

MAJOR IN BIOMEDICAL SCIENCES, ANATOMY AND PHYSIOLOGY CONCENTRATION

This program prepares students for a wide variety of opportunities which have a basis in cellular and molecular biology, human/animal anatomy and physiology. In addition to enrolling in required courses, students will have opportunities to engage in elective courses and laboratory research in specialty areas of endocrinology, pharmacology, pathophysiology, neurophysiology, reproductive physiology, and cardiopulmonary physiology. In this process, students are able to tailor their educational experiences to specific career objectives. The curriculum will prepare graduates to pursue further studies in professional schools for medicine,

veterinary medicine, pharmacy, dentistry, and optometry, as well as other programs such as nursing, physician assistant and physical therapy. The Anatomy and Physiology concentration will also prepare students for graduate studies in animal and human health sciences as well as for employment in a variety of innovative and developing fields in biotechnology.

The basic science curriculum meets many requirements for entrance into professional schools. Experiential learning opportunities are encouraged and could include participating in laboratory research, teaching/tutoring in selected courses, volunteer experiences and leadership positions within student club(s), study abroad, internships, and honors curriculum. These opportunities are encouraged with the student's interests and career goals as the focus.

Requirements Effective Fall 2023

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
VMBS 100	Introduction to Biomedical Sciences Major		2
Select one from the following:			3
BMS 260 ¹	Biomedical Sciences Concentration Elective (See list below) ¹		4
Select one course from the following:			4
MATH 155	Calculus for Biological Scientists I (GT-MA1)	1B	
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		1C	3
Total Credits			31

Sophomore

Select one course from the following:			4
BMS 300	Principles of Human Physiology		
BMS 360	Fundamentals of Physiology		
BMS 302	Laboratory in Principles of Physiology		2
LIFE 210	Introductory Eukaryotic Cell Biology		3
LIFE 212	Introductory Cell Biology Laboratory		2
Select one course from the following:			3-4
BZ 350	Molecular and General Genetics		
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)	3A	
SOCR 330	Principles of Genetics		
Select one group from the following:			8
Group A			
CHEM 245	Fundamentals of Organic Chemistry		
CHEM 246	Fundamentals of Organic Chemistry Laboratory		

2 Major in Biomedical Sciences, Anatomy and Physiology Concentration

Concentration Elective (see list below)

Group B

CHEM 341	Modern Organic Chemistry I		
CHEM 343 ¹	Modern Organic Chemistry II		
CHEM 344	Modern Organic Chemistry Laboratory		

Select one course from the following: 3

STAT 301	Introduction to Applied Statistical Methods		
STAT 307	Introduction to Biostatistics		

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

Total Credits 31-32

Junior

BC 351 Principles of Biochemistry 4

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: 4-5

BMS 301	Human Gross Anatomy		
BMS 305	Domestic Animal Gross Anatomy		
BMS 330	Microscopic Anatomy		

Concentration Electives (See list below)¹ 7

Electives 3

Advanced Writing (<http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing>) 2 3

Social and Behavioral Sciences (<http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences>) 3C 3

Total Credits 29-30

Senior

MIP 300 General Microbiology 3

MIP 302 General Microbiology Laboratory 2

Select one group from the following: 5

Group A:

BMS 345	Functional Neuroanatomy	4B	
BMS 400	Neuroanatomy Through Clinical Case Studies	4A,4C	

Group B:

BMS 420	Cardiopulmonary Physiology	4B	
BMS 421	Perspectives in Cardiopulmonary Diseases	4A,4C	

Group C:

BMS 460	Essentials of Pathophysiology	4B	
BMS 461	Pathophysiology Perspectives	4A,4C	

Concentration Electives (See list below)¹ 6

Electives² 11-13

Total Credits 27-29

Program Total Credits: 120

Concentration Electives – Select a minimum of 19 total credits

- BMS 260 may count as a Concentration Elective. Freshmen must take BMS 260.

