DUAL DEGREE PROGRAM: BIOMEDICAL ENGINEERING COMBINED WITH MECHANICAL ENGINEERING

Requirements
Effective Fall 2025

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
ENGR 111	Fundamentals of Engineering		3
ENGR 114	Engineering for Grand Challenges		3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	5
Select one group from the following:			5
Group A:			
CHEM 111	General Chemistry I (GT-SC2)	3A	
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	
Group B:			
CHEM 120	Foundations of Modern Chemistry (GT-SC2)	3A	
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)	3A	
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
	Total Credits		**30**

Sophomore

BIOM 200	Fundamentals of Biomedical Engineering		2
CHEM 113	General Chemistry II		3
CIVE 260	Engineering Mechanics-Statics		3
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	4
MATH 261	Calculus for Physical Scientists III		4
MATH 340	Intro to Ordinary Differential Equations		4
MECH 200A	Introduction to Manufacturing Processes: Lecture		3
MECH 200B	Introduction to Manufacturing Processes : Laboratory		1
MECH 210	Engineering Design--3D Modeling and Printing		2
MECH 231	Engineering Experimentation		2
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	5
	Total Credits		**33**

Junior

BIOM 300	Problem-Based Learning Biomedical Engr Lab		4
BMS 300	Principles of Human Physiology		4
CIVE 261	Engineering Mechanics-Dynamics		3
CIVE 360	Mechanics of Solids		3
MECH 305	Mechanical Engineering Computational Methods		3
MECH 339	Thermodynamics I for Mechanical Engineers		3

MECH 342	Fluid Mechanics for Mechanical Engineers		3
MECH 439	Thermodynamics II for Mechanical Engineers		3
STAT 315	Intro to Theory and Practice of Statistics		3
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
	Total Credits		**32**

Senior

BIOM 441	Biomechanics and Biomaterials		3
MECH 207	Mechatronics I		3
MECH 307	Mechatronics II		3
MECH 324	Dynamics of Machines		4
MECH 325	Machine Design with Finite Element Analysis		4
MECH 331A	Introduction to Engineering Materials: Lecture		3
MECH 331B	Introduction to Engineering Materials : Lab		1
MECH 338	Thermal/Fluid Sciences Laboratory		1
MECH 344	Heat and Mass Transfer		3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
	Total Credits		**31**

Fifth Year

BIOM 486A	Biomedical Design Practicum: Capstone Design I	4A,4B,4C	4
BIOM 486B	Biomedical Design Practicum: Capstone Design II	4A,4B,4C	4
CHEM 245	Fundamentals of Organic Chemistry		4
BME Broad Electives (See list below):			3
BME Technical Elective (See list below)			6
MECH Technical Elective[1]			3
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
	Total Credits		**30**
	Program Total Credits:		**156**

BME Technical Elective List

Code	Title	Credits
BC 351	Principles of Biochemistry	4
BC 401	Comprehensive Biochemistry I	3
BC 403	Comprehensive Biochemistry II	3
BC 404	Comprehensive Biochemistry Laboratory	2
BC 411	Physical Biochemistry	4
BC 463	Molecular Genetics	3
BC 465	Molecular Regulation of Cell Function	3
BC 565	Molecular Regulation of Cell Function	4
BIOM 304	Global Challenges and Collaborations in BME	3
BIOM 350A	Study Abroad--Ecuador: Prosthetics	1-3
BIOM 421	Transport Phenomena in Biomedical Engineering	3
BIOM 422	Quantitative Systems and Synthetic Biology	3
BIOM 431/ECE 431	Biomedical Signal and Image Processing	3
BIOM 476	Biomedical Engineering Clinical Practicum	1-3
BIOM 495	Independent Study	1-6
BIOM 504/CBE 504	Fundamentals of Biochemical Engineering	3
BIOM 518/ECE 518	Biophotonics	3
BIOM 522/CBE 522	Bioseparation Processes	3
BIOM 525/MECH 525	Cell and Tissue Engineering	3
BIOM 526/ECE 526	Biological Physics	3
BIOM 527A/ ECE 527A	Biosensing: Cells as Circuits	1
BIOM 527B/ ECE 527B	Biosensing: Signal and Noise in Biosensors	1
BIOM 527C/ ECE 527C	Biosensing: Sensor Circuit Fundamentals	1
BIOM 527D/ ECE 527D	Biosensing: Electrochemical Sensors	1
BIOM 527E/ ECE 527E	Biosensing: Affinity Sensors	1

