

P.h.D. Curriculum

First Year Requirements

All bioengineering students in their first year of study are expected to enroll in the six required core courses in the Engineering Physics and Life Science tracks listed below. First-year students are also required to take both seminars (BENG 281 three times and BENG 282), one quarter of Teaching Experience (BENG 501), and an ethics course.

Required Courses for Ph.D. Degree Program (must be taken for letter grade)

Note: The “F,W,S” in parentheses indicate when the course is typically expected to be offered, with “F” indicating Fall, “W” indicating Winter, and “S” indicating Spring.

1. Core Courses (total of six required):

Engineering Physics (three required courses: 2 + 1)

- BENG 226. Foundations of Biomechanics – 4 units (S)
- BENG 227. Transport Phenomena in Living Systems – 4 units (S)
- Plus one of the following – 4 units:
 - BENG 202/CSE282. Bioinformatics II: Introduction to Bioinformatics Algorithms
 - BENG 211. System Biology and Bioengineering I: Biological Components
 - BENG 221. Mathematical Methods for Bioengineering
 - BENG 223. Thermodynamics, Statistical Mechanics, Interfacial Phenomena in Living Systems
 - BENG 241A. Tissue Engineering and Regenerative Medicine: Foundations
 - BENG 280A. Principles of Biomedical Imaging

Life Sciences (three required courses: 2 + 1)

- BENG 230A. Biochemistry – 4 units (F)
- BENG 230B. Cell and Molecular Biology – 4 units (W)
- Plus one of the following – 4 units:
 - BENG 230C. Cardiovascular Physiology
 - BENG 230D. Respiratory and Renal Physiology
 - BENG 232. Musculoskeletal Health, Injury, and Disease
 - BENG 234. Introduction to Neurophysiology: Molecules to Systems
 - BENG 260/ BGGN 260. Neurodynamics

2. Seminars (both required):

- BENG 281. Seminar in Bioengineering – 1 unit (F,W,S) *Must take each quarter during first year*
- BENG 282. Seminar: Faculty Research – 1 unit (F)

3. Elective Courses (four required):

PhD students are required to complete a total of four approved elective courses by the end of their third year of study. Graduate courses offered in the Bioengineering Department (other than the six required courses) may be used to fulfill the elective course requirement, within some exceptions. Students may also take graduate level engineering/science courses offered in other departments (e.g., MAE, ECE, SOM) for elective credit **with prior faculty advisor approval** (see Graduate Coordinator for approval form). Courses taken in fulfillment of the elective course requirement must be taken for letter grade.

Up to two upper division undergraduate courses (4 units, taken for a letter grade), can be counted toward the elective requirement (with elective approval form signed by your adviser).

4. Ethics Course (one required):

- BENG 292. Scientific Ethics – 1 unit

Information about how to request enrollment into BENG 292 will be provided via email by the Graduate Coordinator every quarter.

5. TA Requirement (three required):

One TAship must be done during the first year. The two remaining TAships must be done before the end of your third year or Senate Exam. Graduate Affairs will authorize you to enroll in BENG 501 under the instructor. You will enroll in two units for a 25% TAship (ten hours a week) or four units for a 50% TAship (twenty hours a week). More information about applying for TAships will be provided by the Teaching Coordinator every quarter.

6. Rotations (optional, but highly recommended):

- BENG 298L. Laboratory Research Rotation – 4 units

Please contact the Graduate Coordinator so the department can set up a section under the faculty you will rotate with, if one does not already exist. A one to two page research summary is due at the end of the quarter in which you are conducting the rotation.