DUAL DEGREE PROGRAM: BIOMEDICAL ENGINEERING COMBINED WITH CHEMICAL AND BIOLOGICAL ENGINEERING

TO DECLARE MAJOR: Engineering is a controlled major: students are admitted into the major only if they meet established academic standards. Please see competitive major requirements or the advisor in the Department for more information.

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 chemical and biological engineering program 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.

Major Completion Map

Distinctive Requirements for Degree Program:

Freshman					
Semester 1		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 100	Overview of Biomedical Engineering	X			1
CHEM 111	General Chemistry I (GT-SC2)	X		3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	X		3A	1
LIFE 102	Attributes of Living Systems (GT-SC1)	X		3A	4
MATH 160	Calculus for Physical Scientists I (GT-MA1)	X		1B	4
	Total Credits				**14**
Semester 2		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 160	MATLAB for Chemical and Biological Eng	X			1
CHEM 113	General Chemistry II	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
Select one group from the following:					3
Group A:					
CBE 101	Introduction to Chemical and Biological Engr				
Group B:					
CBE 101A	Introduction to Chemical and Biological Engr: Lecture				
CBE 101B	Introduction to Chemical and Biological Engr: Laboratory				
Group C:					
CBE 104A	Study Abroad--Denmark: Intro to Chemical and Biological Engineering				
	Total Credits				**16**
Sophomore					
Semester 3		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 201	Material and Energy Balances	X			3
CBE 205	Fundamentals of Biological Engineering	X			3
CHEM 114	General Chemistry Lab II	X			1
CHEM 341	Modern Organic Chemistry I	X			3
CO 150	College Composition (GT-CO2)		X	1A	3
MATH 261	Calculus for Physical Scientists III	X			4
	Total Credits				**17**
Semester 4		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 210	Thermodynamic Process Analysis	X			3
CHEM 343	Modern Organic Chemistry II	X			3
CHEM 344	Modern Organic Chemistry Laboratory	X			2
MATH 340	Intro to Ordinary Differential Equations	X			4

MECH 262	Engineering Mechanics		X		4
	Total Credits				**16**
Junior					
Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
BMS 300	Principles of Human Physiology	X			4
CBE 310	Molecular Concepts and Applications	X			3
CBE 330	Process Simulation	X			3
CBE 331	Momentum Transfer and Mechanical Separations	X			3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3
	Total Credits				**16**
Semester 6		**Critical**	**Recommended**	**AUCC**	**Credits**
BC 351	Principles of Biochemistry		X		4
BIOM 300	Problem-Based Learning Biomedical Engr Lab	X			4
CBE 320	Chemical and Biological Reactor Design	X			3
CBE 332	Heat and Mass Transfer Fundamentals	X			3
CBE 393	Professional Development Seminar	X			1
	Total Credits				**15**
Senior					
Semester 7		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 421	Transport Phenomena in Biomedical Engineering	X			3
CBE 333	Chemical and Biological Engineering Lab I	X			2
CBE 442	Separation Processes	X			4
CBE 451	Chemical and Biological Engineering Design I	X			3
STAT 315	Intro to Theory and Practice of Statistics	X			3
BME Broad Elective (see list below)					3
	Total Credits				**18**
Semester 8		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 422	Quantitative Systems and Synthetic Biology	X			3
CBE 430	Process Control and Instrumentation				3
CBE 443	Chemical and Biological Engineering Lab II	X			2
PH 142	Physics for Scientists and Engineers II (GT-SC1)		X	3A	5
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)				3B	3
	Total Credits				**16**
Fifth Year					
Semester 9		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 486A	Biomedical Design Practicum: Capstone Design I	X		4A,4B,4C	4
BME Technical Elective (See List on Requirements Tab)			X		3
CBE Technical Elective (See List on Requirements Tab)			X		2
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)				1C	3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)				2	3
	Total Credits				**15**
Semester 10		**Critical**	**Recommended**	**AUCC**	**Credits**
BIOM 486B	Biomedical Design Practicum: Capstone Design II	X		4A,4B,4C	4
BME Technical Elective (See List on Requirements Tab)		X			2
CBE Technical Elective (See List on Requirements Tab)		X			3
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)				3B	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)				3D	3

The benchmark courses for the 10th semester are the remaining courses in the entire program of study	X	
Total Credits		**15**
Program Total Credits:		**158**