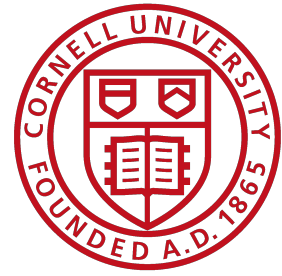


ANIMAL SCIENCE



COURSE PLANNING

Animal Science major offers an opportunity to apply animal biology, physiology, biochemistry, molecular biology and other life sciences to the study of animal breeding and genetics, growth, lactation, nutrition, reproduction and management. Animal Science is diverse and the program offers flexibility for students to explore both basic and applied aspects of animal biology. Topics such as global food production and supply, ethics of animal production and management, and animal welfare are considered throughout the curriculum.

Graduates are prepared to pursue careers in a variety of animal-related fields including: veterinary medicine, dairy production and management, animal feed industry, biomedical research, biotechnology, wildlife conservation, farm management, working with businesses and financial institutions, government agencies, private foundations and teaching/education.



<http://ansci.cals.cornell.edu/undergraduate/curriculum-requirements>

2016 Animal Science Curriculum Committee

Yves Boisclair

Debbie Cherney

Jim Giles

Vimal Selvaraj (*Chair*)

Mike VanAmburgh

Carol McEvoy (*Admin*)

MAJOR REQUIREMENTS

1. **FOUNDATION COURSES**, normally taken in the first two years

BIOAP 1100 Domestic Animal Biology (4 credits - Fall)

ANSC 1105 Contemporary Perspectives on Careers in Animal Science (1 - Spring)

ANSC 2120 Animal Nutrition (4 - Fall)

ANSC 2210 Principles of Animal Genetics (4 - Spring)

ANSC 2400 Animal Reproduction and Development (3 - Spring)

2. **ANIMAL BIOLOGY SYSTEMS** (6 credits minimum)

ANSC 2150 Exotic Avian Husbandry and Propagation (1 credit – Fall)

ANSC 2300 Introduction to Domestic Mammalian Behavior (2 – Spring)

ANSC 2410 Animal Reproduction and Development Lab (1 – Spring)

ANSC 2500 Dairy Cattle Principles (3 – Fall)

ANSC 2650 Equine Biology and Management (3 – Fall)

ANSC 3100 Introduction to Animal Welfare (2 – Fall)

ANSC 3450 Reproductive Physiology and Management of Dairy Cattle (3 – Spring)

ANSC 3500 Meat (3- Fall)

ANSC 3510 Dairy Herd Management (4 – Spring)

ANSC 3511 Junior Dairy Fellows (2 – Spring)

ANSC 3540 Cattle Herd Health (3 – Fall)

ANSC 3550 Dairy Cattle Nutrition (3 – Spring)

ANSC 3600 Beef Cattle (3 – Spring)

ANSC 3800 Sheep (3 – Spring)

ANSC 4000 Feeding the World (4 – Fall)

ANSC 4010 Dairy Production Seminar (1 – Spring)

ANSC 4120 Whole Farm Nutrient Management (4 – Spring)

ANSC 4510 Dairy Herd Business Management (3 – Fall)

ANSC 4560 Dairy Management Fellowship (2 – Spring)

ANSC 4880 Global Food, Energy, and Water Nexus –
Engage the US, China, and India for Sustainability (3 – Fall)

3. **ADVANCED ANIMAL BIOLOGY** (6 credits minimum)

ANSC 3200 Comparative Animal Nutrition and Toxicology (4 credits – Spring)

ANSC 3300 Fish Physiology (3- Spring)

ANSC 3310 Applied Dairy Cattle Genetics (2 – Spring)

ANSC 3400 Comparative Mammalian Reproduction (2 – Fall)

ANSC 3410 Biology of the Mammary Gland in Health and Disease (2 – Spring)

ANSC 3700 Immunology in Animal Health and Disease (3 – Spring)

ANSC 3920 Mechanisms of Animal Growth and Development (2 – Spring)

ANSC 3980 Animals in Biomedical Research (2 – Spring)

ANSC 4110 Integrated Cattle Nutrition (4 – Fall)

ANSC 4140 Ethics and Animal Science (2 – Spring)

ANSC 4250 Gamete Physiology and Fertilization (2 – Fall)

ANSC 4270 Fundamentals of Endocrinology (3 – Fall)

ANSC 4400 Tools for a Lifelong Career in Research (1 – Fall)

ANSC 4940 Nutritional Physiology and Biochemistry (3- Spring)

Note: These courses also fit within focused pathways in the major (see pages 7-12)

COLLEGE DISTRIBUTION REQUIREMENTS

1. **PHYSICAL AND LIFE SCIENCES** (18 credits)

