

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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3

Total Credits	32
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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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3

Total Credits	31
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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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3

Total Credits	30
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Program Total Credits:	156
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BME Technical Elective List

Code	Title	Credits			
BC 351	Principles of Biochemistry	4	BIOM 431/ECE 431	Biomedical Signal and Image Processing	3
BC 401	Comprehensive Biochemistry I	3	BIOM 476	Biomedical Engineering Clinical Practicum	1-3
BC 403	Comprehensive Biochemistry II	3	BIOM 495	Independent Study	1-6
BC 404	Comprehensive Biochemistry Laboratory	2	BIOM 504/CBE 504	Fundamentals of Biochemical Engineering	3
BC 411	Physical Biochemistry	4	BIOM 518/ECE 518	Biophotonics	3
BC 463	Molecular Genetics	3	BIOM 522/CBE 522	Bioseparation Processes	3
BC 465	Molecular Regulation of Cell Function	3	BIOM 525/MECH 525	Cell and Tissue Engineering	3
BC 565	Molecular Regulation of Cell Function	4	BIOM 526/ECE 526	Biological Physics	3
BIOM 304	Global Challenges and Collaborations in BME	3	BIOM 527A/ ECE 527A	Biosensing: Cells as Circuits	1
BIOM 350A	Study Abroad--Ecuador: Prosthetics	1-3	BIOM 527B/ ECE 527B	Biosensing: Signal and Noise in Biosensors	1
BIOM 421	Transport Phenomena in Biomedical Engineering	3	BIOM 527C/ ECE 527C	Biosensing: Sensor Circuit Fundamentals	1
BIOM 422	Quantitative Systems and Synthetic Biology	3	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	ERHS 332	Principles of Epidemiology	3
BIOM 531/MECH 531	Materials Engineering	3	ERHS 450	Introduction to Radiation Biology	3
BIOM 533/CIVE 533	Biomolecular Tools for Engineers	3	ERHS 502	Fundamentals of Toxicology	3
BIOM 537/ECE 537	Biomedical Signal Processing	3	ERHS 510/VS 510	Cancer Biology	3
BIOM 559/ECE 559	Machine Learning in Imaging and Spectroscopy	3	ERHS 540	Principles of Ergonomics	3
BIOM 570/MECH 570	Bioengineering	3	FSHN 470	Advanced Human Nutrition and Metabolism	3
BIOM 572/MECH 572	Regenerative Bioengineering with Stem Cells	3	HES 307	Biomechanical Principles of Human Movement	3
BIOM 573/MECH 573	Structure and Function of Biomaterials	3	HES 319	Neuromuscular Aspects of Human Movement	4
BIOM 574/MECH 574	Bio-Inspired Surfaces	3	HES 403	Physiology of Exercise	3
BIOM 576/MECH 576	Quantitative Systems Physiology	4	HES 420	Electrocardiography and Exercise Management	3
BIOM 578/MECH 578	Musculoskeletal Biosolid Mechanics	3	HES 476	Exercise and Chronic Disease	3
BIOM 579/MECH 579	Cardiovascular Biomechanics	3	MATH 455	Mathematics in Biology and Medicine	3
BMS 301	Human Gross Anatomy	5	MECH 543	Biofluid Mechanics	3
BMS 302	Laboratory in Principles of Physiology	2	MIP 300	General Microbiology	3
BMS 310	Anatomy for the Health Professions	4	MIP 302	General Microbiology Laboratory	2
BMS 320	Virtual Laboratory in Physiology	2	MIP 342	Immunology	4
BMS 325	Cellular Neurobiology	3	MIP 343	Immunology Laboratory	2
BMS 345	Functional Neuroanatomy	4	MIP 351	Medical Bacteriology	3
BMS 405	Nerve and Muscle-Toxins, Trauma and Disease	3	MIP 352	Medical Bacteriology Laboratory	3
BMS 409	Human and Animal Reproductive Biology	3	MIP 420	Medical and Molecular Virology	4
BMS 420	Cardiopulmonary Physiology	3	MIP 443	Microbial Physiology	3
