

## ANS Lab and Specializations Courses and Prerequisites

### LAB COURSES: (Only one lab course is required)

Course	Prerequisites	Units	Qtr	Title
ANG 111	BIS 2C, BIS 101, ABI 103.	4	F, W	Molecular Biology Laboratory Techniques
ANS 106	ANS 104 or NPB 102	3	W	Domestic Animal Behavior Laboratory
ANS 198 (132)	BIS 2AB and CHE 8B/118B	3	F	Microbiology of Animal Systems Laboratory
ANS 198 (133)	ABI 102, ABI 103, NPB 101/ANS 100	4	W	Animal Cell Culture Laboratory
ANS 198 (134)	ABI 102, ABI 103, NPB 101/ANS 100	3	W	Animal Nutrition Laboratory
ANS 198	ANS 100/NPB 101, NPB 121 (conc. ok)	2 + 2 (4 total)	W&S	Stress and Male Reproduction *Students <u>must</u> take both the winter and spring course to fulfill the lab requirement
ANS 135	ABI 102, ABI 103, NPB 101/ANS 100, STA 100 rec.	3	F	Production Animal Laboratory
ANS 136	ANS 2, BIS 2ABC, CHE 8B/118B	3	F	Techniques and Practices of Fish Culture
ANS 137	ANS 2, BIS 2ABC, CHE 8B/118B	3	S	Techniques and Practices of Avian Culture
ANS 139	ABI 102, BIS 101	3	W	Experiments in Animal Physiology
MCB 120L	BIS 102/ABI 102, MCB 120 (concurrently) <b>(Pass 1 open to MCB, MIC Majors only)</b>	3	All	Molecular Biology and Biochemistry Laboratory
MCB 160L	BIS 101 ( <b>Pass 1 open to Genetics Majors only</b> )	5	All	Principles of Genetics Laboratory
NPB 101L	NPB 101 ( <b>ANS 100 not acceptable, Pass 1 open to NPB, BIS Majors only</b> )	3	All	Systemic Physiology Laboratory
PMI 126L	PMI 126 (3 units) (conc ok)	2	W	Immunology Laboratory

#### Prerequisite Sequences

Course:	Required Preparation:
ABI 102	CHE 2AB, CHE 8AB or 118AB
ABI 103	ABI 102
ANG 107	BIS 101
ANS 123	ABI 103 and NPB101/ANS100
ANS 124	ANS 100/NPB 101/ABI 103 Concurrently OK
BIS 101	BIS 2A and 2B, CHE8A/118A, STA 100
ANS 100	BIS 2A; CHE 2B
NPB 101	BIS 2A; CHE 2B; Physics recommended
NPB 121	NPB 101/ANS 100
NPB 121L	NPB 101/ANS 100
STA 100	MAT 16B

## SPECIES SPECIALIZATIONS:

*Please Note: **ALL** Species and Disciplinary Focus Specializations must be approved by Faculty Advisor.*

*For students interested in the **Disciplinary Focus Specializations**, please contact the Advising Center at [asac@ucdavis.edu](mailto:asac@ucdavis.edu) for course suggestions.*

*Disciplinary Focus Specialization options: Behavior, Biochemistry, Genetics, Nutrition, Physiology.*

### LIVESTOCK AND DAIRY (20 units minimum)

Course	Prerequisites	Units	Qtr	Title
ANS 143	ANS 41, NUT 115, NPB 101/ANS 100	4	F odd	Pig and Poultry Care and Management
ANS 144	ANS 41, NUT 115 or consent (ANG 107 rec)	4	S	Beef Cattle and Sheep Production
ANS 120	ANS 2 or consent	3	W	Principles of Meat Science
ANS 120L	ANS 2 or consent; ANS 120 (conc. ok)	2	W	Meat Science Laboratory
ANS 146	NUT 115, or consent (ANG 107 rec)	5	S	Dairy Cattle Production
NUT 115	CHE 8B/118B or consent	4	W	Animal Feeds and Nutrition
NUT 122	ABI 103, (NPB 101/ANS 100, BIS 2C and MAT 16B rec)	4	S	Ruminant Nutrition and Digestive Physiology