- Intro Life Sciences (6 credits)
- Chemistry or Physics (3 credits)
- Other Physical and Life Sciences (6 credits)
- Quantitative Literacy (3 credits)

2. **SOCIAL SCIENCES AND HUMANITIES** (12 credits)

- Human Diversity (3 credits)
- Other Areas (9 credits)

For courses satisfying distributions see:
<http://oap.cals.cornell.edu/searchDist.aspx>

3. **WRITTEN AND ORAL EXPRESSION** (9 credits)

- Written Expression (6 credits)
- Oral Communication (3 credits)

4. **OTHERS:** PHYSICAL EDUCATION (2 courses) and SWIM TEST

TRANSFER STUDENTS

MAJOR REQUIREMENTS: Please consult with an Animal Science advisor about your interest and goals to decide your coursework. Satisfying basic Animal Science major requirements is highly recommended.

PHYSICAL EDUCATION: Students who transfer to Cornell from another college or university will be awarded one term of physical education credit for each full term of academic transfer credit they are granted by Cornell. Transfer students entering Cornell as sophomores or juniors are not usually required to take physical education classes for credit nor are they required to take the Swim Test. Transfer students subject to the credit requirement must take the swim test before signing up for an elective.

MINOR IN ANIMAL SCIENCE

REQUIREMENTS: A minimum of 15 credits is required. The courses need to be taken from Foundation courses (or equivalent), Animal Biology Systems and Advanced Animal Biology. Please consult with an Animal Science advisor for specific information regarding courses.

TEACHING EXPERIENCE

Students can seek out opportunities to serve as an undergraduate teaching assistant in one or more of the ANSC courses during the program. Teaching provides a unique opportunity for in-depth understanding of the material and communicating with other students. Undergraduate TA opportunities are competitive and require permission from the instructor.

Credits for teaching:

ANSC 4980 Undergraduate Teaching in Animal Science (1-6 credits, Fall/Spring)

INTERNSHIPS / STUDY ABROAD

INTERNSHIPS: Students can seek out all types of internships during their program. Formal internships for credit need to be pre-arranged between the offering institution supervisor and Animal Science advisor and must be during or overlapping with the Fall/Spring semester.

Credits for internships:

ANSC 4960 Internship in Animal Science (1-3 credits, Fall/Spring)

CALS Internship:

<http://cals.cornell.edu/academics/advising/career/finding-internship-job/>

SEMESTER ABROAD: This program prepares student to be global citizens. Study abroad can be during the regular semester or over Summer/Winter. Cornell does not allow study abroad during the final semester before graduation. You can schedule an appointment and discuss study abroad plans with CALS International Programs. Links to Study Abroad and Exchange programs are:

CALS Exchange Program: <http://cals.cornell.edu/academics/international/>

Cornell Abroad: <https://www.cuabroad.cornell.edu/>

INDEPENDENT RESEARCH / HONORS PROGRAM

For students in experiencing the research process, this program presents a unique opportunity to work with a Faculty mentor. Research may be performed across multiple program areas (not restricted to ANSC faculty members). Students completing a Honors Thesis will be conferred the B.S. degree with “Distinction in Research.” Consult with your Advisor for details.

CALS Research Honors Program:

<http://cals.cornell.edu/academics/student-research/honors>

Credits for research:

ANSC 4990 Undergraduate Research in Animal Science (1-6 credits, Fall/Spring)

ANSC 4020 Seminar in Animal Science (1 – Spring)

ROLE OF YOUR ADVISOR

Each student in the Animal Science major is assigned a faculty advisor. Your advisor plays several roles: guiding you through the requirements of the major and the College distribution requirements; helping you to clarify your educational and career goals; suggesting courses to help you meet your particular educational interests and career goals; and serving as a source of information about opportunities and services available to you through the College and University (e.g., study abroad, internships, career counseling, health and psychological services). If you make the effort to get to know your advisor, she or he also may serve as a reference for you for internships, jobs, or graduate school.

YOUR RESPONSIBILITIES

Ultimately, you are responsible for your education. Having the opportunity to obtain a first-rate university education is a privilege few have. You owe it to yourself and the world to make the most of it. Students are responsible for making regular progress toward meeting the curriculum requirements of their specific concentration. In addition, it helps to develop a plan of courses early in your program, especially if you would like to study abroad, participate in an exchange program or are planning on graduate or professional school.

