

Biomedical Engineering Interdisciplinary Minor

All students pursuing the Biomedical Engineering undergraduate minor are required to take introductory courses in Biomedical Engineering, a physiology course, and an upper division biomedical engineering course. Further, students will also complete elective courses in biosciences and engineering applications and will earn a minimum of 21 credits total with a minimum of 12 upper division credits.

	Course Code	Course Title	Credits	Prerequisites	
	<input type="checkbox"/>	BIOM 100	Overview of Biomedical Engineering	1	
Pick 1	<input type="checkbox"/>	BIOM 200	Fundamentals of Biomedical Engineering	2	LIFE 102; MATH 160
	<input type="checkbox"/>	CBE 205	Introduction to Biological Engineering	3	CBE 101; CBE 160; LIFE 102
Pick 1	<input type="checkbox"/>	BMS 300	Principles of Human Physiology	4	BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111
	<input type="checkbox"/>	BMS 301	Human Gross Anatomy	5	BZ 110 or LIFE 102
	<input type="checkbox"/>	BMS 360	Fundamentals of Physiology	4	BZ 110 or LIFE 102; CHEM 245 or CHEM 341 or concurrent registration
Pick 1	<input type="checkbox"/>	BIOM 300	Problem-Based Learning Biomedical Engineering Lab	4	BIOM 101 or BIOM 200 or (BIOM 100; CBE 205; MECH 262); MATH 340 or MATH 345
	<input type="checkbox"/>	BIOM 421	Transport Phenomena in Biomedical Engineering	3	BMS 300; CBE 332 or MECH 344
	<input type="checkbox"/>	BIOM/ECE 431	Biomedical Signal and Image Processing	3	ECE 303; ECE311; PH142 (all with minimum grade of C)
	<input type="checkbox"/>	BIOM 441	Biomechanics and Biomaterials	3	BMS 300 or conc.; CIVE 360; MECH 324 or conc.; MECH 331 or conc.; MECH 342

6 credits (minimum) Bioscience electives: _____ _____

Course options can include: (see reverse for prerequisites not listed above)

BC 351	BIOM 476 A or B ¹	BMS300	BMS 420	CHEM 341 or 345	HES 476	MIP 300
BIOM 300	BIOM 495 ¹	BMS 301	BMS 430	CHEM 344	LIFE 102	OT 215
BIOM 421	BIOM/MECH 525	BMS 325	BUS 205 ²	HES 207	LIFE 103	PHIL 205 ²
BIOM 422	BIOM/CIVE 533	BMS 345	BZ 310	HES 307	LIFE 210	PHIL 305E ²
BIOM/ECE 431	BIOM/MECH 573	BMS 360	CHEM 113	HES 403	MGT 420 ²	PSY 456
BIOM 441	BIOM/MECH 574	BMS 405	CHEM 245	HES 420	MGT 440 ²	PSY 457

5 credits (minimum) Engineering Applications electives: _____ _____

Course options can include: (see reverse for prerequisites not listed above)

BIOM 300	BIOM 441	BIOM/MECH 573	CBE 331	CIVE 261	ECE 341	MECH 331
BIOM 382A	BIOM 476 A or B ¹	BIOM/MECH 574	CBE 332	ECE 202	MATH 340 ¹	MECH 342
BIOM 421	BIOM 495 ¹	CBE 201	CBE 406	ECE 204	MECH 237	PH 245 ¹
BIOM 422	BIOM/MECH 525	CBE 210	CBE 430	ECE/STAT 303 ¹	MECH 262	STAT 315 ¹
BIOM/ECE 431	BIOM/CIVE 533	CBE 320	CIVE 260	ECE 331	MECH 307	

¹ A maximum of 1 course may be selected from non-engineering and independent study/practicum courses; a maximum of 3 credits of BIOM 495 may be counted toward the minor.

² A maximum of 1 course may be selected from non-technical courses

Required Courses Cr:	Bioscience Electives Cr:	Engr. Appl. Electives Cr:	Upper Div. Credits:	Total Credits:
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Name & CSU ID: _____

Date: _____

Course list with prerequisites; please refer to main document to determine how courses count in each category

