Approved Coursework Listing

This list contains previously approved coursework to meet requirements of the BME programs of work. This list is not exhaustive. If you are interested in courses not on this list, send a request to the Graduate Advisor (edward.castillo@utexas.edu) and include the course number, name, and the requirement for which you want to use the course. Students must gain prior approval before enrolling in courses not on this list, with a few exceptions:

- Any graduate level course with the BIO prefix can count toward the biological and clinical sciences requirement.
- Any graduate level course with the M or SDS prefix can count toward the math and statistics requirement.
- PhD and terminal MSE students may use an upper-division undergraduate course toward the biological and clinical sciences requirement with the Graduate Advisor's approval.

Biological and Clinical Sciences

These courses will satisfy the biological and clinical sciences requirement and technical elective requirements.

Dept.	Num.	Course Name
BCH	387D	Physical Methods in Biochemistry and Molecular Biology
BCH	394	Structure and Function of Proteins and Nucleic Acids
BCH	395G	Structure and Function of Proteins and Membranes
BIO	336	Tumor Biology (upper-division undergraduate level)
BIO	383	Current Topics in Cell Biology
BIO	383	Topics in Membrane Biology
BIO	381K	Cellular and Molecular Basis of Neuro Development
BIO	382K	Biology for Big Data Scientists
BIO	382K	Cell Membrane Trafficking
BIO	383K	Membrane Trafficking in Eukaryotic Cells
BIO	383K	Topics in Membrane Biology
BIO	384K	Phylogenetic Perspectives
BIO	394M	Tumor Biology
BIO	391P	Advanced Virology
BIO	394M	Advanced Immunology
BIO	394M	Immunology
BIO	395G	Biochemistry
BIO	395H	Cell Biology
BIO	395J	Molecular Biology
BIO	395J	Genes/Genome/Gene Expression
BME	382J	Biological Membranes and Cell Interfaces: Principles and Applications
CH	391	Macromolecular Chemistry
CH	391	Advanced Chemical Biology
CHE	384	Quantitative Analysis of Cell and Molecular Biology
CHM	394	Structure and Function of Proteins and Nucleic Acids

CH	395	Cell Biology
CH	395G	Biochemistry
CSE	397	Pathology and Epidemiology of Cardiovascular Disease
GS07	1113	Microbial Physiology
KIN	395	Advanced Exercise Physiology
KIN	395	Cardiovascular Responses and Adaptations to Exercise
KIN	395	Human Cardiovascular/Autonomic Physiology
M E	391	Cardiovascular Pathology
M E	397	Pathology and Epidemiology of Cardiovascular Disease
N	396C	Advanced Pathophysiology
NEU	380G	Visual Neuroscience
NEU	381N	Basic Processes of Nerve Cells
NEU	382	Cellular Neuroscience
NEU	383C	Functional Neuroanatomy
NEU	383D	Neuropharmacology
NEU	385L	Addiction Neuroscience
NEU	385L	Ion Channels
NEU	385L	Neurobiology of Disease
NEU	382T	Principles of Neuroscience
NEU	394P	Introduction to Sensory-Motor Systems
NEU	394P	Neurobiology of Learning and Memory
NEU	394P	Current Topics in Behavioral Neuroscience
NTR	390	Molecular Nutritional Sciences
PGS	380F	Biomedical Pharmacology
PGS	384L	Biochemistry and Molecular Toxicology
PGS	388C	Enzyme Catalysts, Mechanisms and Applications
PGS	388K	Molecular Mechanisms and Methods in Nutrition and Cancer
PHR	391	Advanced Pharmaceutics
PHY	382P	Biophysics & Biological Physics
PSY	387S	Principles of Cognitive Neuroscience
PSY	380E	Vision Systems
PSY	394U	Introduction to Sensory Motor Systems
SLH	391Q	Anatomy & Physiology of the Auditory System

Math and Statistics

These courses will satisfy the math and statistics requirement and technical elective requirements. Any graduate level Math (M) or Statistics (SDS) course will fulfill this requirement.