### EQUINE SCIENCE (20 units minimum)

Course	Prerequisites	Units	Qtr	Title
ANS 15	None	3	W	Introductory Horse Husbandry
ANS 115	ANS 15, BIS 101, NPB 101/ANS 100 and any upper division NUT course	4	F	Advanced Horse Production
ANS 125	NPB 101/ANS 100	3	W odd	Equine Exercise Physiology
ANS 126	ANS 15, NUT 115	3	W even	Equine Nutrition
ANS 127	NPB 101/ANS 100, ANS 115	3	S	Advanced Equine Reproduction
ANS 141	ANS 115, (ECN 1AB rec)	4	S	Equine Enterprise Management (GE SS)
NUT 115	CHE 8B/118B or consent	4	W	Animal Nutrition
ANG 105	ANS 15, BIS 101	3	W odd	Horse Genetics

### LABORATORY ANIMALS (23 units minimum)

Course	Prerequisites	Units	Qtr	Title
ANS 42	None	4	W	Introductory Companion Animal Biology
ANS 103	ANS 104 or NPB 102 or equiv	4	W	Animal Welfare
ANS 104	ANS 2 or BIS 2B	4	F, S	Principles and Applications of Domestic Animal Behavior
ANS 140	NPB 101/ANS 100	4	F	Management of Laboratory Animals
NPB 102	BIS 2ABC	3	All	Animal Behavior
NPB 123	BIS 2AB	4	F	Comparative Vertebrate Organology
NUT 123	ABI 103	3	S	Comparative Animal Nutrition
NUT 123L	NUT 123 (conc okay)	1	S	Comparative Animal Nutrition Laboratory

**F, W, S, Su:** Fall, Winter, Spring, Summer

**Conc. Ok :** Concurrent Enrollment ok

**Rec.:** Recommended

## COMPANION AND CAPTIVE ANIMALS (20 units minimum)

Course	Prerequisites	Units	Qtr	Title
ANS 42	None	4	W	Introductory Companion Animal Biology
ANS 142	ANS 42, BIS 101, NPB 101/ANS 100, (ABI 103 rec)	4	F	Companion Animal Care and Management
ANS 104	ANS 2 or BIS 2B	4	F, S	Principles and Applications of Domestic Animal Behavior
ANS 107	BIS 2B	3	SuII	Zoo Biology and Research
ANS 170	Writing course	4	F, S	Ethics of Animal Use (GE SS)
AVS 100	BIS 2AB	3	S	Avian Biology
AVS 103	BIS 2AB	3	F	Avian Development and Genomics
NUT 115	CHE 8B/118B or consent	4	W	Animal Nutrition
NUT 123	ABI 103	3	S	Comparative Animal Nutrition
NUT 123L	NUT 123 (conc ok)	1	S	Comparative Animal Nutrition Laboratory
VME 158	BIS 2ABC (EVE 100 recommended)	3	W, S	Disease Ecology
WFC 134	BIS2ABC (EVE 100 recommended)	3	W	Herpetology
WFC 134L	WFC 134 (conc. ok)	3	W	Herpetology Lab

## AQUATIC ANIMALS

Integrative Animal Biology Courses - must take 2 courses from the list below\*\*

Course	Prerequisites	Units	Qtr	Title
ANS 123	ABI 103/BIS103 and NPB101/ANS100	4	S	Animal Growth and Development
EVE 112	BIS 2BC (systematics, and EVE courses rec)	3	W even	Biology of Invertebrates
WFC 120	BIS 2B	3	F	Biology and Conservation of Fishes
NPB 123	BIS2AB	4	F	Comparative Vertebrate Organology

\*\*These courses cannot be used to satisfy both the integrative animal biology requirement and specialization

## Aquatic Animals Specialization Courses: (20 units minimum)

Course	Prerequisites	Units	Qtr	Title
ABT 161	BIS 2B, MAT 16B, CHE 2B	3	W even	Water Quality Management for Aquaculture
ANS 18	None	4	F	Introductory Aquaculture
ETX 120	BIS 2A, CHE 8B	4	W odd	Perspectives in Aquatic Toxicology
EVE 112L	BIS 1B or BIS 2BC, EVE 112 (conc. ok)	2	W even	Biology of Invertebrates Laboratory
EVE 115	BIS 2B, ESP 100/EVE 101	4	W odd	Marine Ecology
NPB 123	BIS 2AB	4	F	Comparative Vertebrate Organology
MCB 150	BIS 101	4	W	Developmental Biology

\*\*Students interested in fulfilling the Aquatic Animals specialization through the Bodega Bay Marine Laboratory may visit their undergraduate course website for more information:

<http://bml.ucdavis.edu/education/courses/>

F, W, S, Su: Fall, Winter, Spring, Summer

Conc. Ok : Concurrent Enrollment ok

Rec.: Recommended

## AVIAN SCIENCES

Integrative Animal Biology Courses - must take 2 courses from the list below\*\*

Course	Prerequisites	Units	Qtr	Title
AVS 100	BIS 2AB	3	S	Avian Biology
ANS 123	ABI 103/BIS103 and NPB101/ANS100	4	S	Animal Growth and Development
NPB 130	NPB 101/ANS100	4	F	Physiology of the Endocrine Glands
NPB 117	BIS 2AB, CHE 2B (NPB 101/ANS 100 rec)	3	F	Avian Physiology

\*These courses cannot be used to satisfy both the integrated animal biology requirement and the specialization coursework.