BMS 430	Endocrinology	3	MIP 450	Microbial Genetics	3
BMS 450	Pharmacology	3	NB 500/BMS 502	Readings in Cellular Neurobiology	1
BMS 500	Mammalian Physiology I	4	NB 501	Cellular and Molecular Neurophysiology	2
BMS 501	Mammalian Physiology II	4	BME Broad Electives		
BMS 503/NB 503	Developmental Neurobiology	3	Code	Title	Credits
BMS 505/NB 505	Neuronal Circuits, Systems and Behavior	3	AB 410	Understanding Pesticides	3
BZ 310	Cell Biology	4	ART 237	Drawing for Non-Art Majors	3
BZ 311	Developmental Biology	4	ATS 550	Atmospheric Radiation and Remote Sensing	3
BZ 350	Molecular and General Genetics	4	ATS 555	Air Pollution	3
BZ 476/BZ 576	Genetics of Model Organisms	3	ATS 560	Air Pollution Measurement	2
CBE 330	Process Simulation	3	BC 351	Principles of Biochemistry	4
CBE 505	Biochemical Engineering Laboratory	1	BC 401	Comprehensive Biochemistry I	3
CBE 543	Membranes for Biotechnology and Biomedicine	3	BC 403	Comprehensive Biochemistry II	3
CHEM 334	Quantitative Analysis Laboratory	1	BC 404	Comprehensive Biochemistry Laboratory	2
CHEM 335	Introduction to Analytical Chemistry	3	BC 406A	Investigative Biochemistry: Protein Biochemistry	2
CHEM 343	Modern Organic Chemistry II	3	BC 406B	Investigative Biochemistry: Molecular Genetics	2
CHEM 344	Modern Organic Chemistry Laboratory	2	BC 406C	Investigative Biochemistry: Cellular Biochemistry	2
CHEM 346	Organic Chemistry II	4	BC 411	Physical Biochemistry	4
CHEM 433	Clinical Chemistry	3	BC 441	3D Molecular Models for Biochemistry	1
CHEM 539A	Principles of NMR and MRI: Basic NMR Principles	1	BC 463	Molecular Genetics	3
CHEM 539B	Principles of NMR and MRI: NMR Diffusion Measurements-2D NMR and MRI	1	BC 464	Molecular Genetics Recitation	1
CHEM 539C	Principles of NMR and MRI: Advanced NMR and MRI Techniques	1	BC 465	Molecular Regulation of Cell Function	3
ECE 569/MECH 569	Micro-Electro-Mechanical Devices	3	BC 517	Metabolism	2
ENGR 533	Spaceflight and Biological Systems	3	BC 521/CHEM 521	Principles of Chemical Biology	3

BC 563	Molecular Genetics	4	BMS 450	Pharmacology	3
BIOM 304	Global Challenges and Collaborations in BME	3	BMS 460	Essentials of Pathophysiology	3
BIOM 350A	Study Abroad--Ecuador: Prosthetics	1-3	BMS 500	Mammalian Physiology I	4
BIOM 350B	Study Abroad--Portugal: Biomedical Engineering and Healthcare	1	BMS 501	Mammalian Physiology II	4
BIOM 421	Transport Phenomena in Biomedical Engineering	3	BMS 503/NB 503	Developmental Neurobiology	3
BIOM 431/ECE 431	Biomedical Signal and Image Processing	3	BMS 505/NB 505	Neuronal Circuits, Systems and Behavior	3
BIOM 504/CBE 504	Fundamentals of Biochemical Engineering	3	BMS 545	Neuroanatomy	5
BIOM 517/ECE 517	Advanced Optical Imaging	3	BMS 575	Human Anatomy Dissection	4
BIOM 518/ECE 518	Biophotonics	3	BSPM 302	Applied and General Entomology	2
BIOM 522/CBE 522	Bioseparation Processes	3	BSPM 361	Elements of Plant Pathology	3
BIOM 525/MECH 525	Cell and Tissue Engineering	3	BZ 240	Synthetic Biology-Principles and Applications	3
BIOM 526/ECE 526	Biological Physics	3	BZ 310	Cell Biology	4
BIOM 527A/ ECE 527A	Biosensing: Cells as Circuits	1	BZ 311	Developmental Biology	4
BIOM 527B/ ECE 527B	Biosensing: Signal and Noise in Biosensors	1	BZ 348/MATH 348	Theory of Population and Evolutionary Ecology	4
BIOM 527C/ ECE 527C	Biosensing: Sensor Circuit Fundamentals	1	BZ 350	Molecular and General Genetics	4
BIOM 527D/ ECE 527D	Biosensing: Electrochemical Sensors	1	BZ 360	Bioinformatics and Genomics	4
BIOM 527E/ ECE 527E	Biosensing: Affinity Sensors	1	BZ 420	Evolutionary Medicine	3
BIOM 527F/ ECE 527F	Biosensing: Biophotonic Sensors Using Refractive Index	1	BZ 476/BZ 576	Genetics of Model Organisms	3
