

# MAJOR IN BIOMEDICAL SCIENCES, MICROBIOLOGY AND INFECTIOUS DISEASE CONCENTRATION

## Requirements Effective Summer 2020

### 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 and Global Awareness ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-global-awareness">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-global-awareness</a> )		3E	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 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 305	Domestic Animal Gross Anatomy	4
BMS 325	Cellular Neurobiology	3
BMS 401	Laboratory Research in Biomedical Sciences	4
BMS 450	Pharmacology	3
BSPM 302	Applied and General Entomology	2
BZ 220	Introduction to Evolution	3
BZ 310	Cell Biology	4
BZ 333	Introductory Mycology	4
BZ 346	Population and Evolutionary Genetics	3
BZ 350	Molecular and General Genetics	4
BZ 360	Bioinformatics and Genomics	3
BZ 418	Ecology of Infectious Diseases	4
BZ 577/MIP 577	Computer Analysis in Population Genetics	2
BZ 578/MIP 578	Genetics of Natural Populations	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 210		2
ERHS 320	Environmental Health–Water Quality	3
ERHS 332	Principles of Epidemiology	3
ERHS 430	Human Disease and the Environment	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	4
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 192	Microbiology First-Year Seminar	2
MIP 275	Microcomputing Applications in Microbiology	2
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 401	Laboratory Research Methods in Microbiology	4
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	Biosafety in Research Laboratories	2
MIP 555	Principles and Mechanisms of Disease	3
MIP 563	Biology of Disease Vectors	3
MIP 570	Functional Genomics	3
PH 122	General Physics II (GT-SC1)	5
SOCR 330	Principles of Genetics	3
SOCR 455	Soil Microbiology	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).