**Avian Sciences Specialization Courses: (20 units minimum)**

Course	Prerequisites	Units	Qtr	Title
AVS 13	Lower Division Students Only	3	F	Birds, Humans, and the Environment
AVS 115	BIS 2A	3	Su II	Raptor Biology
NPB 102	BIS 2ABC	3	All	Animal Behavior
NUT 123	ABI 103	3	S	Comparative Animal Nutrition
NUT 123L	ABI 103, NUT 123 (conc ok)	1	S	Comparative Animal Nutrition Laboratory
WFC 111	BIS 2ABC (upper division ecology course rec.)	3	F	Biology and Conservation of Wild Birds
WFC 111L	WFC 111 (conc ok)	3	F	Laboratory in Biology and Conservation of Wild Birds
WFC 136	WFC 111 (WFC 111L rec.)	4	W even	Ecology of Waterfowl and Game Birds

## POULTRY

Integrated Animal Biology Courses - must take 2 courses from the list below\*\*

Course	Prerequisites	Units	Qtr	Title
AVS 100	BIS 2AB	3	S	Avian Biology
ANS 123	ABI103/BIS103 and NPN101/ANS100	4	S	Animal Growth and Development
NPB 130	NPB101/ANS100	4	F	Physiology of the Endocrine Glands
NPB 117	BIS 2AB, CHE 2B,(NPB 101/ANS 100 rec)	3	F	Avian Physiology

\*\*These courses cannot be used to satisfy both the integrated animal biology requirement and the specialization coursework.

**Poultry Specialization Courses: (20 units minimum)**

Course	Prerequisites	Units	Qtr	Title
AVS 13	Lower Division Students Only	3	F	Birds, Humans, and the Environment
ANS 143	NUT 115, NPB 101/ANS 100	4	F odd	Pig and Poultry Care and Management
ANS 120	ANS 2 or consent	3	W	Principles of Meat Science
ANS 120L	ANS 2 or consent; ANS 120 (conc. ok)	2	W	Meat Science Laboratory
NUT 123	ABI 103	3	S	Comparative Animal Nutrition
NUT 123L	ABI 103, NUT 123 (conc okay)	1	S	Comparative Animal Nutrition Laboratory
WFC 136	WFC 111 (WFC 111L rec.)	4	W even	Ecology of Waterfowl and Game Birds

**COURSES THAT MAY BE USED TOWARDS ANY SPECIALIZATION:**

Course	Prerequisites	Units	Qtr	Title
ANS 103	ANS 104 or NPB 102 or equiv	4	W	Animal Welfare
ANS 104	ANS 2 or BIS 2B	4	F, S	Principles and Applications of Domestic Animal Behavior
ANS 107	BIS 2B	3	SuII	Zoo Biology and Research
ANS 112	BIS 2B or ANS 1, (STA 100 or PLS 120 rec)	3	S	Sustainable Animal Agriculture (GE SS) <b>May not be offered Spring 2019</b>
ANS 120	ANS 2 or consent	3	W	Principles of Meat Science
ANS 120L	ANS 2 or consent, ANS120 (conc. ok)	2	W	Meat Science Laboratory
ANS 128	Upper Div. Standing, PLS 21	4	W	Agricultural Applications of Linear Programming
ANS 129	BIS 2ABC, CHE 2AB, CHE 8AB	3	W odd	Environmental Stewardship in Animal Production Systems
ANS 148	Upper division standing	4	S	Enterprise Analysis in Animal Industries (GE SS)
ANS 170	Writing course	4	F, S	Ethics of Animal Use (GE SS)
EVE 107	BIS 2B	4	F odd	Animal Communication
EVE 181	BIS 2B, BIS 2C (conc ok)	4	F	Ecology and Evolution of Plant-Animal Interactions
MCB 120	BIS 102/ABI102	3	All	Molecular Biology and Biochemistry Laboratory Lecture
NPB 102	BIS 2ABC	3	All	Animal Behavior
NPB 123	BIS 2AB	4	F	Comparative Vertebrate Organology
NPB 152	NPB 101/ANS 100, 102	3	S, Su I	Hormones and Behavior
NUT 115	CHE 8B/118B or consent	4	W	Animal Feeds and Nutrition
NUT 122	ABI 103, (BIS 2C, MAT 16B, NPB 101/ANS 100 rec)	4	S	Ruminant Nutrition and Digestive Physiology
NUT 123	ABI 103	3	S	Comparative Animal Nutrition
NUT 123L	ABI 103 and NUT 123 (conc ok)	1	S	Comparative Animal Nutrition Laboratory
PHR 106	Upper Div. Standing	2	W	Human-Animal Interactions: Benefits and Issues
PMI 126	ABI 102/BIS 102 or consent	3	W	Fundamentals of Immunology
PMI 127	Microbiology course w/lab	5	S	Medical Bacteria and Fungi
PMI 128	BIS 102	3	S	Biology of Animal Viruses
VMB 101V, 101Y	Upper Div. Standing, CHE 8AB, BIS 2ABC	3	F, S	Principles of Pharmacology and Toxicology
VME 158	BIS 2ABC	3	W, S	Infectious Disease in Ecology and Conservation
WFC 110	BIS 2ABC; EVE 101 or ESP 100	3	S	Biology and Conservation of Wild Animals
WFC 110L	WFC110 (conc ok)	3	S	Laboratory in Biology and Conservation of Wild Animals
WFC 160	BIS2ABC	3	W odd	Animal Coloration
NPB 108Y	None	3	NCO	Animal Behavior Lab