BIOM 527F/ ECE 527F	Biosensing: Biophotonic Sensors Using Refractive Index	1
BIOM 531/MECH 531	Materials Engineering	3
BIOM 533/CIVE 533	Biomolecular Tools for Engineers	3
BIOM 537/ECE 537	Biomedical Signal Processing	3
BIOM 559/ECE 559	Machine Learning in Imaging and Spectroscopy	3
BIOM 570/MECH 570	Bioengineering	3
BIOM 572/MECH 572	Regenerative Bioengineering with Stem Cells	3
BIOM 573/MECH 573	Structure and Function of Biomaterials	3
BIOM 574/MECH 574	Bio-Inspired Surfaces	3
BIOM 576/MECH 576	Quantitative Systems Physiology	4
BIOM 578/MECH 578	Musculoskeletal Biosolid Mechanics	3
BIOM 579/MECH 579	Cardiovascular Biomechanics	3
BMS 301	Human Gross Anatomy	5
BMS 302	Laboratory in Principles of Physiology	2
BMS 310	Anatomy for the Health Professions	4
BMS 320	Virtual Laboratory in Physiology	2
BMS 325	Cellular Neurobiology	3
BMS 345	Functional Neuroanatomy	4
BMS 405	Nerve and Muscle-Toxins, Trauma and Disease	3
BMS 409	Human and Animal Reproductive Biology	3
BMS 420	Cardiopulmonary Physiology	3
BMS 430	Endocrinology	3
BMS 450	Pharmacology	3
BMS 500	Mammalian Physiology I	4
BMS 501	Mammalian Physiology II	4
BMS 503/NB 503	Developmental Neurobiology	3
BMS 505/NB 505	Neuronal Circuits, Systems and Behavior	3
BZ 310	Cell Biology	4
BZ 311	Developmental Biology	4
BZ 350	Molecular and General Genetics	4
BZ 476/BZ 576	Genetics of Model Organisms	3
CBE 330	Process Simulation	3
CBE 505	Biochemical Engineering Laboratory	1
CBE 543	Membranes for Biotechnology and Biomedicine	3
CHEM 334	Quantitative Analysis Laboratory	1
CHEM 335	Introduction to Analytical Chemistry	3
CHEM 343	Modern Organic Chemistry II	3
CHEM 344	Modern Organic Chemistry Laboratory	2
CHEM 346	Organic Chemistry II	4
CHEM 433	Clinical Chemistry	3
CHEM 539A	Principles of NMR and MRI: Basic NMR Principles	1
CHEM 539B	Principles of NMR and MRI: NMR Diffusion Measurements-2D NMR and MRI	1
CHEM 539C	Principles of NMR and MRI: Advanced NMR and MRI Techniques	1
ECE 569/MECH 569	Micro-Electro-Mechanical Devices	3
ENGR 533	Spaceflight and Biological Systems	3
ERHS 332	Principles of Epidemiology	3
ERHS 450	Introduction to Radiation Biology	3
ERHS 502	Fundamentals of Toxicology	3
ERHS 510/VS 510	Cancer Biology	3
ERHS 540	Principles of Ergonomics	3
FSHN 470	Advanced Human Nutrition and Metabolism	3
HES 307	Biomechanical Principles of Human Movement	3
HES 319	Neuromuscular Aspects of Human Movement	4
HES 403	Physiology of Exercise	3
HES 420	Electrocardiography and Exercise Management	3
HES 476	Exercise and Chronic Disease	3
MATH 455	Mathematics in Biology and Medicine	3
MECH 543	Biofluid Mechanics	3
MIP 300	General Microbiology	3
MIP 302	General Microbiology Laboratory	2
MIP 342	Immunology	4
MIP 343	Immunology Laboratory	2
MIP 351	Medical Bacteriology	3
MIP 352	Medical Bacteriology Laboratory	3
MIP 420	Medical and Molecular Virology	4
MIP 443	Microbial Physiology	3
MIP 450	Microbial Genetics	3
NB 500/BMS 502	Readings in Cellular Neurobiology	1
NB 501	Cellular and Molecular Neurophysiology	2

