

# MAJOR IN BIOMEDICAL SCIENCES, MICROBIOLOGY AND INFECTIOUS DISEASE CONCENTRATION

## Requirements Effective Fall 2024

### Freshman

		AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	3A	1
CHEM 113	General Chemistry II		3
CHEM 114	General Chemistry Lab II		1
CO 150	College Composition (GT-CO2)	1A	3
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	4
MIP 250	Eukaryotic Microbiology		3
MIP 260	The World of Parasites		3
VMBS 100	Introduction to Biomedical Sciences Major		2
Select a minimum of 3 credits from the following:		1B	3-4
MATH 118	College Algebra in Context II (GT-MA1)	1B	
MATH 124	Logarithmic and Exponential Functions (GT-MA1)	1B	
MATH 125	Numerical Trigonometry (GT-MA1)	1B	
MATH 126	Analytic Trigonometry (GT-MA1)	1B	
MATH 155	Calculus for Biological Scientists I (GT-MA1)	1B	
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	
Elective			3

### Total Credits

30-31

### Sophomore

BC 351	Principles of Biochemistry		4
MIP 300	General Microbiology		3
MIP 302	General Microbiology Laboratory		2
MIP 342	Immunology		4
Select one group from the following:			8
Group A			
CHEM 245	Fundamentals of Organic Chemistry		
CHEM 246	Fundamentals of Organic Chemistry Laboratory		
Concentration Elective (see list below)			
Group B			
CHEM 341	Modern Organic Chemistry I		
CHEM 343 <sup>1</sup>	Modern Organic Chemistry II		
CHEM 344	Modern Organic Chemistry Laboratory		
Historical Perspectives ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives</a> )		3D	3
Social and Behavioral Sciences ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences</a> )		3C	3

Elective			3
	<b>Total Credits</b>		<b>30</b>
<b>Junior</b>			
Select one course from the following:			5
PH 121	General Physics I (GT-SC1)	3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	
Select one course from the following:			3-4
MIP 443	Microbial Physiology		
MIP 450	Microbial Genetics		
Select one course from the following:			4
BMS 300	Principles of Human Physiology		
BMS 360	Fundamentals of Physiology		
Concentration Electives (See list below)			8
Advanced Writing ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing</a> )		2	3
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )		3B	3
Diversity, Equity, and Inclusion ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion</a> )		1C	3
	<b>Total Credits</b>		<b>29-30</b>
<b>Senior</b>			
MIP 351	Medical Bacteriology	4B	3
MIP 420	Medical and Molecular Virology	4A	4
Select one course from the following:			2-3
MIP 400A	Capstone in Microbiology: Medical Microbiology	4C	
MIP 400B	Capstone in Microbiology: Biotechnology	4C	
MIP 400C	Capstone in Microbiology: Immunology	4C	
MIP 400D	Capstone in Microbiology: Microbial Diversity/Ecology	4C	
MIP 400E	Capstone in Microbiology: Microbial Genetics	4C	
MIP 400F	Capstone in Microbiology: Virology	4C	
MIP 400G	Capstone in Microbiology: Service Learning	4C	
MIP 400H	Capstone in Microbiology: Prion Biology	4C	
MIP 400I	Capstone in Microbiology: Mycobacterial Biology	4C	
MIP 400J	Capstone in Microbiology: Big Data Sets in Microbiology	4C	
MIP 400K	Capstone in Microbiology: Parasitology	4C	
MIP 400L	Capstone in Microbiology: Microbiome Biology	4C	
MIP 400M	Capstone in Microbiology: Vector Biology	4C	
MIP 400N	Capstone in Microbiology: Environmental Sustainability Health Science	4C	
MIP 400O	Capstone in Microbiology: Pathology of Infectious Disease	4C	
MIP 400P	Capstone in Microbiology: Veterinary Microbiology	4C	
MIP 400Q	Capstone in Microbiology: One Health	4C	
MIP 400R	Capstone in Microbiology: Food Microbiology	4C	
MIP 400S	Capstone in Microbiology: Biofilm Biology	4C	
MIP 498	Research	4C	
Select one course from the following:			3
STAT 301	Introduction to Applied Statistical Methods		
STAT 307	Introduction to Biostatistics		
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )		3B	3
Concentration Electives (See list below)			7

Electives<sup>2</sup>

6-9

Total Credits

29-31

Program Total Credits:

