

# Biomedical Engineering

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## An Interdisciplinary Curriculum

The interdisciplinary Biomedical Engineering program is administered through Agricultural and Biological Engineering for the College of Engineering. Programs of study and research leading to both the Master of Science and the Doctor of Philosophy degrees in Biomedical Engineering are available. Biomedical Engineering is the engineering discipline that applies engineering principles to study and finds solutions for problems associated with the human body, medicine, and the health care field. At MSU, students can concentrate on research in areas such as injury biomechanics and bio-inspired design, computational modeling, vascular calcification, hemodynamics and sickle cell disease, bone fracture healing, and cartilage regeneration.

## Admission Criteria

Regular admission into the M.S. or Ph.D. programs requires the student meet the following criteria.

- Meet the admission requirements of the Office of the Graduate School
- Have earned a bachelor's degree in an engineering discipline
- Submit GRE scores
- Receive a positive recommendation by the coordinating committee of the biomedical engineering graduate program
- Be accepted as a student by a member of the biomedical engineering graduate faculty

The student must have a 3.00 grade point average or higher and, if applicable, a TOEFL score of 600 PBT (96 iBT) or IELTS score of 7.5 or greater. A student entering the Ph.D. program should have an M.S. in an engineering discipline. Special consideration may be given to exceptional students with a B.S. degree in engineering who may wish to bypass the M.S. in completing the requirements for the doctoral degree.

## Provisional Admission

An applicant who has not fully met the GPA requirement stipulated by the University may be admitted on a provisional basis. The provisionally-admitted student is eligible for a change to regular status after receiving a 3.00 GPA on the first 9 hours of graduate courses at Mississippi State University (with no grade lower than a C). The first 9 hours of graduate courses must be within the student's program of study. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 is not attained, the provisional student **shall** be dismissed from the graduate program. Academic departments may set higher standards for students to fulfill provisional requirements; a student admitted with provisional status should contact the graduate coordinator for the program's specific requirements. **While in the provisional status, a student is not eligible to hold a graduate assistantship.**

## Contingent Admission

If a student applying to the M.S. program does not have an undergraduate degree in engineering or an approved C.S. degree, the student will be required to complete approximately 45-48 hours of prerequisite coursework in mathematics, the sciences, or engineering. The student will be granted contingent admission until the course requirement has been satisfied. If a student applying to the Ph.D. program does not have a B.S. or M.S. in engineering or C.S., the same set of 45-48 hours of courses will be required before the student is fully admitted.

## Graduate Committees

The graduate committee for each M.S. and Ph.D. student will be composed of a minimum of four and five faculty members, respectively. Faculty members on the graduate Biomedical Engineering faculty hold appointments in departments in the College of Engineering at MSU, the Department of Chemistry at MSU, the Department of Animal and Dairy Sciences at MSU, the College of Veterinary Medicine (CVM) at MSU, and in departments of the University of Mississippi Medical Center (UMC) in Jackson, MS.

The following requirements for an M.S. graduate committee will apply.

- Chair must be an MSU engineering faculty member
- One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)

- Two or more members must be engineers
- Two or more members must be MSU faculty members

The following requirements for a Ph.D. graduate committee will apply.

- Chair must be an MSU engineering faculty member
- One member must be a clinician (CVM faculty, UMC faculty, or practicing clinician)
- Three or more members must be engineers
- Three or more members must be MSU faculty members

## Academic Performance

Unsatisfactory performance in the graduate program in Biomedical Engineering is defined as any of the following.

- Failure to maintain a B average in attempted graduate courses after admission to the program
- A grade of D or F in any course
- More than two grades below a B
- Failure of the qualifying or preliminary exam (Ph.D. students only)
- Failure of the thesis/dissertation defense
- Unsatisfactory evaluation of a thesis or dissertation
- Receiving a second grade of U in ABE 8000 Research/Thesis or ABE 9000 Research/Dissertation (A student who receives a grade of U will be placed on academic probation the following semester. A second grade of U in ABE 8000/9000 in the probationary semester or any thereafter will result in dismissal from the program.)

Any one of these or a combination of these will constitute the basis for review for possible dismissal. The graduate coordinator will review the record along with the student's graduate committee and take a final course of action which will be recommendation for immediate dismissal or the establishment of a probationary period in which corrective action must take place. Appeal of dismissal can be made by submitting a written appeal statement to the department head. If the dismissal is upheld by the department head upon the student's appeal, the student can then submit a written appeal to the dean of the College of Engineering.

For more information, contact the Biomedical Engineering Graduate Program Coordinating Committee, Department of Agricultural and Biological Engineering, Box 9632, Mississippi State, MS 39762 or by e-mail at [abe-head@abe.msstate.edu](mailto:abe-head@abe.msstate.edu). Information is also available at <http://www.abe.msstate.edu>.

## Master of Science in Biomedical Engineering

|                                      |  |    |
|--------------------------------------|--|----|
| ABE 8621                             | Methods of Biomedical Engineering Research     | 1  |
| ABE 8801                             | Clinical Experience for Biomedical Engineering | 1  |
| BIO 6514<br>or BIO 6114              | Animal Physiology<br>Cellular Physiology       | 4  |
| ST 8114                              | Statistical Methods                            | 4  |
| 8000-level or higher coursework      |  | 6  |
| Additional graduate-level coursework |  | 8  |
| Research/thesis                      |  | 6  |
| <hr/>                                |  |    |
| Total Hours                          |  | 30 |

An oral comprehensive examination and a thesis are also required. The M.S. degree requires 24 semester hours of coursework above the baccalaureate degree. In addition, 6 or more thesis research credit hours are required.

## Doctor of Philosophy in Biomedical Engineering

|                                      |  |    |
|--------------------------------------|--|----|
| ABE 8621                             | Methods of Biomedical Engineering Research     | 1  |
| ABE 8801                             | Clinical Experience for Biomedical Engineering | 1  |
| BIO 6514<br>or BIO 6114              | Animal Physiology<br>Cellular Physiology       | 4  |
| ST 8114                              | Statistical Methods                            | 4  |
| 8000-level or higher coursework      |  | 6  |
| MA XXXX                              | Graduate-level mathematics course <sup>1</sup> | 3  |
| Additional graduate-level coursework |  | 29 |

|                                    |       |
|------------------------------------|-------|
| Dissertation research/dissertation | 20-32 |
| Total Hours                        | 80    |

<sup>1</sup> Or approved substitute, such as an additional graduate level statistics course.

The Ph.D. degree requires that the student pass a qualifying exam, a preliminary exam, a dissertation defense, and a minimum of 48 coursework hours beyond the B.S., and 20-32 dissertation research