BIOM 531/MECH 531	Materials Engineering	3	CBE 330	Process Simulation	3
BIOM 532/MECH 532	Materials Issues in Mechanical Design	3	CBE 406	Introduction to Transport Phenomena	3
BIOM 533/CIVE 533	Biomolecular Tools for Engineers	3	CBE 501	Chemical Engineering Thermodynamics	3
BIOM 537/ECE 537	Biomedical Signal Processing	3	CBE 502	Advanced Reactor Design	3
BIOM 559/ECE 559	Machine Learning in Imaging and Spectroscopy	3	CBE 503	Transport Phenomena Fundamentals	3
BIOM 570/MECH 570	Bioengineering	3	CBE 505	Biochemical Engineering Laboratory	1
BIOM 572/MECH 572	Regenerative Bioengineering with Stem Cells	3	CBE 514	Polymer Science and Engineering	3
BIOM 573/MECH 573	Structure and Function of Biomaterials	3	CBE 521	Mathematical Modeling for Chemical Engineers	3
BIOM 574/MECH 574	Bio-Inspired Surfaces	3	CBE 524	Bioremediation	1
BIOM 576/MECH 576	Quantitative Systems Physiology	4	CBE 540/CIVE 540	Advanced Biological Wastewater Processing	3
BIOM 578/MECH 578	Musculoskeletal Biosolid Mechanics	3	CBE 560	Engineering of Protein Expression Systems	3
BIOM 579/MECH 579	Cardiovascular Biomechanics	3	CBE 570	Biomolecular Engineering/Synthetic Biology	3
BMS 301	Human Gross Anatomy	5	CHEM 231	Foundations of Analytical Chemistry	3
BMS 302	Laboratory in Principles of Physiology	2	CHEM 232	Foundations of Analytical Chemistry Lab	2
BMS 305	Domestic Animal Gross Anatomy	4	CHEM 246	Fundamentals of Organic Chemistry Laboratory	1
BMS 310	Anatomy for the Health Professions	4	CHEM 261	Fundamentals of Inorganic Chemistry	3
BMS 320	Virtual Laboratory in Physiology	2	CHEM 263	Foundations of Inorganic Chemistry	4
BMS 325	Cellular Neurobiology	3	CHEM 264	Foundations of Inorganic Chemistry Laboratory	1
BMS 330	Microscopic Anatomy	4	CHEM 311	Introduction to Nanoscale Science	3
BMS 345	Functional Neuroanatomy	4	CHEM 315	Foundations of Polymer Chemistry	3
BMS 405	Nerve and Muscle-Toxins, Trauma and Disease	3	CHEM 320	Chemistry of Additions	3
BMS 409	Human and Animal Reproductive Biology	3	CHEM 333	Forensic Chemistry	3
BMS 420	Cardiopulmonary Physiology	3	CHEM 334	Quantitative Analysis Laboratory	1
BMS 430	Endocrinology	3	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	CIVE 538	Aqueous Chemistry	3
CHEM 431	Instrumental Analysis	4	CIVE 560	Advanced Mechanics of Materials	3
CHEM 433	Clinical Chemistry	3	CIVE 562	Fundamentals of Vibrations	3
CHEM 440	Advanced Organic Chemistry Laboratory	2	CS 152	Python for STEM	2
CHEM 445	Synthetic Organic Chemistry	3	CS 163	CS1—No Prior Programming Experience	4
CHEM 448	Medicinal Chemistry	3	CS 164	CS1—Computational Thinking with Java	4
CHEM 451	Foundations of Catalytic Chemistry	3	CS 165	CS2—Data Structures	4
CHEM 461	Inorganic Chemistry	3	CS 220	Discrete Structures and the Applications	4
CHEM 462	Inorganic Chemistry Laboratory	2	CS 253	Software Development with C++	4
CHEM 465	Chemistry of Sustainable E-Waste Management	1	CS 270	Computer Organization	4
CHEM 522	Methods of Chemical Biology	2	CS 314	Software Engineering	3
CHEM 532	Advanced Chemical Analysis II	3	CS 320	Algorithms—Theory and Practice	3
CHEM 537	Electrochemical Methods	3	CS 356	Systems Security	3
CHEM 539A	Principles of NMR and MRI: Basic NMR Principles	1	CS 370	Operating Systems	3
CHEM 539B	Principles of NMR and MRI: NMR Diffusion Measurements-2D NMR and MRI	1	CS 4** - Any 400-level CS course except CS 495		
CHEM 539C	Principles of NMR and MRI: Advanced NMR and MRI Techniques	1	CS 5** - Any 500-level CS course		
CHEM 541	Organic Molecular Structure Determination	2	DSCI 320/MATH 320	Optimization Methods in Data Science	3