120

## Concentration Electives

Code	Title	Credits
<b>Select a minimum of 18 credits from the following not taken elsewhere in the program. CHEM 343 may count as a Concentration Elective for students who select organic chemistry Group B in the Sophomore year.</b>		
A minimum of two laboratory courses MUST be selected from the following:		
MIP 150	Introduction to Research Methods	
MIP 335	Food Microbiology Laboratory	
MIP 343	Immunology Laboratory	
MIP 352	Medical Bacteriology Laboratory	
MIP 401	Laboratory Research Methods in Microbiology	
MIP 425	Virology and Cell Culture Laboratory	
MIP 433/ESS 433	Microbial Ecology Laboratory	
MIP 462/ BSPM 462/BZ 462	Parasitology and Vector Biology	
MIP 550	Microbial and Molecular Genetics Laboratory	
Two unique courses (for a maximum of 6 credits) may be selected from the following:		
MIP 298	Introductory Research	
MIP 384	Supervised College Teaching	
MIP 495	Independent Study	
MIP 498	Research	
ANEQ 460	Meat Safety	2
BC 404	Comprehensive Biochemistry Laboratory	2
BC 463	Molecular Genetics	3
BMS 301	Human Gross Anatomy	5
BMS 302	Laboratory in Principles of Physiology	2
BMS 305	Domestic Animal Gross Anatomy	4
BMS 325	Cellular Neurobiology	3
BMS 330	Microscopic Anatomy	4
BMS 345	Functional Neuroanatomy	4
BMS 401	Laboratory Research in Biomedical Sciences	4
BMS 420	Cardiopulmonary Physiology	3
BMS 450	Pharmacology	3
BMS 460	Essentials of Pathophysiology	3
BSPM 302	Applied and General Entomology	2
BSPM 361	Elements of Plant Pathology	3
BZ 220	Introduction to Evolution	3
BZ 310	Cell Biology	4
BZ 333	Introductory Mycology	4
BZ 350	Molecular and General Genetics	4
BZ 360	Bioinformatics and Genomics	4
BZ 418	Ecology of Infectious Diseases	4
CHEM 334	Quantitative Analysis Laboratory	1
CHEM 335	Introduction to Analytical Chemistry	3
CHEM 343	Modern Organic Chemistry II <sup>1</sup>	3
ERHS 220	Environmental Health	3
ERHS 320	Environmental Health–Water Quality	3
ERHS 332	Principles of Epidemiology	3
ERHS 340	Cancer Biology, Medicine, and Society	2
ERHS 350	Principles of Occupational Safety and Health	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 502	Fundamentals of Toxicology	3
ERHS 567	Cell and Molecular Toxicology Techniques	3
FTEC 360	Brewing Processes	4
FTEC 460	Brewing Science II	5
FTEC 574	Current Issues in Food Safety	2
LIFE 103	Biology of Organisms–Animals and Plants (GT-SC1)	4
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)	3
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
MATH 155	Calculus for Biological Scientists I (GT-MA1)	4
MATH 160	Calculus for Physical Scientists I (GT-MA1)	4
MIP 303	General Microbiology–Honors Recitation	1
MIP 315	Pathology of Human and Animal Disease	3
MIP 334	Food Microbiology	3
MIP 400A	Capstone in Microbiology: Medical Microbiology	2
MIP 400B	Capstone in Microbiology: Biotechnology	2
MIP 400C	Capstone in Microbiology: Immunology	2
MIP 400D	Capstone in Microbiology: Microbial Diversity/Ecology	2
MIP 400E	Capstone in Microbiology: Microbial Genetics	2
MIP 400F	Capstone in Microbiology: Virology	2
MIP 400G	Capstone in Microbiology: Service Learning	2
MIP 400H	Capstone in Microbiology: Prion Biology	2
MIP 400I	Capstone in Microbiology: Mycobacterial Biology	2
MIP 400J	Capstone in Microbiology: Big Data Sets in Microbiology	2
MIP 400K	Capstone in Microbiology: Parasitology	2

MIP 400L	Capstone in Microbiology: Microbiome Biology	2
MIP 400M	Capstone in Microbiology: Vector Biology	2
MIP 400N	Capstone in Microbiology: Environmental Sustainability & Health Science	2
MIP 400O	Capstone in Microbiology: Pathology of Infectious Disease	2
MIP 400P	Capstone in Microbiology: Veterinary Microbiology	2
MIP 400Q	Capstone in Microbiology: One Health	2
MIP 400R	Capstone in Microbiology: Food Microbiology	2
MIP 400S	Capstone in Microbiology: Biofilm Biology	2
MIP 410	Foundations of Modern Biotechnology	2
MIP 432/ESS 432	Microbial Ecology	3
MIP 443	Microbial Physiology	4
MIP 450	Microbial Genetics	3
MIP 496	Group Study	1-3
MIP 530	Advanced Molecular Virology	4
MIP 540	Fundamentals of Biosafety and Biosecurity	2
MIP 555	Principles and Mechanisms of Disease	3
MIP 563	Biology of Disease Vectors	3
MIP 570	Functional Genomics	3
OT 215	Medical Terminology	1
PH 122	General Physics II (GT-SC1)	5
SOCR 330	Principles of Genetics	3
SOCR 455	Microbiomes of Soil Systems	3
SOCR 456	Soil Microbiology Laboratory	1
VS 331	Histology	4
VS 333	Domestic Animal Anatomy	4

<sup>1</sup> CHEM 343 may count as a Concentration Elective for students who select organic chemistry Group B in the Sophomore year.

<sup>2</sup> Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- to 400-level).