BME Broad Electives

Code	Title	Credits
AB 410	Understanding Pesticides	3
ART 237	Drawing for Non-Art Majors	3
ATS 550	Atmospheric Radiation and Remote Sensing	3
ATS 555	Air Pollution	3
ATS 560	Air Pollution Measurement	2
BC 351	Principles of Biochemistry	4
BC 401	Comprehensive Biochemistry I	3
BC 403	Comprehensive Biochemistry II	3
BC 404	Comprehensive Biochemistry Laboratory	2
BC 406A	Investigative Biochemistry: Protein Biochemistry	2
BC 406B	Investigative Biochemistry: Molecular Genetics	2
BC 406C	Investigative Biochemistry: Cellular Biochemistry	2
BC 411	Physical Biochemistry	4
BC 441	3D Molecular Models for Biochemistry	1
BC 463	Molecular Genetics	3
BC 464	Molecular Genetics Recitation	1
BC 465	Molecular Regulation of Cell Function	3
BC 517	Metabolism	2
BC 521/CHEM 521	Principles of Chemical Biology	3

BC 563	Molecular Genetics	4
BIOM 304	Global Challenges and Collaborations in BME	3
BIOM 350A	Study Abroad--Ecuador: Prosthetics	1-3
BIOM 350B	Study Abroad--Portugal: Biomedical Engineering and Healthcare	1
BIOM 421	Transport Phenomena in Biomedical Engineering	3
BIOM 431/ECE 431	Biomedical Signal and Image Processing	3
BIOM 504/CBE 504	Fundamentals of Biochemical Engineering	3
BIOM 517/ECE 517	Advanced Optical Imaging	3
BIOM 518/ECE 518	Biophotonics	3
BIOM 522/CBE 522	Bioseparation Processes	3
BIOM 525/MECH 525	Cell and Tissue Engineering	3
BIOM 526/ECE 526	Biological Physics	3
BIOM 527A/ ECE 527A	Biosensing: Cells as Circuits	1
BIOM 527B/ ECE 527B	Biosensing: Signal and Noise in Biosensors	1
BIOM 527C/ ECE 527C	Biosensing: Sensor Circuit Fundamentals	1
BIOM 527D/ ECE 527D	Biosensing: Electrochemical Sensors	1
BIOM 527E/ ECE 527E	Biosensing: Affinity Sensors	1
BIOM 527F/ ECE 527F	Biosensing: Biophotonic Sensors Using Refractive Index	1
BIOM 531/MECH 531	Materials Engineering	3
BIOM 532/MECH 532	Materials Issues in Mechanical Design	3
BIOM 533/CIVE 533	Biomolecular Tools for Engineers	3
BIOM 537/ECE 537	Biomedical Signal Processing	3
BIOM 559/ECE 559	Machine Learning in Imaging and Spectroscopy	3
BIOM 570/MECH 570	Bioengineering	3
BIOM 572/MECH 572	Regenerative Bioengineering with Stem Cells	3
BIOM 573/MECH 573	Structure and Function of Biomaterials	3
BIOM 574/MECH 574	Bio-Inspired Surfaces	3
BIOM 576/MECH 576	Quantitative Systems Physiology	4
BIOM 578/MECH 578	Musculoskeletal Biosolid Mechanics	3
BIOM 579/MECH 579	Cardiovascular Biomechanics	3