- BMS 330 may count as a Concentration Elective if either BMS 301 or BMS 305 were taken to satisfy the anatomy requirement in the Junior year.

- BMS 345, BMS 420, and BMS 460 may count as Concentration Electives if not taken to satisfy All-University Core Curriculum (AUCC) Category 4 in the major.
- BMS 384 may be taken for a maximum of 3 credits.
- A maximum total of 3 credits earned in BMS 487, BMS 495, and BMS 498 may count toward the Concentration Electives. Additional credits earned in these courses will count as free elective credits.
- Only one of the following courses may count as a Concentration Elective: BMS 496A, BMS 496B, BMS 496C, BMS 496D. Additional credits earned in these courses will count as free elective credits.
- CHEM 343 may count as a Concentration Elective for students who select organic chemistry Group B in the Sophomore year.

Code	Title	Credits
BC 463	Molecular Genetics	3
BC 465	Molecular Regulation of Cell Function	3
BMS 192	First Year Seminar in Biomedical Sciences	1
BMS 260	Biomedical Sciences ¹	3
BMS 325	Cellular Neurobiology	3
BMS 330	Microscopic Anatomy ¹	4
BMS 345	Functional Neuroanatomy ¹	4
BMS 384	Supervised College Teaching ¹	1-3
BMS 401	Laboratory Research in Biomedical Sciences	4
BMS 405	Nerve and Muscle-Toxins, Trauma and Disease	3
BMS 409	Human and Animal Reproductive Biology	3
BMS 420	Cardiopulmonary Physiology ¹	3
BMS 425	Introduction to Systems Neurobiology	3
BMS 430	Endocrinology	3
BMS 450	Pharmacology	3
BMS 460	Essentials of Pathophysiology ¹	3

A maximum of 3 credits may be selected from the following:

BMS 487	Internship ¹
BMS 495	Independent Study ¹
BMS 498	Research ¹

A maximum of one course may be selected from the following:

Freshman

Semester 1

Students will be required to take either MATH 155 or MATH 160 in Freshman semester 2. Students who intend to take MATH 160 will need to take MATH 126 in addition to MATH 124 and MATH 125

	Critical	Recommended	AUCC	Credits
CHEM 111	General Chemistry I (GT-SC2)	X	3A	4
CHEM 112	General Chemistry Lab I (GT-SC1)	X	3A	1
CO 150	College Composition (GT-CO2)	X	1A	3
LIFE 102	Attributes of Living Systems (GT-SC1)	X	3A	4
VMBS 100	Introduction to Biomedical Sciences Major			2

MATH 124, MATH 125, and MATH 126 must be completed by the end of Semester 1, if necessary.

Total Credits					14
Semester 2		Critical	Recommended	AUCC	Credits
CHEM 113	General Chemistry II	X			3
CHEM 114	General Chemistry Lab II	X			1

BMS 496A	Honors: Human Gross Anatomy ¹	
BMS 496B	Honors: Physiology Lab ¹	
BMS 496C	Honors: Physiology Case Studies ¹	
BMS 496D	Honors: Animal Gross Anatomy ¹	
BMS 500	Mammalian Physiology I	4
BMS 501	Mammalian Physiology II	4
BMS 521	Comparative Reproductive Physiology	3
BMS 531	Domestic Animal Dissection	3
BMS 575	Human Anatomy Dissection	4
BZ 220	Introduction to Evolution	3
CHEM 343	Modern Organic Chemistry II ¹	3
MIP 342	Immunology	4
MIP 351	Medical Bacteriology	3
PH 122	General Physics II (GT-SC1)	5

¹ See Concentration Elective notes directly above the course list.

² Select enough free electives at student's discretion to complete degree program of 120 credits. Enough upper division (300- and 400-level) credits must be taken to bring total number of upper division credits to 42.

Major Completion Map

Distinctive Requirements for Degree Program:

To Declare Major: competitive entry controls required and capped enrollment in place. Please contact Director of Student Success in the CVMBS Student Success Center for more information.