**\*\*If students use any of these substitutions, it must be approved by their faculty advisor**

F, W, S, Su: Fall, Winter, Spring, Summer

Conc. Ok : Concurrent Enrollment ok

Rec.: Recommended

## Companion Animal Specialization 198 Courses:

<b>Courses</b>	<b>Course Title</b>	<b>Course Description</b>	<b>Units</b>	<b>Qtr</b>	<b>Prerequisites</b>
ANG 198 (185)	The Science of Captive Breeding and Reintroduction	In this one credit seminar course, advanced undergraduates will meet once weekly to explore the peer-reviewed literature surrounding the latest advances in the science captive breeding and reintroduction biology. Although our focus will be on fish and wildlife species, many principles we'll cover are relevant to captive breeding of domestic species. Topics covered in this course will include genetic and ecological considerations in the design and implementation of captive breeding programs, artificial reproductive technologies applied to wild populations, reintroduction biology, and the controversy surrounding	1	S	Upper Division Standing
ANS 198 (159)	Animal Conservation Genetics	Genetic principles taught in the context of their application to animal conservation. More specifically, how genetic concepts and information can be used to help conserve and manage threatened or endangered animal species. Topics include but are not limited to population genetic structure, genetic drift and effective population size, mutation and genetic load, population subdivision and defining conservation units, captive breeding and restoration, inbreeding/outbreeding depression and genetic rescue, natural and artificial insemination. <b>May not be offered Spring 2018</b>	3	S	BIS 101
ANS 198	Companion Animal Nutrition	Applied companion animal nutrition course that will be focused primarily on dogs and cats. This course will include a discussion of the nutritional considerations specifically related to health and longevity of companion animals. Commercial and prescription-type diets will be evaluated with an emphasis on functional ingredients. Additional special topics will include the impact of physiological status and disease on nutrient requirements of the animal and nutrient utilization in the body.	4	S	ABI 102, ANS 42 (NUT 115 rec.)

## Animal Science 198 Courses that may apply toward ANY Specialization:

<b>Courses</b>	<b>Title</b>	<b>Course Descriptions</b>	<b>Units</b>	<b>Qtr</b>	<b>Prerequisites</b>
ANS 198 (150)	Health and Disease Issues in Animals	This course will provide students with basic concepts of animal immunology, microbiology, parasitology, epidemiology, vaccination, and how the knowledge can be used to improve animal health and prevent animal infection and disease. Health and disease issues relevant to various species, including sheep, cattle, pigs, poultry, fish and companion animals will be briefly discussed in the class.	4	S	ANS 2 rec.
ANS 198	Comparative Nutrition and Metabolism	This course will cover a comparison of livestock gastrointestinal tracts, the basic functions of major nutrient classes, nutrient composition of feed ingredients, nutrient digestibility and absorption, nutrient metabolism, and current issues in nutrition.	4	S	ABI 102 rec., ABI 103 rec., and NUT115 rec.

**\*For ANS 198 courses, contact ASAC in order to obtain a CRN to register for the course**