M.Eng. Curriculum

Requirements

1. Six core courses from approved list
2. Three Technical Elective (TE) courses from approved list, one of which must be BENG 295
3. Three General Elective (GE) courses from approved list
4. BENG 291. Seminar: Professional Issues in Bioengineering

All courses must be taken for letter grade with the exception of BENG 291 and BENG 295 which are offered S/U grading only. Students must maintain at least a B average in courses taken to fulfill the degree requirements. BENG 295 is an independent industrial training project. Course requirements for BENG 295 include a written technical report and oral presentation. BENG 295 may be taken for up to two quarters (4-units each quarter) for technical elective credit.

Required Courses for M.Eng. 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

- BENG 221. Mathematical Methods for Bioengineering – 4 units (F)
- BENG 223. Thermodynamics, Statistical Mechanics, Interfacial Phenomena in Living Systems – 4 units (W)
- BENG 226. Foundations of Biomechanics – 4 units (S)
- BENG 227. Transport Phenomena in Living Systems – 4 units (S)

Life Sciences

- BENG 230A. Biochemistry – 4 units (F)
- BENG 230B. Cell and Molecular Biology – 4 units (W)
- BENG 230C. Cardiovascular Physiology – 4 units (S)
- BENG 230D. Respiratory and Renal Physiology – 4 units (S)
- BENG 232. Musculoskeletal Health, Injury, and Disease – 4 units (S)
- BENG 260. Neurodynamics – 4 units (F)

Tissue Engineering

- BENG 241A. Tissue Engineering and Regenerative Medicine: Foundations – 4 units (F)
- BENG 241B. Tissue Engineering and Regenerative Medicine: Cell Microenvironment – 4 units (W)
- BENG 241C. Tissue Engineering and Regenerative Medicine: Development and Growth – 4 units (S)

- BENG 242/ MATS 257. Polymer Science and Engineering – 4 units (F)

Imaging

- BENG 247A. Advanced Biophotonics – 4 units (F)
- BENG 280A. Principles of Biomedical Imaging – 4 units (F)
- BENG 280B. Comparative Biomedical Imaging – 4 units (W)

2. Technical Elective Courses (three required, one of which must be BENG 295):

- BENG 202/CSE 282. Bioinformatics II: Introduction to Bioinformatics Algorithms
- BENG 203/CSE 283. Genomics, Proteomics, and Network Biology
- BENG 207. Topics in Bioengineering-- *exceptions apply*
- BENG 208. Topics in Bioengineering with Lab-- *exceptions apply*
- BENG/MAE 209. Continuum Mechanics Applied to Medicine/ Biology
- BENG 211. Systems Biology and Bioengineering I: Biological Components
- BENG 212. Systems Biology and Bioengineering II: Network Reconstruction
- BENG 213. Systems Biology and Bioengineering III: Building And Simulating Large-Scale in Silico Models
- BENG/MED 238. Molecular Biology of the Cardiovascular System
- BENG/ECE 247B. Bioelectronics
- BENG/ECE 247C. Bionanotechnology
- BENG 267. Microcirculation in Health and Disease
- BENG/CHEM/MATH 276. Numerical Analysis in Multiscale Biology
- BENG 295. Bioengineering Design Project—required
- CSE 202. Algorithm Design and Analysis
- CSE 210. Principles of Software Engineering
- CSE 250A. Artificial Intelligence: Search and Reasoning
- ECE 235. Nanometer-Scale VLSI Devices
- ECE 251A. Digital Signal Processing I
- ECE 251B. Digital Signal Processing II
- MAE/CENG 210A. Fluid Mechanics I
- MAE 210B. Fluid Mechanics II
- MAE 210C. Fluid Mechanics III
- MAE 221/CENG 221AB. Heat and Mass Transfer
- MAE 229A/MATS 211A. Mechanical Properties
- MAE 231A. Solid Mechanics
- MAE 231B. Elasticity
- MAE 231C. Anelasticity
- MAE 280A. Linear Systems Theory
- MAE 293. Advanced Computer Graphics for Engineers and Scientists
- MATS 252/MAE 266. Biomaterials
- MATS 253/MAE 267. Nanomaterials and Properties
- MATS 258/MAE 250. Medical Device Materials and Applications

Core courses may be taken for technical elective credit.

3. General Elective Courses (three required):

- BENG 225. Business of Biotech
- ECE 254. Detection Theory
- ENG 201. Venture Mechanics
- ENG 202. Enterprise Dynamics
- ENG 203. Applied Innovations
- IR/PS Management: IRCO 420, 421, IRGN 420, 434, 438, 439, 442, 444
- IR/PS International Issues: IRCO 401, IRGN 407, 411, 413, 418
- MAE 290A. Efficient Numerical Methods for Simulation, Optimization, and Control

Technical Elective courses may be taken for General Elective credit. For other courses that address job-specific interests and professional skills such as economics, management, and business, consult with the Student Affairs Office.

4. Seminar Course (required):

- BENG 291. Professional Issues in Bioengineering – 4 units (W)