

# PhD and Combined MD/PhD in Biomedical Engineering

The department offers programs that lead to the Doctor of Philosophy (PhD) in Biomedical Engineering as well as combined MD/PhD degrees. The latter degrees are conferred jointly with the School of Medicine.

The doctoral degree requires a minimum of 72 credits beyond the bachelor's level, with a minimum of 36 being course credits (including the core curriculum) and a minimum of 24 credits of doctoral dissertation research.

The core curriculum that must be satisfied by all PhD students consists of the following:

- One graduate-level course in life science from an approved list
- One graduate-level course in mathematics from an approved list
- One graduate-level course in computer science from an approved list or exemption by proficiency
- Four BME courses from an approved list

Please visit the Biomedical Engineering (BME) website (<https://bme.wustl.edu/graduate/phd/Pages/default.aspx>) for a comprehensive list of the approved courses.

Up to 9 credits of BME 601C Research Rotation for BME Doctoral Students and/or BME 501C BME Doctoral Seminar Series may be counted toward the 36 credits of graduate courses required for the PhD, so a total of 27 additional credits (usually nine courses, including the core curriculum) are required for the PhD. Up to two 400-level courses may be counted toward the nine courses required for the PhD. Graduate courses may be transferred in (up to 24 credits) but must be evaluated and approved by the Director of Doctoral Studies. The evaluation and approval may occur at any time, but course transfer does not become official until after one year in residence at Washington University.

Students seeking the **PhD in Biomedical Engineering** enroll in two to three courses each semester and participate in one or two laboratory rotations during the first year. Before the end of their first 10 months of enrollment in the program, students take their oral qualifying exam, which consists of a presentation of their research done to date in the mentor's laboratory followed by an oral exam addressing any issues directly related to their rotation report or their oral presentation. Upon successfully passing the qualifying examination, they advance to candidacy and complete the balance of their requirements. During the second and third years, students complete their remaining courses, participate in one semester of a mentored teaching experience, and begin their thesis research. By the end of the third year, students must complete their thesis proposal. Students must also complete one accepted and one submitted first-author publication and complete a dissertation.

Students pursuing the combined **MD/PhD in Biomedical Engineering** must complete the degree requirements in both schools. MD/PhD students typically complete the first two years of the medical school preclinical curriculum while also performing one or more research rotations, then the remaining requirements for the doctoral degree, and finally the clinical training years of the medical degree. The department generally gives graduate course credits for some of the medical school courses toward the fulfillment of course requirements for the PhD degree. This is arranged on an individual basis between the student, their academic advisor and the Director of Doctoral Studies.