Pre-Approved Technical Elective (TE) Course Options for the Bioengineering (BE25) Major

The Technical Elective (TE) requirement is satisfied by courses totaling 8 units, 4 units of which must have “engineering” as the primary component, while the other 4 units must be engineering or science. Courses shown below have “engineering” or “science” as the primary component; are “BENG” courses not required for the Bioengineering major; or are other 4-unit, upper-division (100 series) courses taught in one of the departments in the Jacobs School of Engineering. Courses must be taken for a letter grade. Note: any prerequisite courses must also be completed. Not all courses are offered each year/quarter. This list is subject to change. Please verify your Technical Electives prior to enrollment with Student Affairs.

- BENG 120 – Organic Chemistry Structural and Design Principles
- BENG 123 – Dynamic Simulation in Bioengineering
- BENG 133 – Numerical Analysis and Computational Engineering
- BENG 134 – Measurements, Statistics and Probability
- BENG 141 – Biomedical Optics and Imaging
- BENG 160 – Chemical and Molecular Bioengineering Techniques
- BENG 161A – Bioreactor Engineering
- BENG 161B – Biochemical Engineering
- BENG 166A – Cell and Tissue Engineering
- BENG 168 – Biomolecular Engineering
- BENG 193 – Clinical Bioengineering
- BENG 196 – Bioengineering Industrial Internship
- BENG 199 (2 quarters with same faculty)
- CENG 100 – Material and Energy Balances
- CENG/MAE 101A – Introductory Fluid Mechanics
- CENG/NANO 134 – Polymeric Materials
- CENG 199 (2 quarters with same faculty)
- CSE 100 – Advanced Data Structures
- CSE 101 – Design and Analysis of Algorithms
- CSE 112 – Advanced Software Engineering
- CSE 140/140L – Components and Designs Techniques for Digital Systems/Laboratory
- CSE 150A – Intro to Artificial Intelligence: Probabilistic Reasoning and Decision Making
- CSE 150B – Intro to Artificial Intelligence: Search and Reasoning
- CSE 151A – Intro to Machine Learning
- CSE 151B – Deep Learning
- CSE 166 – Image Processing
- CSE 176A – Maker Topics: Healthcare Robotics
- CSE 180 – Biology Meets Computing
- ECE 102 – Introduction to Active Circuit Design
- ECE 103 – Fundamentals of Devices and Materials
- ECE 107 – Electromagnetism
- ECE 118 – Computer Interfacing
• ECE 120 – Solar System Physics
• ECE 138L – Microstructuring Processing Technology Laboratory
• ECE 140B – The Art of Product Engineering II
• ECE 143 – Programming for Data Analysis
• ECE 144 – LabVIEW Programming: Design and Applications
• ECE 161B – Digital Signal Processing I
• ECE 174 – Introduction to Linear and Nonlinear Optimization with Applications
• ECE 175A – Elements of Machine Intelligence: Pattern Recognition and Machine Learning
• ECE 199 – (2 quarters with same faculty)
• ECE 253 – Fundamentals of Digital Image Processing
• ENG 100D and 2 quarters of ENG 100L (must take all of total 8 units)
• MAE/CENG 101A – Introductory Fluid Mechanics
• MAE 105 – Intro to Mathematical Physics
• MAE 108 – Probability and Statistical Methods for Mechanical Engineering
• MAE 118 – Intro to Energy and Environment
• MAE 119 – Introduction to Renewable Energy: Solar and Wind
• MAE 120 – Introduction to Nuclear Energy
• MAE 125 – Building Energy Efficiency
• MAE 130 – Advanced Vibrations
• MAE 131A/SE 110A – Solid Mechanics I
• MAE 143A – Signals and Systems
• MAE 143B – Linear Control
• MAE 144 – Embedded Control and Robotics
• MAE 145 – Introduction to Robotic Planning and Estimation
• MAE 148 – Introduction to Autonomous Vehicles
• MAE 149 – Sensor Networks
• MAE 154 – Product Design and Entrepreneurship
• MAE 180A – Spacecraft Guidance I
• MAE 199 – (2 quarters with same faculty)
• NANO 102 – Foundations in Nanoengineering: Chemical Principles
• NANO 103 – Foundations in Nanoengineering: Biochemical Principles
• NANO 106 – Crystallography of Materials
• NANO 108 – Materials Science and Engineering
• NANO/CENG 134 – Polymeric Materials
• NANO 156 – Modern Concepts in Nanotechnology
• NANO 175 – Nanoengineering in Medicine
• NANO 199 – (2 quarters with same faculty)
• PHYS 122 – Experimental Techniques
• PHYS 151 – Elementary Plasma Physics
• SE 110A/MAE 131A – Solid Mechanics I
• SE 115 – Fluid Mechanics for Structural Engineering
BENG 199, Independent Study Research Courses. BENG students interested in doing research via BENG 199 courses must enroll with the same faculty member in two quarters of BENG 199. *It is preferred (though not required) that the two quarters be taken sequentially.* Completion of two quarters of BENG 199 will satisfy both TE requirements—(a.) completion of a total of 8 units and (b.) the total 4 units required must be “engineering-related.”

“Teams in Engineering Sciences” (TIES) Courses. ENG 100D and 100L courses are considered “engineering-related” courses. Students will receive 8 units of TE credit after passing 1 quarter of ENG 100D (4 units) taken concurrently with ENG 100L (2 units), and passing 1 additional quarters of ENG 100L.

BENG 196, Bioengineering Industrial Internship course. BENG students who obtain a bioengineering related internship and obtain approval and verification of technical content from the Bioengineering Departmental Industrial Relations board may enroll to use 4 units towards satisfying 1 Technical Elective.

BENG 197, Engineering Internship or BENG 198, Directed Group Project courses may **not** be used to satisfy TE requirements in any majors in the Department of Bioengineering.