CHEM 543	Structure/Mechanisms in Organic Chemistry	2	DSCI 369	Linear Algebra for Data Science (credit not allowed for both DSCI 369 and MATH 369)	3-4
CHEM 545	Synthetic Organic Chemistry I	3	or MATH 369	Linear Algebra I	
CHEM 547	Physical Organic Chemistry	3	ECE 312	Linear System Analysis II	3
CHEM 555	Chemistry of Sustainability	3	ECE 4** - Any ECE course at the 400-level except ECE 495		
CHEM 560	Foundations of Inorganic Synthesis	1	ECE 5** - Any ECE course at the 500-level		
CHEM 566	Bioinorganic Chemistry	3	ENGR 300	3D Printing Lab for Engineers	1
CHEM 567	Crystallographic Computation	1	ENGR 422	Technology Entrepreneurship	3
CHEM 569	Chemical Crystallography	3	ENGR 478	Applied Engineering Data Analytics	3
CHEM 570	Chemical Bonding	3	ENGR 502	Engineering Project and Program Management	3
CHEM 575	Fundamentals of Chemical Thermodynamics	1	ENGR 510	Engineering Optimization: Method/Application	3
CHEM 576	Statistical Mechanics	2	ENGR 525	Intellectual Property and Invention Systems	3
CHEM 577	Surface Chemistry	3	ENGR 531	Engineering Risk Analysis	3
CHEM 578A	Computational Chemistry: Electronic Structure	1	ENGR 533	Spaceflight and Biological Systems	3
CHEM 579	Chemical Kinetics	3	ENGR 550/MATH 550	Numerical Methods in Science and Engineering	3
CIVE 322	Basic Hydrology	3	ENGR 570	Coupled Electromechanical Systems	3
CIVE 330	Ecological Engineering	3	ERHS 320	Environmental Health—Water Quality	3
CIVE 367	Structural Analysis	3	ERHS 332	Principles of Epidemiology	3
CIVE 371	Study Abroad—Peru: Grand Challenges in Engineering in Peru	3	ERHS 400	Radiation Safety	3
CIVE 401	Hydraulic Engineering	3	ERHS 410	Environmental Health—Air and Waste Management	3
CIVE 423	Groundwater Engineering	3	ERHS 430	Human Disease and the Environment	3
CIVE 438	Fundamentals of Environmental Engr	3	ERHS 446	Environmental Toxicology	3
CIVE 439	Applications of Environmental Engr Concepts	3	ERHS 448	Environmental Contaminants	3
CIVE 440	Nonpoint Source Pollution	3	ERHS 450	Introduction to Radiation Biology	3
CIVE 442	Air Quality Engineering	3	ERHS 502	Fundamentals of Toxicology	3
CIVE 515	River Mechanics	3	ERHS 503	Toxicology Principles	1
CIVE 520	Physical Hydrology	3	ERHS 510/VS 510	Cancer Biology	3
CIVE 524/WR 524	Modeling Watershed Hydrology	3	ERHS 530	Radiological Physics and Dosimetry I	3
CIVE 531	Groundwater Hydrology	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	MATH 229	Matrices and Linear Equations	2
ESS 311	Ecosystem Ecology	3	MATH 235	Introduction to Mathematical Reasoning	2
ESS 312	Sustainability Science	3	MATH 301	Introduction to Combinatorial Theory	3
ESS 330	Quantitative Reasoning for Ecosystem Science	3	MATH 317	Advanced Calculus of One Variable	3
ESS 353	Global Change Impacts, Adaptation, Mitigation	3	MATH 331	Introduction to Mathematical Modeling	3
ESS 440	Practicing Sustainability	4	MATH 332	Partial Differential Equations	3
ESS 501	Principles of Ecosystem Sustainability	3	MATH 360	Mathematics of Information Security	3
ESS 524	Foundations for Carbon/Greenhouse Gas Mgmt	3	MATH 366	Introduction to Abstract Algebra	3
F 311	Forest Ecology	3	MATH 405	Introduction to Number Theory	3
FIN 305	Fundamentals of Finance	3	MATH 417	Advanced Calculus I	3
FSHN 470	Advanced Human Nutrition and Metabolism	3	MATH 418	Advanced Calculus II	3
FTEC 447	Food Chemistry	3	MATH 419	Introduction to Complex Variables	3
GEOL 150	Dynamic Earth (GT-SC2)	4	MATH 430/ECE 430	Fourier and Wavelet Analysis with Apps	3
GEOL 452	Hydrogeology	4	MATH 450	Introduction to Numerical Analysis I	3