BMS 301	Human Gross Anatomy	5
BMS 302	Laboratory in Principles of Physiology	2
BMS 305	Domestic Animal Gross Anatomy	4
BMS 310	Anatomy for the Health Professions	4
BMS 320	Virtual Laboratory in Physiology	2
BMS 325	Cellular Neurobiology	3
BMS 330	Microscopic Anatomy	4
BMS 345	Functional Neuroanatomy	4
BMS 405	Nerve and Muscle-Toxins, Trauma and Disease	3
BMS 409	Human and Animal Reproductive Biology	3
BMS 420	Cardiopulmonary Physiology	3
BMS 430	Endocrinology	3
BMS 450	Pharmacology	3
BMS 460	Essentials of Pathophysiology	3
BMS 500	Mammalian Physiology I	4
BMS 501	Mammalian Physiology II	4
BMS 503/NB 503	Developmental Neurobiology	3
BMS 505/NB 505	Neuronal Circuits, Systems and Behavior	3
BMS 545	Neuroanatomy	5
BMS 575	Human Anatomy Dissection	4
BSPM 302	Applied and General Entomology	2
BSPM 361	Elements of Plant Pathology	3
BZ 240	Synthetic Biology-Principles and Applications	3
BZ 310	Cell Biology	4
BZ 311	Developmental Biology	4
BZ 348/MATH 348	Theory of Population and Evolutionary Ecology	4
BZ 350	Molecular and General Genetics	4
BZ 360	Bioinformatics and Genomics	4
BZ 420	Evolutionary Medicine	3
BZ 476/BZ 576	Genetics of Model Organisms	3
CBE 330	Process Simulation	3
CBE 406	Introduction to Transport Phenomena	3
CBE 501	Chemical Engineering Thermodynamics	3
CBE 502	Advanced Reactor Design	3
CBE 503	Transport Phenomena Fundamentals	3
CBE 505	Biochemical Engineering Laboratory	1
CBE 514	Polymer Science and Engineering	3
CBE 521	Mathematical Modeling for Chemical Engineers	3
CBE 524	Bioremediation	1
CBE 540/CIVE 540	Advanced Biological Wastewater Processing	3
CBE 560	Engineering of Protein Expression Systems	3
CBE 570	Biomolecular Engineering/Synthetic Biology	3
CHEM 231	Foundations of Analytical Chemistry	3
CHEM 232	Foundations of Analytical Chemistry Lab	2
CHEM 246	Fundamentals of Organic Chemistry Laboratory	1
CHEM 261	Fundamentals of Inorganic Chemistry	3
CHEM 263	Foundations of Inorganic Chemistry	4
CHEM 264	Foundations of Inorganic Chemistry Laboratory	1
CHEM 311	Introduction to Nanoscale Science	3
CHEM 315	Foundations of Polymer Chemistry	3
CHEM 320	Chemistry of Addictions	3
CHEM 333	Forensic Chemistry	3
CHEM 334	Quantitative Analysis Laboratory	1
CHEM 335	Introduction to Analytical Chemistry	3
CHEM 338	Environmental Chemistry	3
CHEM 343	Modern Organic Chemistry II	3
CHEM 344	Modern Organic Chemistry Laboratory	2
CHEM 346	Organic Chemistry II	4

