

The following requirements must be fulfilled:

The general requirements stated under [School of Engineering, Doctoral Program Regulations](#).

Credit requirements

For students with an MS degree, a minimum of 30 credits, of which at least 18 must be credits in courses available for graduate credit, and at least 12 credits must be in dissertation research. Course selections must be approved by the student's advisor.

For students with a BS degree, a minimum of 54 credits; at least 36 of these credits must be from courses available for graduate credit, and at least 12 must be in dissertation research. The remaining 6 credits may be in undergraduate courses available for graduate credit, graduate courses, dissertation research credits, or a combination of all. Course selections must be approved by the student's advisor.

A maximum of 6 credits of independent research ([BME 6050](#)) may be applied towards a doctoral degree.

Preliminary/Qualifying Examinations

All PhD in BME students are required to take a doctoral preliminary examination, which are held at the beginning of each semester. The goal of the exam is to determine the student's aptitude and ability to complete original and independent research at the doctoral level, to assess the student's ability to review previous work from the literature, and to determine the student's ability to understand and apply fundamental concepts in their technical area. A written proposal and an oral presentation of the predetermined question are required. All students should take the exam as early as possible after they complete at least 6 credits in core courses and 6 credits in elective courses and maintain a minimum average GPA of 3.4. The examination typically should be completed no later than the beginning of a student's fourth semester.

Dissertation

After successful completion of the preliminary examination the student is admitted to be a candidate for the PhD degree program and begins specialized research under the supervision of his/her dissertation advisor. Research direction may be shared by a full-time faculty member and an outstanding external scientist or engineer, but the final responsibility for the academic aspects of the dissertation work lies with the BME faculty advisor.

Dissertation research proposal

During the research phase, each doctoral candidate is required to give a research proposal presentation to the dissertation committee. The student's research progress is assessed by the committee and appropriate suggestions for continuing research directions are solicited from those in attendance. Scheduling of the research proposal presentation will be done at a minimum of one year before the final dissertation defense by the student's dissertation advisor. The committee helps the student to define the research topic, and ultimately approves the research proposal. The dissertation advisor should propose the membership of the dissertation research committee, which must be approved by the associate chair for research and graduate affairs. At least four individuals should serve on the research proposal committee; the research advisor is the dissertation director (also called the advocate) and three others. Two of the committee members must be full-time BME faculty. Students are required to present the written dissertation proposal to the committee and to successfully defend the proposal in an oral defense after performing the bulk of their dissertation research. After the proposal defense, the student submits the revised proposal, complying with all suggestions, clarifications, and corrections, as required by the dissertation committee.

Dissertation Defense

The dissertation advisor may decide that the research achieved by the doctoral student is sufficient to satisfy the requirement of the degree. The advisor proposes an examining committee for the purpose of administering the final dissertation examination (dissertation defense). The committee of examiners must consist of no fewer than five members, at least three of whom normally are full-time BME faculty members with scholarly specialties within the area of concentration; at least one member normally is from an academic specialty outside the area of concentration. An external examiner must be invited. The dissertation advisor serves on the examining committee both as advocate and as a non-voting committee member. As its first order of business, the committee elects its own chairman, who should not be the dissertation advisor or the student's faculty advisor. The dissertation examining committee must be approved by the associate chair for research and graduate affairs prior to the date of the defense. Each member of the examination committee, no later than three weeks prior to the defense, should receive a copy of the dissertation document. At the same time, the candidate must provide a 350-word abstract and other information to the department for the purpose of preparing an announcement of the defense. The dissertation defense is an oral examination, which is open to the public. When the dissertation is accepted as complete, it should be submitted electronically no later than the date specified by the Office of the Registrar.

Publication Requirements

Before the doctoral defense, the PhD student must publish at least one first-author manuscript in a peer-reviewed journal on original work related to the topic of the doctoral dissertation.

Graduation and Scholarship Requirements

Students are responsible for adhering to the university's minimum GPA requirement for graduation and scholarships. Consult [SEAS Regulations](#) section of this Bulletin. Students should contact the department for additional information and requirements.