Last Updated: August 2026

Ph.D. Curriculum

First Year Requirements

All first-year bioengineering students must complete six required core courses in the Engineering and Life Science tracks listed below, as well as BENG 289 (Grant Writing and Professionalism). Additional first-year requirements include BENG 281 (all three quarters), BENG 282 (Fall quarter), one quarter of BENG 501 (Teaching Experience; Winter or Spring), three quarters of research credit (BENG 298L or BENG 299), and completion of a CITI ethics certificate.

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

1. Core Courses (total of six required):

Engineering Physics: select three courses (all courses are 4 units)

- BENG 202/ CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms
- BENG 203/ CSE 283. Genomics/ Proteomics/ Network Biology
- BENG 211. Systems Biology and Bioengineering I: Biological Components
- BENG 216. Neuromorphic Integrated Bioelectronics
- BENG 221. Mathematical Methods for Bioengineering
- BENG 223. Thermodynamics, Statistical Mechanics, and Interfacial Phenomena in Living Systems
- BENG 226. Foundations of Bioengineering I: Tissue and Cell Properties
- BENG 227. Transport Phenomena in Living Systems
- BENG 280A. Principles of Biomedical Imaging

Life Sciences: select three courses (all courses are 4 units)

- BENG 204. Systems Medicine: Data Analytics and Mechanisms
- BENG 230A. Biochemistry
- BENG 230B. Cell and Molecular Biology
- 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 241A. Tissue Engineering and Regenerative Medicine: Foundations
- BENG 260/ BGGN 260. Neurodynamics
- BENG 285. Statistical Learning in Bioinformatics

Bioengineering students should enroll in the BENG sections of all courses listed above when applicable.

2. Elective Courses (three required):

PhD students are required to complete a total of three approved elective courses by the end of their third year of study. Graduate courses offered in the Bioengineering Department (other than the seven required courses) may be used to fulfill the elective requirement, with some exceptions. Students may also take graduate level engineering/ science courses offered in other departments (e.g., MAE, ECE, SOM, etc.) 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 the faculty advisor).

3. Professional Development (one required):

- BENG 289: Grant Writing and Professionalism in Bioengineering

4. Seminars (both required):

- BENG 281. Seminar in Bioengineering – 1 unit (F,W,S), three quarters; ***Must** be taken each quarter during the first year*
- BENG 282. Seminar in Faculty Research – 1 unit (F), one quarter

5. Ethics Requirement:

- BENG 292. Scientific Ethics – 1 unit

Information about enrollment for BENG 292 will be provided via email by the Graduate Coordinator.

6. Teaching Requirement (three required):

One Graduate Instructional Apprenticeship (GIAship) must be completed during the first year. The two remaining GIAships must be done before the end of the third year or Senate exam. Graduate Affairs will authorize enrollment in BENG 501 under the instructor of the course for which the GIAship is being completed. Enrollment is for 2 units for a 25% GIAship (10 hours per week) or for 4 units for a 50% GIAship (20 hours per week). More information about applying for GIAships will be provided by the Teaching Coordinator each quarter.

7. Research

- BENG 298L. Laboratory Research Rotation – 4 units

Students rotate in labs during their first year. Students may enroll in up to three rotations (BENG 298L, four units) during their first year. A one-to-two-page laboratory report is due at the end of each rotation. Credit for this work requires approval from the faculty in charge of the laboratory where the work is performed. BENG 298L credit counts toward the number of units necessary for full-time student status, but not toward fulfilling academic course work requirements.

- BENG 299. Graduate Research – 1-12 units

Once students have identified their thesis lab, students may enroll in BENG 299 (four units or more). Credit for BENG 299 research units is adjudicated upon approval of the faculty that sponsors and supervises the research carried out by the enrolled student.

Please contact the Graduate Coordinator so the department may set up a section of BENG 298L or BENG 299 under the faculty member if one does not already exist for that quarter.