CHEM 355	Foundations of Sustainable Chemistry	3
CHEM 431	Instrumental Analysis	4
CHEM 433	Clinical Chemistry	3
CHEM 440	Advanced Organic Chemistry Laboratory	2
CHEM 445	Synthetic Organic Chemistry	3
CHEM 448	Medicinal Chemistry	3
CHEM 451	Foundations of Catalytic Chemistry	3
CHEM 461	Inorganic Chemistry	3
CHEM 462	Inorganic Chemistry Laboratory	2
CHEM 465	Chemistry of Sustainable E-Waste Management	1
CHEM 522	Methods of Chemical Biology	2
CHEM 532	Advanced Chemical Analysis II	3
CHEM 537	Electrochemical Methods	3
CHEM 539A	Principles of NMR and MRI: Basic NMR Principles	1
CHEM 539B	Principles of NMR and MRI: NMR Diffusion Measurements-2D NMR and MRI	1
CHEM 539C	Principles of NMR and MRI: Advanced NMR and MRI Techniques	1
CHEM 541	Organic Molecular Structure Determination	2
CHEM 543	Structure/Mechanisms in Organic Chemistry	2
CHEM 545	Synthetic Organic Chemistry I	3
CHEM 547	Physical Organic Chemistry	3
CHEM 555	Chemistry of Sustainability	3
CHEM 560	Foundations of Inorganic Synthesis	1
CHEM 566	Bioinorganic Chemistry	3
CHEM 567	Crystallographic Computation	1
CHEM 569	Chemical Crystallography	3
CHEM 570	Chemical Bonding	3
CHEM 575	Fundamentals of Chemical Thermodynamics	1
CHEM 576	Statistical Mechanics	2
CHEM 577	Surface Chemistry	3
CHEM 578A	Computational Chemistry: Electronic Structure	1
CHEM 579	Chemical Kinetics	3
CIVE 322	Basic Hydrology	3
CIVE 330	Ecological Engineering	3
CIVE 367	Structural Analysis	3
CIVE 371	Study Abroad--Peru: Grand Challenges in Engineering in Peru	3
CIVE 401	Hydraulic Engineering	3
CIVE 423	Groundwater Engineering	3
CIVE 438	Fundamentals of Environmental Engr	3
CIVE 439	Applications of Environmental Engr Concepts	3
CIVE 440	Nonpoint Source Pollution	3
CIVE 442	Air Quality Engineering	3
CIVE 515	River Mechanics	3
CIVE 520	Physical Hydrology	3
CIVE 524/WR 524	Modeling Watershed Hydrology	3
CIVE 531	Groundwater Hydrology	3
CIVE 538	Aqueous Chemistry	3
CIVE 560	Advanced Mechanics of Materials	3
CIVE 562	Fundamentals of Vibrations	3
CS 152	Python for STEM	2
CS 163	CS1---No Prior Programming Experience	4
CS 164	CS1--Computational Thinking with Java	4
CS 165	CS2--Data Structures	4
CS 220	Discrete Structures and the Applications	4
CS 253	Software Development with C++	4
CS 270	Computer Organization	4
CS 314	Software Engineering	3
CS 320	Algorithms--Theory and Practice	3
CS 356	Systems Security	3
CS 370	Operating Systems	3
CS 4** - Any 400-level CS course except CS 495		
CS 5** - Any 500-level CS course		
DSCI 320/MATH 320	Optimization Methods in Data Science	3
DSCI 369	Linear Algebra for Data Science (credit not allowed for both DSCI 369 and MATH 369)	3-4
or MATH 369	Linear Algebra I	
ECE 312	Linear System Analysis II	3
ECE 4** - Any ECE course at the 400-level except ECE 495		
ECE 5** - Any ECE course at the 500-level		
ENGR 300	3D Printing Lab for Engineers	1
ENGR 422	Technology Entrepreneurship	3
ENGR 478	Applied Engineering Data Analytics	3
ENGR 502	Engineering Project and Program Management	3
ENGR 510	Engineering Optimization: Method/ Application	3
ENGR 525	Intellectual Property and Invention Systems	3
ENGR 531	Engineering Risk Analysis	3
ENGR 533	Spaceflight and Biological Systems	3
ENGR 550/ MATH 550	Numerical Methods in Science and Engineering	3
ENGR 570	Coupled Electromechanical Systems	3
ERHS 320	Environmental Health--Water Quality	3
ERHS 332	Principles of Epidemiology	3
ERHS 400	Radiation Safety	3
ERHS 410	Environmental Health-Air and Waste Management	3
ERHS 430	Human Disease and the Environment	3
ERHS 446	Environmental Toxicology	3
ERHS 448	Environmental Contaminants	3
ERHS 450	Introduction to Radiation Biology	3
ERHS 502	Fundamentals of Toxicology	3
ERHS 503	Toxicology Principles	1
ERHS 510/VS 510	Cancer Biology	3
ERHS 530	Radiological Physics and Dosimetry I	3
ERHS 540	Principles of Ergonomics	3
ERHS 542	Biostatistical Methods for Qualitative Data	3
ERHS 547	Equipment and Instrumentation	3

