vasundhara Varadan, Vijay Varadan
• Professors Ang, Beitle, Carrier, Deaton, El-Shenawee, Kim, Verma, Wickramsinghe
• Associate Professors Roper, Tung, Ye
• Assistant Professors Hestekin (C.), Jin, Servoss, Wejinya, Wolchok, Zaharoff

Biomedical engineering encompasses the creation, design, and operation, of processes / technology related to the broad field of human healthcare. The profession traditionally has focused on applications related to the development of instrumentation and diagnostic equipment, discovery of novel treatment options, production of new therapeutics, and the elucidation of underlying biophysical phenomena. Newer applications of bioengineering take advantage of the ever deepening understanding of human physiology and molecular genetics, as related to prevention, detection, and treatment of medical conditions. The program objectives of the Biomedical Engineering undergraduate program are to produce graduates who are capable of:

- succeeding in the practice of engineering or other professional activities, and
- succeeding in post baccalaureate studies.

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

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in global, economic, environmental, and societal contexts
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

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

**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 page 42 in the Academic Regulations chapter for university requirements of the program.

**Fall Semester Year 1**

3 ENGL 1013 Composition I
4 MATH 2554 Calculus I
3 CHEM 1113 University Chemistry for Engineers I or CHEM 1103 University Chemistry I *
4 PHYS 2054 University Physics I with Lab
1 GNEG 1111 Introduction to Engineering I
**15 Semester hours**

**Spring Semester Year 1**

3 ENGL 1023 Technical Composition II
4 Freshman Science Elective with Lab **
4 MATH 2564 Calculus II
3 HIST 2003 or HIST 2013 or PLSC 2003
1 GNEG 1121 Introduction to Engineering II
**15 Semester hours**

**Fall Semester Year 2**

3 BMEG 2613 Introduction to Biomedical Engineering
4 MATH 2574 Calculus III
4 Sophomore Science Elective with Lab **

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4 BIOL 1543/1541L Principles of Biology
**15 Semester hours**

**Spring Semester Year 2**
3 BMEG 2813 Biomechanics
4 BMEG 2904 Biomedical Instrumentation with Lab
4 MATH 3404 Differential Equations
3 BIOL 2533 Cell Biology
3 Fine Arts Elective (from Univ/State Core List)
**17 Semester hours**

**Fall Semester Year 3**
4 BMEG 3634 Biomaterials with Lab
4 CHEM 3603/3601L Organic Chemistry I
3 CHEG 2313 Thermodynamics
4 ELEG 3124 Systems and Signal Analysis
3 Social Science Elective (from Univ/State Core List)
**18 Semester hours**

**Spring Semester Year 3**
3 BMEG 3653 Biomedical Modeling and Numerical Methods
4 BMEG 3824 Biomolecular Engineering with Lab
4 BIOL 2213/2211L Human Physiology
4 CHEM 3613/3611L Organic Chemistry II
3 CHEG 2133 or MEEG 3503 Fluid Mechanics
**18 Semester hours**

**Fall Semester Year 4**
3 BMEG 4813 Biomedical Engineering Design I with Lab
3 BMEG 4623 Biomedical Transport Phenomenon
3 BMEG Elective
3 Science Elective
3 Social Science Elective (from Univ/State Core List)
**15 Semester hours**

**Spring Semester Year 4**
3 BMEG 4923 Biomedical Engineering Design II with Lab
3 BMEG Elective
3 BMEG Elective
3 Social Science Elective (from Univ/State Core List)
3 Humanities Elective (from Univ/State Core List)
**15 Semester hours**

**128 Total hours**

* Pre-med students are encouraged to take CHEM 1103/1101L
** The Freshman Engineering Science Elective must be chosen from either (CHEM 1133/1131L or CHEM 1123/1121L) or PHYS 2074. Students must complete either (CHEM 1113 & CHEM 1133) or (CHEM 1103 & CHEM 1123).
*** The Sophomore Science Elective must be PHYS 2074 (if CHEM 1123 or CHEM 1133 was chosen as the Freshman Engineering Elective) or CHEM 1123/1121L or CHEM 1133/1131L (if PHYS 2074 was chosen as the Freshman Engineering Science Elective). Students must complete either (CHEM 1113 & CHEM 1133) or (CHEM 1103 & CHEM 1123).

**Technical Options in Biomedical Engineering**

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 at http://www.bmeg.uark.edu. 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

Each student in biomedical engineering is required to complete six semester hours of biomedical engineering technical electives (see Undergraduate Advising Handbook for a list of courses), and four semester hours of Organic Chemistry (3 hour with 1 hour laboratory). Students interested in pursuing an undergraduate biomedical degree as a lead to medical school should be aware that a total of 8 hours of organic chemistry (6 hour with 2 hour laboratory) may be required (please see your adviser for more specific details).

**Technical Elective Courses**

Six hours of upper level technical electives will be chosen from upper division (3000 and above) courses in mathematics, engineering, and the sciences with the approval of their adviser. The department maintains a list of approved technical electives which may be found in the department's Undergraduate Advising Handbook, which is available on the department's web site at http://www.bmeg.uark.edu.

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**Deleted:** 4 BIOL 2213/2211L Human Physiology

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Stacy Leann Sanchez 1/3/13 9:04 AM
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Stacy Leann Sanchez 1/3/13 9:07 AM
**Deleted:** or Science

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**Deleted:** * The Freshman Engineering Science Elective must be chosen from either CHEM ... [1]

**Honors Program Requirements**
Students enrolled in the Honors College who are to receive the Bachelor of Science in Biomedical Engineering must complete a minimum of 12 hours of honors credit. At least 6 hours must be completed within the Biomedical Engineering program including at least 3 hours resulting in an Honors Thesis. The BMEG honors courses are acceptable as engineering electives and in some cases may be substituted for required courses.

See Page 325 for Biomedical Engineering (BMEG) courses.

## SECTION VIII: Action Recorded by Registrar's Office

PROGRAM INVENTORY/DARS

PGRM _____ SUBJ _____ CIP _____ CRTS _____

DGRE _____ PGCT _____ OFFC&CRTY VALID _____

REPORTING CODES

PROG. DEF. _____ REQ. DEF.

Initials ____ Date _____

### Distribution

Notification to:
(1) College (2) Department (3) Admissions (4) Institutional Research (5) Continuing Education (6) Graduate School
(7) Treasurer (8) Undergraduate Program Committee

5/12/08