GEOL 454	Geomorphology	4	MATH 451	Introduction to Numerical Analysis II	3
GES 362	Systems Thinking and Sustainability	3	MATH 455	Mathematics in Biology and Medicine	3
GES 441	Analysis of Sustainable Energy Solutions	3	MATH 460	Information and Coding Theory	3
GES 450	Global Sustainability and Health	3	MATH 463	Post-Quantum Cryptography	3
GES 465/MSE 465	Sustainable Strategies for E-Waste Management	3	MATH 466	Abstract Algebra I	3
GES 528/CIVE 528	Assessing the Food, Energy, Water Nexus	3	MATH 467	Abstract Algebra II	3
GES 542	Biobased Fuels, Energy, and Chemicals	3	MATH 469	Linear Algebra II	3
GR 305	Geography of Global Health	3	MATH 470	Euclidean and Non-Euclidean Geometry	3
HES 207	Anatomical Kinesiology	4	MATH 474	Introduction to Differential Geometry	3
HES 307	Biomechanical Principles of Human Movement	3	MATH 525	Optimal Control	3
HES 319	Neuromuscular Aspects of Human Movement	4	MATH 530	Mathematics for Scientists and Engineers	3
HES 345	Population Health and Disease Prevention	3	MATH 532	Mathematical Modeling of Large Data Sets	3
HES 403	Physiology of Exercise	3	MATH 535	Foundations of Applied Mathematics	3
HES 420	Electrocardiography and Exercise Management	3	MATH 546	Partial Differential Equations II	3
HES 476	Exercise and Chronic Disease	3	MATH 550/ENGR 550	Numerical Methods in Science and Engineering	3
HORT 579	Mass Spectrometry Omics-Methods and Analysis	3	MATH 560	Linear Algebra	3
IDEA 310B	Design Thinking Toolbox: 3D Modeling	3	MATH 569A/DSCI 569A	Linear Algebra for Data Science: Matrices and Vectors Spaces	1
IDEA 310D	Design Thinking Toolbox: Digital Imaging	1	MATH 569B/DSCI 569B	Linear Algebra for Data Science: Geometric Techniques for Data Reduction	1
IDEA 310H/CS 310H	Design Thinking Toolbox: Mixed Reality Design	3	MATH 569C/DSCI 569C	Linear Algebra for Data Science: Matrix Factorizations and Transformations	1
IDEA 455/MGT 455	Designing for Defense	3	MATH 569D/DSCI 569D	Linear Algebra for Data Science: Theoretical Foundations	1
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)	3	MECH 200	Introduction to Manufacturing Processes	3
LIFE 202B	Introductory Genetics Recitation: Molecular	1	MECH 307	Mechatronics II	3
LIFE 203	Introductory Genetics Laboratory	2	MECH 324	Dynamics of Machines	4
LIFE 210	Introductory Eukaryotic Cell Biology	3	MECH 325	Machine Design with Finite Element Analysis	4
LIFE 211	Introductory Cell Biology Honors Recitation	1	MECH 331	Introduction to Engineering Materials	4
LIFE 212	Introductory Cell Biology Laboratory	2	MECH 4** - Any 400-level MECH course except MECH 495		
LIFE 320	Ecology	3	MECH 5** - Any 500-level MECH course		
LSPA 340	Spanish for Animal Health and Care Fields	3	MGT 305	Fundamentals of Management	3
LSPA 346	Spanish for Health Care	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	PH 561	Elementary Particle Physics	3
MIP 342	Immunology	4	PH 571	Mathematical Methods for Physics I	3
MIP 343	Immunology Laboratory	2	PHIL 322	Biomedical Ethics	3
MIP 351	Medical Bacteriology	3	PHIL 410	Gödel's Incompleteness Theorems	3
MIP 352	Medical Bacteriology Laboratory	3	PSY 253	Human Factors and Engineering Psychology	3
MIP 410	Foundations of Modern Biotechnology	2	SOCR 322	Principles of Microclimatology	3
MIP 420	Medical and Molecular Virology	4	SOCR 330	Principles of Genetics	3
MIP 425	Virology and Cell Culture Laboratory	2	SOCR 375	Soil Biogeochemistry	3
MIP 432/ESS 432	Microbial Ecology	3	SOCR 400	Soils and Global Change-Impacts and Solutions	3
MIP 433/ESS 433	Microbial Ecology Laboratory	1	SOCR 455	Microbiomes of Soil Systems	3
MIP 443	Microbial Physiology	3	SOCR 456	Soil Microbiology Laboratory	1