ERHS 560	Health Impact Assessment	2
ESS 311	Ecosystem Ecology	3
ESS 312	Sustainability Science	3
ESS 330	Quantitative Reasoning for Ecosystem Science	3
ESS 353	Global Change Impacts, Adaptation, Mitigation	3
ESS 440	Practicing Sustainability	4
ESS 501	Principles of Ecosystem Sustainability	3
ESS 524	Foundations for Carbon/Greenhouse Gas Mgmt	3
F 311	Forest Ecology	3
FIN 305	Fundamentals of Finance	3
FSHN 470	Advanced Human Nutrition and Metabolism	3
FTEC 447	Food Chemistry	3
GEOL 150	Dynamic Earth (GT-SC2)	4
GEOL 452	Hydrogeology	4
GEOL 454	Geomorphology	4
GES 362	Systems Thinking and Sustainability	3
GES 441	Analysis of Sustainable Energy Solutions	3
GES 450	Global Sustainability and Health	3
GES 465/MSE 465	Sustainable Strategies for E-Waste Management	3
GES 528/CIVE 528	Assessing the Food, Energy, Water Nexus	3
GES 542	Biobased Fuels, Energy, and Chemicals	3
GR 305	Geography of Global Health	3
HES 207	Anatomical Kinesiology	4
HES 307	Biomechanical Principles of Human Movement	3
HES 319	Neuromuscular Aspects of Human Movement	4
HES 345	Population Health and Disease Prevention	3
HES 403	Physiology of Exercise	3
HES 420	Electrocardiography and Exercise Management	3
HES 476	Exercise and Chronic Disease	3
HORT 579	Mass Spectrometry Omics-Methods and Analysis	3
IDEA 310B	Design Thinking Toolbox: 3D Modeling	3
IDEA 310D	Design Thinking Toolbox: Digital Imaging	1
IDEA 310H/CS 310H	Design Thinking Toolbox: Mixed Reality Design	3
IDEA 455/MGT 455	Designing for Defense	3
LIFE 201B	Introductory Genetics: Molecular/ Immunological/Developmental (GT-SC2)	3
LIFE 202B	Introductory Genetics Recitation: Molecular	1
LIFE 203	Introductory Genetics Laboratory	2
LIFE 210	Introductory Eukaryotic Cell Biology	3
LIFE 211	Introductory Cell Biology Honors Recitation	1
LIFE 212	Introductory Cell Biology Laboratory	2
LIFE 320	Ecology	3
LSPA 340	Spanish for Animal Health and Care Fields	3
LSPA 346	Spanish for Health Care	3
MATH 229	Matrices and Linear Equations	2
MATH 235	Introduction to Mathematical Reasoning	2
MATH 301	Introduction to Combinatorial Theory	3
MATH 317	Advanced Calculus of One Variable	3
MATH 331	Introduction to Mathematical Modeling	3
MATH 332	Partial Differential Equations	3
MATH 360	Mathematics of Information Security	3
MATH 366	Introduction to Abstract Algebra	3
MATH 405	Introduction to Number Theory	3
MATH 417	Advanced Calculus I	3
MATH 418	Advanced Calculus II	3
MATH 419	Introduction to Complex Variables	3
MATH 430/ECE 430	Fourier and Wavelet Analysis with Apps	3
MATH 450	Introduction to Numerical Analysis I	3
MATH 451	Introduction to Numerical Analysis II	3
MATH 455	Mathematics in Biology and Medicine	3
MATH 460	Information and Coding Theory	3
MATH 463	Post-Quantum Cryptography	3
MATH 466	Abstract Algebra I	3
MATH 467	Abstract Algebra II	3
MATH 469	Linear Algebra II	3
MATH 470	Euclidean and Non-Euclidean Geometry	3
MATH 474	Introduction to Differential Geometry	3
MATH 525	Optimal Control	3
MATH 530	Mathematics for Scientists and Engineers	3
MATH 532	Mathematical Modeling of Large Data Sets	3
MATH 535	Foundations of Applied Mathematics	3
MATH 546	Partial Differential Equations II	3
MATH 550/ ENGR 550	Numerical Methods in Science and Engineering	3
MATH 560	Linear Algebra	3
MATH 569A/ DSCI 569A	Linear Algebra for Data Science: Matrices and Vectors Spaces	1
MATH 569B/ DSCI 569B	Linear Algebra for Data Science: Geometric Techniques for Data Reduction	1
MATH 569C/ DSCI 569C	Linear Algebra for Data Science: Matrix Factorizations and Transformations	1
MATH 569D/ DSCI 569D	Linear Algebra for Data Science: Theoretical Foundations	1
MECH 200	Introduction to Manufacturing Processes	3
MECH 307	Mechatronics II	3
MECH 324	Dynamics of Machines	4
MECH 325	Machine Design with Finite Element Analysis	4
MECH 331	Introduction to Engineering Materials	4
MECH 4** - Any 400-level MECH course except MECH 495		
MECH 5** - Any 500-level MECH course		
MGT 305	Fundamentals of Management	3
MGT 340	Fundamentals of Entrepreneurship	3
MIP 300	General Microbiology	3
MIP 302	General Microbiology Laboratory	2
MIP 315	Pathology of Human and Animal Disease	3
MIP 334	Food Microbiology	3

