Biomedical Engineering (BMEG)

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Degrees Conferred:
M.S.B.M.E. (BMEG)
Ph.D. (BMEG) in Engineering

Master of Science in Biomedical Engineering (M.S.B.M.E.)

Primary Areas of Faculty Research: Bioimaging and biosensing; bioinformatics and computational biology; tissue engineering and biomaterials; bio-MEMS/nanotechnology.

Program Objectives: The objectives of the M.S.B.M.E. program are to prepare graduates for careers in biomedical engineering practice with government agencies, engineering firms, consulting firms or industries and to provide a foundation for continued study at the post-master’s level.

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 http://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 basic Engineering Education Requirements prior to being admitted. Complete details for admission may be obtained in the applicable program section from the BMEG website (http://bmeg.uark.edu) as well as in the BMEG graduate program handbook.

Basic Engineering Education Requirements: 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: 15 hours of Humanities/Social Sciences, 6 hours of English Composition, 16 hours of Mathematics (including Calculus I, Calculus II, Calculus III and Differential Equations), 8 hours of University-level Biology, 8 hours of University-level Chemistry, 8 hours of University-level (calculus-based) Physics, and 15 hours of Basic Engineering Topics (selected from courses such as Biomechanics, Thermodynamics, Bioinstrumentation, Fluid Mechanics, Transport Phenomena and others). Students should consult the Graduate Coordinator for a complete list of courses that satisfy the Basic Engineering Topics criterion.

Complete details for admission may be obtained in the applicable program section from the BMEG website (http://bmeg.uark.edu) 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 BMEG website (http://bmeg.uark.edu) as well as in the BMEG graduate program handbook.

- Thesis Option: 24 hours of graduate-level course work, including 12 hours of Biomedical Engineering Graduate Core as identified below, plus six 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.
- Non-thesis Option: 30 hours of graduate-level course work including 12 hours of Biomedical Engineering Graduate Core as identified below.

Biomedical Engineering Graduate Core:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEG 5103</td>
<td>Design and Analysis of Experiments in Biomedical Research (Irregular)</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 5203</td>
<td>Mathematical Modeling of Physiological Systems (Irregular)</td>
<td>3</td>
</tr>
<tr>
<td>BMEG 5504</td>
<td>Biomedical Microscopy (Irregular)</td>
<td>4</td>
</tr>
<tr>
<td>BMEG 5801</td>
<td>Graduate Seminar I (Fa)</td>
<td>1</td>
</tr>
<tr>
<td>BMEG 5811</td>
<td>Graduate Seminar II (Sp)</td>
<td>1</td>
</tr>
</tbody>
</table>

1. A B.S. or M.S. degree in engineering or engineering equivalent or completion of the Basic Engineering Education Requirements (see below) with a GPA of at least 3.0.

2. A GPA of 3.0 or higher on the last 60 hours of the baccalaureate degree.

3. A GRE score of 302 or above (verbal and quantitative).

4. 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.

5. 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.
Doctor of Philosophy in Engineering with a Concentration in Biomedical Engineering (BMEG)

Program Description: The Ph.D. Degree in Engineering with a concentration in Biomedical Engineering is an interdisciplinary research degree awarded through the College of Engineering in cooperation with the Graduate School (at the University of Arkansas, there is a common Ph.D. degree for all engineering disciplines). The Ph.D. Degree is earned through advanced coursework and in-depth, specialized research. Graduates from this program will be well-prepared for careers in academia, industry or government or as entrepreneurs in technology-based start-up companies.

Admission to Degree Program: Admission into the Ph.D. program with a concentration in Biomedical Engineering 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 http://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 statement of purpose. All students in the Ph.D. program are offered either a research or teaching assistantship. A member of the faculty who is eligible (graduate faculty status of Group I), must agree to serve as the major adviser to the prospective student. Because of the multidisciplinary nature of Biomedical Engineering, students holding either Engineering or non-Engineering degrees are eligible to apply. Eligibility criteria are outlined below:

• Engineering Academic Background: Students with a B.S. or M.S. degree in engineering or engineering equivalent are eligible to apply for the Ph.D. program.
• Non-engineering Academic Background: Students with a non-engineering degree must fulfill the admission requirements for the Master of Science in Biomedical Engineering (M.S.B.M.E.) including the Basic Engineering Education Requirements (see admission requirements for the M.S.B.M.E.). Students with a non-engineering background may be admitted directly into the Ph.D. program; however, it is recommended that students first complete the M.S.B.M.E. degree before entering the Ph.D. program.

Complete details for admission may be obtained in the applicable section from the BMEG website (http://bmeg.uark.edu) as well as in the BMEG graduate program handbook.

Degree Requirements for the Doctor of Philosophy in Engineering with a concentration in Biomedical Engineering: In addition to the requirements of the Graduate School and the College of Engineering, candidates must meet the following requirements:

1. Develop a Plan of Study within the first year after matriculation.
2. Complete an Annual Progress Report for each subsequent year of study.
3. Complete at least 42 hours of coursework beyond the B.S. degree. A minimum of 30 semester hours of coursework must be at the graduate level (5000 or above). The cumulative grade-point average on all graduate courses presented for the degree must be at least 3.0. Upon recommendation of the student’s Program Advisory Committee, a student who has entered the Ph.D. program after a M.S. degree in engineering may receive credit for up to 24 hours of course work. See Coursework Requirements, below, for additional details.
4. Complete 30 hours of dissertation. Upon recommendation of the student’s Program Advisory Committee, a student who has entered the Ph.D. program after a M.S. degree in engineering may receive credit for up to six hours of thesis research toward the dissertation requirement.
5. Satisfactorily pass both a written and oral candidacy examination administered by the student’s Program Advisory Committee. Details of the candidacy exam are found in the BMEG graduate program handbook.
6. Assist in departmental teaching for two semesters.
7. Submit and defend the final dissertation to the student’s Dissertation Committee.

Coursework Requirements: Students are required to complete 42 credit hours of coursework beyond the B.S. degree in engineering or equivalent in the following four categories.

Biomedical Engineering Graduate Core (12 hours)

<table>
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<tr>
<td>BMEG 5103</td>
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</tr>
</tbody>
</table>

Life Science – minimum of six hours approved by the student’s Program Advisory Committee

Engineering Electives – minimum of nine hours approved by the student’s Program Advisory Committee

General Electives – minimum of six hours approved by the student’s Program Advisory Committee

Detailed degree requirements may be obtained in the applicable program section from the BMEG website (http://bmeg.uark.edu) as well as in the BMEG graduate program handbook.