Dept.	Num.	Course Name
ASE	380P	Analytical Methods
BME	383	Mathematical Modeling

BME	380J	5-Biostatistics, Study Design, and Research Methods
BME	383J	Introduction to Mathematical and Physical Biology
BME	383J	Mathematical Physiology
CH	382L/M	Advanced Physical Chemistry: Statistical Mechanics
C S	384R	Geometric Bio-Modeling and Visualization
C S	395T	Computational Statistics with Application to Bioinformatics
CSE	383K	Numerical Analysis: Linear Algebra
CSE	384K	Theory of Probability
CSE	386L	Mathematical Methods in Science and Engineering
CSE	389C	Introduction to Math Modeling in Science and Engineering
CSE	389D	Mathematical Modeling in Science and Engineering II
CSE	393F	Finite Element Methods
CSE	393H	Advanced Finite Element Theory
CSE	397	Introduction to Mathematical and Physical Biology
CSE	397	Validation and UQ in Computational Modeling
CSE	397	Computational Variational Methods for Inverse Problems
CSE	397	Scientific Machine Learning
EDP	482K	Experimental Design and Statistical Inference
ECE	380L	Data Mining
ECE	381J	Probability and Stochastic Process
ECE	381K	Convex Optimization
E M	388	Solid Mechanics I
E M	384K	Continuum Mechanics
GEO	384M	Inverse Theory
M	384C	Mathematical Statistics I
M	392C	Lie Groups
M	392C	Dynamical Systems
PHR	394M	Statistics
SDS	380C	Statistical Methods I
SDS	380D	Statistical Methods II
SDS	383C	Statistical Modeling I
SDS	384	Mathematical Statistics
SDS	384	Bayesian Statistics
SDS	384	4-Regression Analysis
SDS	384	6-Design and Analysis of Experiments
SDS	384	Scientific Machine Learning
SDS	385	Computational Biology and Bioinformatics
SDS	385	Applied Regression
SDS	385	Statistical Models for Big Data
SDS	386D	Monte Carlo Methods
SDS	392	Introduction to Scientific Programming

STA	380	10-Mathematical Statistics for Applications

Track 1: Biomedical Imaging and Instrumentation

These courses will satisfy the Track 1 technical requirement and technical elective requirements.

Dept.	Num.	Course Name
BME	381J	3-Biomedical Imaging: Signals and Systems
BME	381J	8-Functional Imaging Laboratory
BME	381J	Electrophysiology Frontiers
BME	381J	9-Fundamental Biomedical Optical Imaging
BME	381J	11-Medical Imaging
BME	381J	12-Optical Imaging
BME	381J	Rehabilitation Engineering
BME	383J	Computational Imaging and Inverse Problems
BME	384J	1-Biomedical Instrumentation
BME	384J	5-Projects in Biomedical Engineering
BME	384J	Bioelectronics/Biointerfaces
BME	385J	Biomedical Micro and Nanotechnology
BME	381J	10-Optics and Lasers
BME	381J	13-Fluorescence Microscopy and Spectroscopy
BME	384J	Introduction to Neural Engineering
ECE	381K	16-Digital Video
ECE	371R/Q	Digital Image Processing
ECE	381K	Digital Signal Processing
ECE	381V	Genomic Signal Processing
ECE	385J	Brain Computer Interaction
ECE	385J	Neural Engineering
M E	397	Haptic and Teleoperated Systems
PSY/NEU	386D	Multivariate Pattern Analysis of Neuroimaging Data
PSY	394U	Methods for fMRI

Track 2: Cell and Biomolecular Engineering

These courses will satisfy the Track 2 technical requirement and technical elective requirements.

Dept.	Num.	Course Name
BME	380J	4-Fields, Forces and Flows
BME	382J	1-Cell and Tissue Engineering
BME	382J	3-Molecular Sensors and Nanodevices for BME Applications
BME	382J	4-Advanced Engineering Biomaterials
BME	382J	5-Structured Surfaces, Fabrication, Characterization and Application

BME	382J	6-Biopolymers and Drug/Gene Delivery
BME	382J	7-Cell and Molecular Biomechanics
BME	382J	8-Molecular Biophysics: Measurements and Methods
BME	382J	9-Biomimetic Design and Engineering
BME	382J	10-Immune Engineering
BME	382J	Polymer and Bioconjugate Chemistry
BME	382J	Bionanotechnology
BME	382J	Biological Responses to Medical Devices
BME	382J	Delivery of Therapeutic Agents
BME	382J	Nanomedicine
BME	382J	Multiscale Biosystems/Microengineering
BME	382J	Matrices, Organoids, and Microphysiological Systems
BME	383J	Modeling Biological Signal and Regulatory Systems
BME	385J	7-Tissue/Cells with Biomechanical Applications
BME	385J	Cancer Bioengineering
BME	385J	Tissue Microenvironments
BME	385J	Growth and Remodeling of Tissue Systems
BME	385J	Systems Immunology: Health and Disease
CH	391	Macromolecular Chemistry
CHE	384T	Nanomaterials Chemistry and Engineering
CHE	384T	Quantitative Analysis of Cellular and Molecular Biology

Track 3: Computational Biomedical Engineering

These courses will satisfy the Track 3 technical requirement and technical elective requirements.