MIP 335	Food Microbiology Laboratory	2
MIP 342	Immunology	4
MIP 343	Immunology Laboratory	2
MIP 351	Medical Bacteriology	3
MIP 352	Medical Bacteriology Laboratory	3
MIP 410	Foundations of Modern Biotechnology	2
MIP 420	Medical and Molecular Virology	4
MIP 425	Virology and Cell Culture Laboratory	2
MIP 432/ESS 432	Microbial Ecology	3
MIP 433/ESS 433	Microbial Ecology Laboratory	1
MIP 443	Microbial Physiology	3
MIP 450	Microbial Genetics	3
MIP 530	Advanced Molecular Virology	4
MIP 543	RNA Biology	3
MIP 550	Microbial and Molecular Genetics Laboratory	4
MIP 555	Principles and Mechanisms of Disease	3
MKT 305	Fundamentals of Marketing	3
MSE 501	Materials Technology Transfer	1
MSE 502A	Materials Science and Engineering Methods: Materials Structure and Scattering	1
MSE 502B	Materials Science and Engineering Methods: Computational Materials Methods	1
MSE 502C	Materials Science and Engineering Methods: Materials Microscopy	1
MSE 502D	Materials Science and Engineering Methods: Materials Spectroscopy	1
MSE 502E	Materials Science and Engineering Methods: Bulk Properties and Performance	1
MSE 502F	Materials Science and Engineering Methods: Experimental Methods for Materials Research	1
MSE 503	Mechanical Behavior of Materials	3
MSE 504	Thermodynamics of Materials	3
MSE 505	Kinetics of Materials	3
NR 319	Introduction to Geospatial Science	4
NR 323/GR 323	Remote Sensing and Image Interpretation	3
NR 505	Concepts in GIS	4
PH 314	Introduction to Modern Physics	4
PH 315	Modern Physics Laboratory	2
PH 341	Mechanics	4
PH 351	Electricity and Magnetism	4
PH 353	Optics and Waves	4
PH 361	Physical Thermodynamics	3
PH 425	Advanced Physics Laboratory	2
PH 451	Introductory Quantum Mechanics I	3
PH 452	Introductory Quantum Mechanics II	3
PH 462	Statistical Physics	3
PH 517	Chaos, Fractals, and Nonlinear Dynamics	3
PH 521	Introduction to Lasers	3
PH 522	Introductory Laser Laboratory	1
PH 531	Introductory Condensed Matter Physics	3
PH 561	Elementary Particle Physics	3
PH 571	Mathematical Methods for Physics I	3
PHIL 322	Biomedical Ethics	3
PHIL 410	Gödel's Incompleteness Theorems	3
PSY 253	Human Factors and Engineering Psychology	3
SOCR 322	Principles of Microclimatology	3
SOCR 330	Principles of Genetics	3
SOCR 375	Soil Biogeochemistry	3
SOCR 400	Soils and Global Change-Impacts and Solutions	3
SOCR 455	Microbiomes of Soil Systems	3
SOCR 456	Soil Microbiology Laboratory	1
SOCR 467	Soil and Environmental Chemistry	3
SOCR 470	Soil Physics	3
SOCR 471	Soil Physics Laboratory	1
SOCR 567	Environmental Soil Chemistry	4
SPCM 434	International and Intercultural Communication	3
STAR 512	Design and Data Analysis for Researchers II	4
STAT 158	Introduction to R Programming	1
STAT 305	Sampling Techniques	3
STAT 307	Introduction to Biostatistics	3
STAT 331	Intermediate Applied Statistical Methods	3
STAT 341	Statistical Data Analysis I	3
STAT 342	Statistical Data Analysis II	3
STAT 400	Statistical Computing	3
STAT 420	Probability and Mathematical Statistics I	3
STAT 421	Introduction to Stochastic Processes	3
STAT 430	Probability and Mathematical Statistics II	3
STAT 460	Applied Multivariate Analysis	3
SYSE 501	Foundations of Systems Engineering	3
SYSE 505	Systems Thinking for the Real World	3
SYSE 530	Overview of Systems Engineering Processes	3
SYSE 532/ECE 532	Dynamics of Complex Engineering Systems	3
SYSE 534	Human Systems Integration	3
VS 333	Domestic Animal Anatomy	4