PATHWAY: GENERAL ANIMAL SCIENCE

1. Major Requirements (Foundation Courses)
2. Animal Biology
 - ANSC 2410: Animal Reproduction and Development Lab
 - ANSC 2500: Dairy Cattle Principles
 - ANSC 2650: Equine Biology and Management
 - ANSC 2710: Canine Reproduction
 - ANSC 2720: Feline Reproduction
 - ANSC 3410: Biology of Lactation
 - ANSC 3540: Dairy Cattle Herd Health
 - ANSC 3600: Beef Cattle
 - ANSC 3700: Immunology in Animal Health and Disease
 - ANSC 3800: Sheep
 - ANSC 3920: Mechanisms of Animal Growth and Development
 - ANSC 3980: Animals in Biomedical Research
 - ANSC 4000: Feeding the World
 - ANSC 4400: Tools for a Lifelong Career in Research
3. Agronomy
 - ANSC 4120: Whole Farm Nutrient Management
 - PLSCS 2110: Field Crop Systems
 - PLSCS 3150: Weed Biology and Management
4. Other Related Courses
 - ANSC 4140: Ethics and Animal Science
 - AEM 1200: Introduction to Business Management
 - AEM 2210: Financial Accounting
 - AEM 2400: Marketing
 - AEM 3020: Farm Business Management
 - IARD 2020: Perspectives in International Agriculture and Rural Development

PATHWAY: PRE-VETERINARY MEDICINE

1. Major Requirements (Foundation Courses)
2. Pre-requisites to meet most veterinary school admissions requirements
 - BIOAP 1100, BIOG 1440, BIOEE 1610, BIOMG 1350 or BIOG 1445: General Biology Lecture
 - BIOG 1500: General Biology Lab
 - BIOMI 2900 and 2910: General Microbiology
 - BIOMG 3310 and 3320: Principles of Biochemistry
 - CHEM 2070 and 2080: General Chemistry
 - CHEM 3570 and 3580 and 2510: Organic Chemistry for the Life Sciences
 - PHYS 1101 and 1102: General Physics
3. Animal Biology
 - ANSC 2150: Exotic Avian Husbandry and Propagation
 - ANSC 2410: Animal Reproduction and Development Lab
 - ANSC 3700: Immunology in Animal Health and Disease
 - ANSC 3920: Mechanisms of Animal Growth and Development
 - ANSC 3980: Animals in Biomedical Research
 - ANSC 4110: Integrated Cattle Nutrition
4. Reproduction
 - ANSC 2710: Canine Reproduction
 - ANSC 2720: Feline Reproduction
 - ANSC 3400: Comparative Mammalian Reproduction
 - ANSC 3410: Biology Of Lactation
 - ANSC 3450: Reproductive Physiology and Management of Dairy Cattle
 - ANSC 4250: Gamete Physiology and Fertilization
 - ANSC 4270: Fundamentals Of Endocrinology
5. Animal Production
 - ANSC 2500: Dairy Cattle Principles
 - ANSC 3600: Beef
 - ANSC 3800: Sheep
6. Biological Sciences
 - BIOAP 3110: Introductory Animal Physiology
 - BIOAP 3160: Cellular Physiology
 - BIOAP 3190: Animal Physiology Experimentation
 - BIOMS 3150: Basic Immunology
7. Other Related Courses
 - ANSC 4140: Ethics in Animal Science
 - AEM 1200: Introduction to Business Management
 - AEM 2210: Financial Accounting
 - AEM 2400: Marketing

PATHWAY: DAIRY MANAGEMENT

1. Major Requirements (Foundation Courses)
2. Dairy Management
 - ANSC 2500: Dairy Cattle Principles
 - ANSC 3310: Applied Dairy Cattle Genetics
 - ANSC 3450: Reproductive Physiology and Management of Dairy Cattle
 - ANSC 3510: Dairy Herd Management
 - ANSC 3511: Junior Dairy Fellows
 - ANSC 3540: Dairy Cattle Herd Health
 - ANSC 3550: Dairy Cattle Nutrition
 - ANSC 4010: Dairy Production Seminar
 - ANSC 4110: Integrated Cattle Nutrition
 - ANSC 4120: Whole Farm Nutrient Management
 - ANSC 4510: Dairy Herd Business Management
 - ANSC 4560: Dairy Management Fellowship
3. Applied Economics and Management
 - AEM 2210: Financial Accounting
 - AEM 2400: Marketing
 - AEM 3020: Farm Business Management
 - AEM 3200: Business Law I
 - AEM 3240: Finance
 - AEM 3250: Personal Enterprise and Small Business Management
 - AEM 3460: Dairy Markets and Policy
 - AEM 4020: Food and Brand Lab Workshop
 - AEM 4030: Farm Management Study Trip
 - AEM 4040: Financial Management for Agriculture and Agribusiness
 - AEM 4050: Agricultural Finance
 - AEM 4260: Fixed-Income Securities
4. Related Courses
 - ANSC 2410: Animal Reproduction And Development Lab
 - ANSC 3410: Biology of Lactation
 - PLSCS 2110: Field Crop Systems
 - PLSCS 3150: Weed Biology and Management
 - HADM 2274: Business Computing
 - HADM 4415: Managerial Leadership in the 21st Century
 - NBA 3000: Entrepreneurship and Private Equity

