MAJOR IN CHEMICAL AND BIOLOGICAL ENGINEERING, MOLECULAR MEDICINE CONCENTRATION

Distinctive Requirements for Degree Program:

TO PREPARE FOR FIRST SEMESTER: The curriculum for this major assumes students enter college prepared to take calculus.

Major Completion Map

Students may enroll in either the standalone major or (at most) one of the concentrations under the Major in Chemical and Biological Engineering.

Freshman					
Semester 1		**Critical**	**Recommended**	**AUCC**	**Credits**
CHEM 120	Foundations of Modern Chemistry (GT-SC2)	X		3A	4
CHEM 121	Foundations of Modern Chemistry Laboratory (GT-SC1)	X		3A	1
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
	Total Credits				**15**
Semester 2		**Critical**	**Recommended**	**AUCC**	**Credits**
ENGR 114	Engineering for Grand Challenges	X			3
LIFE 102	Attributes of Living Systems (GT-SC1)	X		3A	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	X		1B	4
1C (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)			X	1C	3
	Total Credits				**14**
Sophomore					
Semester 3		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 201	Material and Energy Balances	X			3
CBE 205	Fundamentals of Biological Engineering	X			3
MATH 261	Calculus for Physical Scientists III	X			4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	X		3A	5
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3
	Total Credits				**18**
Semester 4		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 210	Thermodynamic Process Analysis	X			3
CBE 223	CBE Design and Experimentation I	X			2
CBE 393	Professional Development Seminar		X		1
CHEM 241	Foundations of Organic Chemistry	X			4
CHEM 242	Foundations of Organic Chemistry Laboratory	X			1
MATH 340	Intro to Ordinary Differential Equations	X			4
	Total Credits				**15**
Junior					
Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
BC 351 or CHEM 321	Principles of Biochemistry Foundations of Chemical Biology	X			4
CBE 320	Chemical and Biological Reactor Design				3
CBE 330	Process Simulation	X			3
CBE 331	Momentum Transfer and Mechanical Separations	X			3
CBE 334	CBE Design and Experimentation II	X			1

Chemistry Elective			X		3
	Total Credits				**17**
Senior					
Semester 6		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 332	Heat and Mass Transfer Fundamentals	X			3
CBE 335	CBE Design and Experimentation III	X			1
CBE 340	Statistics for CBE Applications	X			3
Bioscience Elective			X		3
Chemistry Elective			X		3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			X	3D	3
	Total Credits				**16**
Semester 7		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 442	Separation Processes	X			4
CBE 443	Chemical and Biological Engineering Lab II	X			2
CBE 451	Chemical and Biological Engineering Design I	X		4A,4B,4C	3
Technical Elective			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	3B	3
	Total Credits				**18**
Semester 8		**Critical**	**Recommended**	**AUCC**	**Credits**
CBE 430	Process Control and Instrumentation	X			3
CBE 452	Chemical and Biological Engineering Design II	X		4A,4B,4C	3
Technical Elective		X			6
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		X		3C	3
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.		X			
	Total Credits				**15**
	Program Total Credits:				**128**