[1] Select 3 credits from any of the following: Any 400- or 500-level MECH course except MECH 486A, MECH 486B, MECH 495, MECH 498A, or MECH 498B.

Major Completion Map

Distinctive Requirements for Degree Program:

TO PREPARE FOR FIRST SEMESTER: The curriculum for this major assumes students enter college prepared to take calculus and chemistry. To qualify for graduation, students in the biomedical engineering combined with mechanical engineering must achieve a minimum 2.000 grade point average at CSU in all courses in engineering, mathematics, computer science, statistics, physics, and chemistry as well as courses taken as technical electives.

Freshman

Semester 1		**Critical**	**Recommended**	**AUCC**	**Credits**
CO 150	College Composition (GT-CO2)		X	1A	3
ENGR 111	Fundamentals of Engineering	X			3
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
Select one group from the following:		X			5
Group A:					
CHEM 111	General Chemistry I (GT-SC2)	X		3A	
CHEM 112	General Chemistry Lab I (GT-SC1)		X	3A	
Group B:					
CHEM 120	Foundations of Modern Chemistry (GT-SC2)	X		3A	
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)	X		3A	
	Total Credits				**15**

Semester 2		**Critical**	**Recommended**	**AUCC**	**Credits**
ENGR 114	Engineering for Grand Challenges	X			3
MATH 161	Calculus for Physical Scientists II (GT-MA1)	X		1B	4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	X		3A	5
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X	3D	3
	Total Credits				**15**

Sophomore

Semester 3		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 200	Fundamentals of Biomedical Engineering	X			2
LIFE 102	Attributes of Living Systems (GT-SC1)	X		3A	4
MATH 261	Calculus for Physical Scientists III	X			4
MECH 210	Engineering Design--3D Modeling and Printing	X			2
PH 142	Physics for Scientists and Engineers II (GT-SC1)	X		3A	5
	Total Credits				**17**

Semester 4		**Critical**	**Recommended**	**AUCC**	**Credits**
CHEM 113	General Chemistry II		X		3
CIVE 260	Engineering Mechanics-Statics	X			3
MATH 340	Intro to Ordinary Differential Equations	X			4
MECH 200A	Introduction to Manufacturing Processes: Lecture	X			3
MECH 200B	Introduction to Manufacturing Processes : Laboratory	X			1
MECH 231	Engineering Experimentation	X			2
	Total Credits				**16**

Junior

Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
BMS 300	Principles of Human Physiology		X		4
CIVE 261	Engineering Mechanics-Dynamics	X			3
MECH 305	Mechanical Engineering Computational Methods	X			3
MECH 339	Thermodynamics I for Mechanical Engineers	X			3
STAT 315	Intro to Theory and Practice of Statistics		X		3
	Total Credits				**16**

Semester 6		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 300	Problem-Based Learning Biomedical Engr Lab	X			4
CIVE 360	Mechanics of Solids	X			3
MECH 342	Fluid Mechanics for Mechanical Engineers	X			3
MECH 439	Thermodynamics II for Mechanical Engineers	X			3

Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3
	Total Credits				**16**
Senior					
Semester 7		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 441	Biomechanics and Biomaterials	X			3
MECH 207	Mechatronics I	X			3
MECH 324	Dynamics of Machines	X			4
MECH 331A	Introduction to Engineering Materials: Lecture	X			3
MECH 331B	Introduction to Engineering Materials : Lab	X			1
	Total Credits				**14**
Semester 8		**Critical**	**Recommended**	**AUCC**	**Credits**
MECH 307	Mechatronics II	X			3
MECH 325	Machine Design with Finite Element Analysis	X			4
MECH 338	Thermal/Fluid Sciences Laboratory		X		1
MECH 344	Heat and Mass Transfer		X		3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3A	3
	Total Credits				**17**
Fifth Year					
Semester 9		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 486A	Biomedical Design Practicum: Capstone Design I	X		4A,4B,4C	4
CHEM 245	Fundamentals of Organic Chemistry		X		4
BME Technical Elective (See List on Requirements tab)			X		3
MECH Technical Elective (See approved courses on Requirements Tab)			X		3
	Total Credits				**14**
Semester 10		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 486B	Biomedical Design Practicum: Capstone Design II	X		4A,4B,4C	4
BME Broad Electives (See List Below):		X			3
BME Technical Elective (See List on Requirements tab)		X			3
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		X		1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		X		3B	3
The benchmark courses for the 10th semester are the remaining courses in the entire program of study.		X			
	Total Credits				**16**
	Program Total Credits:				**156**