Dept.	Num.	Course Name
BCH	394P	Bioinformatics
BME	383J	5-Introduction to Nonlinear Dynamics in Biological Systems
BME	383J	9-Computational Methods for Biomedical Engineers I
BME	383J	10-Computational Methods for Biomedical Engineers II
BME	383J	Analysis of Biological Systems
BME	383J	Computational Biomolecular Engineering
BME	383J	Data Mining
BME	383J	Introduction to Computational Oncology
BME	383J	Introduction to Mathematical and Physical Biology
BME	383J	Mathematical Physiology
BME	383J	Computational Imaging and Inverse Problems
BME	385J	Computational Modeling in Bioengineering and Medicine
BME	385J	Medical Decision Making
C S	388	Natural Language Processing

C S	391L	Machine Learning
C S	395T	Foundations of Predictive Machine Learning
CSE	380	Tools and Techniques for Computational Science
CSE	397	Computational Magnetic Resonance Imaging
ECE	381K	Machine Learning on Real World Networks
ECE	381K	Applied Machine Learning
ECE	381V	Computer Vision
ECE	381V	Computational MRI
ECE	385J	Brain-Computer Interaction
NEU	385P/L	Programming and Data Analysis for Modern Neuroscience
SDS	394	Scientific & Technical Computing
SDS	385	Computational Biology and Bioinformatics

Track 4: Molecular, Cellular, and Tissue Biomechanics

These courses will satisfy the Track 4 technical requirement and technical elective requirements.

Dept.	Num.	Course Name
BME	381J	Rehabilitation Engineering
BME	382J	9-Biomimetic Design and Engineering
BME	382J	Multiscale Biosystems/Microengineering
BME	383J	2-Musculoskeletal Biomechanics
BME	383J	4-Biomechanics of Human Movement
BME	384J	4-Bioelectric Phenomena
BME	384T	Cell/Tissue/Scaffold Biomechanics
BME	385J	Modeling/Simulating Cardiac Function
BME	382J	Cell and Molecular Biomechanics
BME	382J	8-Molecular Biophysics: Measurements and Methods
BME	385J	7-Tissue/Cell Biomechanical Applications
BME	385J	Thin Film Mechanics
BME	385J	Tissue/Scaffold Biomechanics
BME	385J	Soft Tissue Biomechanics
BME	385J	Growth and Remodeling of Tissue Systems
CH	393L	Topic: *Biophysics*
E M	384K	Continuum Mechanics

Technical Electives

These courses will satisfy the technical elective requirements only. They will not count toward any of the Track 1-4 technical requirements.

Students are allowed to substitute one professional development (PD) elective for one technical elective.

Dept.	Num.	Course Name

ASE	382Q	Fundamentals of Incompressible Flow
BGS	380	Health Law: A New Approach (PD)
BIO	382K	Informatics/Data Analysis for Life Sciences
BIO	384K	Python Programming for Biology
BIO	384K	DEI in STEM: The Science Behind Bias
BME	385J	Medical Device Design and Manufacturing
BME	385J	Inquiry-Based Instruction Design
BME	385J	Imaging Clinical Immersion
BME	385J	Health Equity in Engineering Design
C E	397	Environmental Implications of Nanomaterials
CHE	392	Polymer Science
CHE	392P	Introduction to Polymer Materials Science
CHE	384P	Entrepreneurship (PD)
CHE	386K	X-Ray Diff Theory
CH	393L	Topic: *Elements of Spectroscopy*
C S	380L	Advanced Operating Systems
C S	386L	Programming Languages
C S	394D	Deep Learning
C S	395T	Scalable Machine Learning
C S	395T	Physical Simulation
C S	395T	Introduction to Cognitive Science
CSE	392	Geo Fdtns Data Sci/Predctv ML
ECE	382N	Computer Architecture
ECE	385J	Neural Engineering
KIN	386	Qualitative Research Methods
M E	385J	Modeling and Simulation of Human Movement
M E	387R	Practical Electron Microscopy
M E	390N	Health Physics Laboratory
M E	395	The Enterprise of Technology (PD)
M E	397	Additive Manufacturing
M E	397	Algorithms for Sensor-Based Robotics
MIS	381N	User Generated Content Analytics
PGS	381G	Advanced Manufacturing Pharmacology
PGS	380M	Advanced Pharmaceutics Experimental Design
PGS	381F	Pharmaceutical Product Development
PGS	382V	Pharmaceutical Biotechnology
PGS	384K	Fundamentals of Toxicology
PGS	389M	Fundamentals of Health Innovations
PSY	381D	Brain Connectivity
PSY	394P	Neuroinflammation in Health/Pain
TXA	395	Body Scanning and Virtual Clothing