

# B.S. in Biotechnology, Animal Systems Option

## Program Learning Outcomes

- Students completing this program will: Learning Objective 1: Define, describe and use the fundamental terms and concepts of modern animal biotechnology as evidenced by the ability to present, discuss and answer questions about a scientific article in the field of biotechnology.
- Learning Objective 2: Design an experiment to test a hypothesis or fundamental concept in animal biotechnology
- Learning Objective 3: Perform basic animal biotechnology lab techniques
- Learning Objective 4: Access and analyze bioinformatics data
- Learning Objective 5: Verbally communicate about fundamental and modern animal biotechnology concepts.
- Learning Objective 6: Communicate in a written form about fundamental and modern animal biotechnology concepts

Freshman Year	Credits	
	Fall	Spring
WRIT 101W - College Writing I	3	
BIOB 105CS - Introduction to Biotechnology	3	
BIOB 170IN - Principles of Biological Diversity	4	
CHMY 141 - College Chemistry I & CHMY 142 - College Chemistry I Lab or CHMY 151 and CHMY 152	4	
Select one of the following:	3	
BIOB 318 - Biometry*		
STAT 216Q - Introduction to Statistics*		
M 165Q - Calculus for Technology I*		
BIOB 160 - Principles of Living Systems or BIOB 260 - Cellular and Molecular Biology		4
CHMY 143 - College Chemistry II & CHMY 144 - College Chemistry II Lab or CHMY 153 and CHMY 154		4
Select one of the following:		3
M 161Q - Survey of Calculus*		
M 166 - Calculus for Technology II*		
University Core and Electives		3
Year Total:	17	14

Sophomore Year	Credits	
	Fall	Spring
BIOB 375 - General Genetics	3	
CHMY 321 - Organic Chemistry I & CHMY 322 - Organic Chemistry I Lab or CHMY 211 and CHMY 212	4-5	
BIOM 360 - General Microbiology	5	
University Core and Electives	3	
CHMY 323 - Organic Chemistry II & CHMY 324 - Organic Chemistry II Lab**		4
ECNS 101IS - Economic Way of Thinking		3
University Core and Electives**		7-11
Year Total:	15-16	14-18

Junior Year	Credits	
	Fall	Spring
BCH 380 - Biochemistry & BCH 381 - Biochemistry Lab	5	
BIOM 457R - Research Methods in Immunology	4	
University Core and Electives	6	
BIOM 400 - Medical Microbiology		3
BIOM 455R - Research Mthds in Microbiology		4
Select one of the following:		
ANSC 265 - Anatomy and Physiology of Domestic Animals - Lecture & ANSC 266 - Anatomy and Physiology of Domestic Animals - Lab or BIOH 201 - Human Anatomy and Physiology I or BIOH 211 - Human Anatomy and Physiology II		4
University Core and Elective		4
Year Total:	15	15

Senior Year	Credits	
	Fall	Spring
PHSX 205 - College Physics I	4	
BIOH 445 - Introduction to Pharmacology	3	
BIOM 494 - Seminar/Workshop	1	
BIOM 498R - Microbiology and Biotechnology Internships	4	
University Core and Electives	3	
PHSX 207 - College Physics II		4
BIOB 424 - Ethical Practice of Science		3
BIOM 494 - Seminar/Workshop		1
University Core and Electives		7
Year Total:	15	15
<b>Total Program Credits:</b>		<b>120</b>

\* If a student takes BIOB 318 Biometry or STAT 216Q Introduction to Statistics, then the student must take M 161Q Survey of Calculus. If a student takes M 165Q Calculus for Technology I, then the student must take M 166 Calculus for Technology II.

\*\* If a student takes CHMY 321 Organic Chemistry I, the student must take CHMY 323 Organic Chemistry II.

## Recommended Electives

ANSC 320	Animal Nutrition	3
ANSC 321	Physiology of Animal Reproduction	4
ANSC 322	Principles of Animal Genetics	3
ANSC 337	Disease of Domestic Livestock	3
ANSC 421	Assisted Reproduction Technologies w/ Lab	4
BCH 441	Biochemistry of Macromolecules	3
BCH 442	Metabolic Regulation	3
BCH 444R	Biochemistry & Molecular Biology Methods	3
BIOB 425	Adv Cell & Molecular Biology	3
BIOB 410	Immunology	3
BIOH 201	Human Anatomy and Physiology I **	5
BIOH 211	Human Anatomy and Physiology II **	4
BIOH 405	Hematology	3
BIOH 445	Introduction to Pharmacology	3
BIOM 431	Medical Bacteriology	3
BIOM 435	Virology	3

BIOM 450	Microbial Physiology	3
BIOO 310	Comparative Vertebrate Anatomy	4
BIOO 412	Animal Physiology	3
EQUUS 327	Equine Lameness	3
EQUUS 346	Equine Reproductive Management	4
BIOM 492	Independent Study	1-3
BIOM 490R	Undergraduate Research	4

\* CHMY 211 Elements of Organic Chemistry serves as the prerequisite for additional Chemistry courses, which are required in the Biotechnology Degree, Animal Systems Option. Graduate departments at some universities require that students have one year of organic Chemistry.

Therefore, students potentially interested in graduate school can take the CHMY 321/CHMY 323 series of organic Chemistry during their sophomore year.

\*\*If one of these is used as a departmental requirement, then it cannot count as elective credits.

A minimum of 120 credits is required for graduation; 42 of these credits must be in courses numbered 300 or above.