MIP 450	Microbial Genetics	3	SOCR 467	Soil and Environmental Chemistry	3
MIP 530	Advanced Molecular Virology	4	SOCR 470	Soil Physics	3
MIP 543	RNA Biology	3	SOCR 471	Soil Physics Laboratory	1
MIP 550	Microbial and Molecular Genetics Laboratory	4	SOCR 567	Environmental Soil Chemistry	4
MIP 555	Principles and Mechanisms of Disease	3	SPCM 434	International and Intercultural Communication	3
MKT 305	Fundamentals of Marketing	3	STAR 512	Design and Data Analysis for Researchers II	4
MSE 501	Materials Technology Transfer	1	STAT 158	Introduction to R Programming	1
MSE 502A	Materials Science and Engineering Methods: Materials Structure and Scattering	1	STAT 305	Sampling Techniques	3
MSE 502B	Materials Science and Engineering Methods: Computational Materials Methods	1	STAT 307	Introduction to Biostatistics	3
MSE 502C	Materials Science and Engineering Methods: Materials Microscopy	1	STAT 331	Intermediate Applied Statistical Methods	3
MSE 502D	Materials Science and Engineering Methods: Materials Spectroscopy	1	STAT 341	Statistical Data Analysis I	3
MSE 502E	Materials Science and Engineering Methods: Bulk Properties and Performance	1	STAT 342	Statistical Data Analysis II	3
MSE 502F	Materials Science and Engineering Methods: Experimental Methods for Materials Research	1	STAT 400	Statistical Computing	3
MSE 503	Mechanical Behavior of Materials	3	STAT 420	Probability and Mathematical Statistics I	3
MSE 504	Thermodynamics of Materials	3	STAT 421	Introduction to Stochastic Processes	3
MSE 505	Kinetics of Materials	3	STAT 430	Probability and Mathematical Statistics II	3
NR 319	Introduction to Geospatial Science	4	STAT 460	Applied Multivariate Analysis	3
NR 323/GR 323	Remote Sensing and Image Interpretation	3	SYSE 501	Foundations of Systems Engineering	3
NR 505	Concepts in GIS	4	SYSE 505	Systems Thinking for the Real World	3
PH 314	Introduction to Modern Physics	4	SYSE 530	Overview of Systems Engineering Processes	3
PH 315	Modern Physics Laboratory	2	SYSE 532/ECE 532	Dynamics of Complex Engineering Systems	3
PH 341	Mechanics	4	SYSE 534	Human Systems Integration	3
PH 351	Electricity and Magnetism	4	VS 333	Domestic Animal Anatomy	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			

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 (http://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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)	X	3C	3
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Total Credits			16
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Senior

		Critical	Recommended	AUCC	Credits
Semester 7					
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
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		Critical	Recommended	AUCC	Credits
Semester 8					
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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			X	2	3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3A	3

Total Credits			17
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Fifth Year

		Critical	Recommended	AUCC	Credits
Semester 9					
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
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		Critical	Recommended	AUCC	Credits
Semester 10					
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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		X		1C	3
Arts and Humanities (http://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
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Program Total Credits:			156
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