To Prepare for First Semester: The curriculum for the anatomy and physiology concentration assumes students enter college prepared to take calculus. Entering students who are not prepared to take calculus will need to fulfill pre-calculus requirements in the first semester.

Those pre-calculus requirements are listed as benchmark courses in Freshman Semester 1 below. LIFE 102 requires high school chemistry as a prerequisite; CHEM 111 requires Algebra II as a prerequisite (this prerequisite is met by having Algebra II by test credit, transfer credit, or placement out of MATH 117 and MATH 118 on Math Placement Exam).

Select one course from the following:					4
MATH 155	Calculus for Biological Scientists I (GT-MA1)		1B		
MATH 160	Calculus for Physical Scientists I (GT-MA1)		1B		
Select one course from the following:					3
BMS 260	Biomedical Sciences	X			
Concentration Elective (see list on Requirements Tab):					
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			3B		3
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)			1C		3
Total Credits					17
Sophomore					
Semester 3					
		Critical	Recommended	AUCC	Credits
LIFE 210	Introductory Eukaryotic Cell Biology	X			3
LIFE 212	Introductory Cell Biology Laboratory				2
Select one group from the following:					3-5
Group A					
CHEM 245	Fundamentals of Organic Chemistry				
CHEM 246	Fundamentals of Organic Chemistry Laboratory				
Group B					
CHEM 341	Modern Organic Chemistry I				
Select one course from the following:					3
STAT 301	Introduction to Applied Statistical Methods				
STAT 307	Introduction to Biostatistics				
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			3B		3
Total Credits					14-16
Semester 4					
		Critical	Recommended	AUCC	Credits
Select one course from the following:					4
BMS 300	Principles of Human Physiology	X			
BMS 360	Fundamentals of Physiology				
BMS 302	Laboratory in Principles of Physiology				2
Select the same group (A or B) as selected in semester 3:					3-5
Group A					
Concentration Elective (see list below)					
Group B					
CHEM 343	Modern Organic Chemistry II				
CHEM 344	Modern Organic Chemistry Laboratory				
Select one course from the following:					3-4
BZ 350	Molecular and General Genetics				
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)			3A	
SOCR 330	Principles of Genetics				
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)			3D		3
CHEM 341 must be completed by the end of Semester 4.					
					X
Total Credits					15-18
Junior					
Semester 5					
		Critical	Recommended	AUCC	Credits
BC 351	Principles of Biochemistry				4
Select one course from the following:					5
PH 121	General Physics I (GT-SC1)	X		3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)			3A	

Concentration Electives (See list on Requirements Tab):				3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)			2	3

Total Credits				15	
Semester 6		Critical	Recommended	AUCC	Credits
Select one course from the following:					4-5
BMS 301	Human Gross Anatomy				
BMS 305	Domestic Animal Gross Anatomy				
BMS 330	Microscopic Anatomy				
Concentration Electives (See list on Requirements Tab):					4
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)					3
Electives					3

Total Credits				14-15	
Senior					
Semester 7		Critical	Recommended	AUCC	Credits
Select one group from the following:					5
Group A:					
BMS 345	Functional Neuroanatomy			4B	
BMS 400	Neuroanatomy Through Clinical Case Studies			4A,4C	
Group B:					
BMS 420	Cardiopulmonary Physiology			4B	
BMS 421	Perspectives in Cardiopulmonary Diseases			4A,4C	
Group C:					
BMS 460	Essentials of Pathophysiology			4B	
BMS 461	Pathophysiology Perspectives			4A,4C	
Concentration Electives (See list on Requirements Tab):					3
Electives					7

Total Credits				15	
Semester 8		Critical	Recommended	AUCC	Credits
MIP 300	General Microbiology	X			3
MIP 302	General Microbiology Laboratory	X			2
Concentration Electives (See list on Requirements Tab):					3
Electives					4-6
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.					

Total Credits				12-14
Program Total Credits:				120