BC 351	Principles of Biochemistry	4	BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345
BIOM 382A	Study Abroad: Prosthetics in Ecuador	1-2	--
BIOM 422	Kinetics of Biomolecular and Cellular Systems	3	BIOM 421 or CBE 320
BIOM 476A/B ¹	Biomedical Clinical Practicum I or II	2 or 4	BMS 300; BIOM/MECH 470; Dept Approval; Grading: S/U only
BIOM 495 ¹	Independent Study	1-3	Dept approval; Grading: instructor option
BIOM/MECH 525	Cell and Tissue Engineering	3	BC 351 or BMS 300 or BMS 500 or BZ 310 or NB 501 (or instructor permission)
BIOM/CIVE 533	Biomolecular Tools for Engineers	3	BMS 300 or MIP 300
BIOM/MECH 573	Structure and Function of Biomaterials	3	MECH 331
BIOM/MECH 574	Bio-Inspired Surfaces	3	CHEM 111; MECH 342
BMS 325	Cellular Neurobiology	3	BMS 300 or BMS 360
BMS 345	Functional Neuroanatomy	4	BMS 300 or BMS 360
BMS 405	Nerve and Muscle-Toxins, Trauma & Disease	3	BMS 325 or BMS 345
BMS 420	Cardiopulmonary Physiology	3	BMS 300 or BMS 360
BMS 430	Endocrinology	3	BMS 300 or BMS 360
BUS 205 ²	Legal and Ethical Issues in Business	3	--
BZ 310	Cell Biology	4	BZ 110 or BZ 120 or LIFE 103; CHEM 113
CBE 201	Material and Energy Balances	3	CBE 101 or CBE 160 or conc. or MATH 151 or conc.; LIFE 102 or conc.; CHEM 111; PH 141 or conc.
CBE 210	Thermodynamic Process Analysis	3	CBE 201 with a minimum grade of a C; MATH 261 or conc.
CBE 320	Chemical and Biologic Reactor Design	3	CBE 310; CBE 330 (both with a minimum grade of a C)
CBE 331	Momentum Transfer and Mechanical Separations	3	CBE 210 with a minimum grade of a C; MATH 340
CBE 332	Heat and Mass Transfer Fundamentals	3	CBE 330; CBE 331 (both with a minimum grade of a C)
CBE 406	Introduction to Transport Phenomena	3	CBE 332
CBE 430	Process Control and Instrumentation	3	CBE 320; CBE 442 (both with a minimum grade of a C)
CHEM 113	General Chemistry II	3	CHEM 107 or 111 or 117; MATH 124 or MATH 141 or (MATH 155 or 160 or 161 or 229 or 261 or any of those concurrently)
CHEM 245	Fundamentals of Organic Chemistry	4	CHEM 107 or CHEM 113
CHEM 341 - or - CHEM 345	Modern Organic Chemistry I - or - Organic Chemistry I	3 4	CHEM 113 CHEM 113; CHEM 114
CHEM 344	Modern Organic Chemistry Lab	2	CHEM 114; CHEM 343 or conc.
CIVE 260	Engineering Mechanics-Statics	3	MATH 159 or 160; PH 141
CIVE 261	Engineering Mechanics-Dynamics	3	CIVE 260
ECE 202	Circuit Theory Applications	4	ECE 103; MATH 161 (both with a minimum grade of a C)
ECE 204	Introduction to Electrical Engineering	3	MATH 161; PH 142
ECE/STAT 303 ¹	Introduction to Communications Principles	3	MATH 261 with a minimum grade of a C; MATH 340 or 345 or conc.
ECE 331	Electronics Principles I	4	ECE 341 or 451 or conc.; ECE 202; MATH 340 or 345; PH 142 (last three with a minimum grade of a C)
ECE 341	Electromagnetic Fields and Devices I	3	ECE 311 and 331 or conc.; ECE 202; MATH 340 or 345; PH 142 (last three with a minimum grade of a C)
HES 207	Anatomical Kinesiology	3	MATH 125 or conc.
HES 307	Biomechanical Principles of Human Movement	3	HES 207 or BMS 301; PH 121 or PH 141
HES 403	Physiology of Exercise	4	BMS 300 or BMS 360; LIFE 102
HES 420	Electrocardiography and Exercise Management	3	BMS 300
HES 476	Exercise and Chronic Disease	3	BC 351; FSHN 350; HES 403
LIFE 102	Attributes of Living Systems	4	--
LIFE 103	Biology of Organisms-Animals and Plants	4	LIFE 102
LIFE 210	Introductory Eukaryotic Cell Biology	3	LIFE 102; CHEM 111; CHEM 112
MATH 340 ¹	Introduction to Ordinary Differential Equations	4	MATH 255 or MATH 261
MECH 237	Introduction to Thermal Sciences	3	MATH 160; PH 141
MECH 262	Engineering Mechanics	4	MATH 161; PH 141
MECH 307	Mechatronics and Measurement Systems	4	CIVE 261; ECE 204 ; MATH 340; MECH 231
MECH 331	Introduction to Engineering Materials	4	CHEM 111; CHEM 112; MECH 231
MECH 342	Mechanics and Thermodynamics of Flow Processes	3	MATH 340; MECH 337 or conc.; PH 141
MGT 420 ¹	New Venture Creation	3	MGT 340
MGT 440 ¹	New Venture Management	3	Instructor Approval
MIP 300	General Microbiology	3	BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345 or any of those conc.
OT 215	Medical Terminology	1	--
PH 245 ¹	Introduction to Electronics	3	MATH 161; PH 142
PHIL 205 ¹	Introduction to Ethics	3	Sophomore standing or higher
PHIL 305E ¹	Philosophical Issues in Professions-Animal Science	3	--
PSY 456	Sensation and Perception	3	PSY 252
PSY 457	Sensation and Perception Laboratory	2	PSY 250; PSY 456 or conc.
STAT 315 ¹	Statistics for Engineers or Scientists	3	MATH 155 or 159 or 160