PATHWAY: ANIMAL NUTRITION

1. Major Requirements (Foundation Courses)
2. Animal Biology and Management
 - ANSC 3200: Comparative Animal Nutrition and Toxicology: Horses, Dogs, Cats, and More
 - ANSC 3410: Biology of Lactation
 - ANSC 3550: Dairy Cattle Nutrition
 - ANSC 3980: Animals in Biomedical Research
 - ANSC 4110: Integrated Cattle Nutrition
 - ANSC 4270: Fundamentals of Endocrinology
3. Nutritional Sciences
 - NS 1150: Nutrition, Health and Society
 - NS 1220: Nutrition and the Life Cycle
 - NS 3200: Introduction to Human Biochemistry
 - NS 3310: Physiological and Biochemical Basis of Human Nutrition
4. Biochemistry and Physiology
 - BIOG 3300: Principles of Biochemistry, Individualized Instruction
 - BIOG 3350: Principles of Biochemistry - Proteins, Metabolism, and Molecular Biology
 - BIOAP 3110: Introductory Animal Physiology
 - BIOAP 4580: Mammalian Physiology

PATHWAY: ANIMAL PHYSIOLOGY

1. Major Requirements (Foundation Courses)
2. Physiology
 - ANSC 2410: Animal Reproduction and Development Lab
 - ANSC 2710: Canine Reproduction
 - ANSC 2720: Feline Reproduction
 - ANSC 3400: Comparative Mammalian Reproduction
 - ANSC 4250: Gamete Physiology and Fertilization
 - ANSC 4270: Fundamentals of Endocrinology
3. Growth and Development
 - ANSC 3410: Biology of Lactation
 - ANSC 3920: Mechanisms of Animal Growth and Development
4. Health and Disease
 - ANSC 3700: Immunology in Animal Health and Disease
 - ANSC 3980: Animals in Biomedical Research
5. Related ANSC Courses
 - ANSC 3100: Introduction to Animal Welfare
 - ANSC 3200: Comparative Animal Nutrition and Toxicology: Horses, Dogs, Cats, and More
 - ANSC 3550: Dairy Cattle Nutrition
 - ANSC 4110: Integrated Cattle Nutrition
 - ANSC 4120: Whole Farm Nutrient Management
 - ANSC 4140: Ethics and Animal Science
6. Biological Sciences Related Courses
 - BIOAP 3110: Introductory Animal Physiology
 - BIOAP 3160: Cellular Physiology
 - BIOAP 3190: Animal Physiology Experimentation
 - BIOAP 4580: Mammalian Physiology
 - BIOMG 4000: A Genomics Approach to Studying Life
 - BIOMG 4870: Human Genomics
 - BIOMS 4130: Histology – The Biology of the Tissues

PATHWAY: ANIMAL GENETICS

1. Major Requirements (Foundation Courses)
2. Animal Genetics Concentrations (*Select courses from one of the following concentrations*)
 - a. Animal Breeding Concentration
 - ANSC 2410: Animal Reproduction and Development Lab
 - ANSC 4140: Ethics in Animal Science
 - ANSC 4990: Undergraduate Research in Animal Science
 - Suggested advanced courses:*
 - BIOEE 2740: The Vertebrates – Structure, Function, and Evolution
 - BIOMG 4810: Population Genetics
 - BIOMG 4870: Human Genomics
 - BIONB 4310: Genes and Behavior
 - b. Computational Genetics Concentration
 - BEE 1510: Introduction to Computer Programming
 - CS 4520: Introduction to Bioinformatics
 - MATH 1110: Calculus I
 - MATH 1120: Calculus II
 - Suggested advanced courses:*
 - BIOMG 4810: Population Genetics
 - BTRY 4820: Statistical Genomics
 - BTRY 4830: Quantitative Genomics and Genetics
 - BTRY 4840: Computational Genomics
 - c. Molecular Genetics Concentration
 - ANSC 3920: Mechanisms of Animal Growth and Development
 - ANSC 3980: Animals in Biomedical Research
 - ANSC 4990: Undergraduate Research in Animal Science
 - Suggested advanced courses:*
 - BIOMG 4000: A Genomics Approach to Studying Life
 - BIOMG 4340: Appl of Molecular Biology to Medicine, Agriculture and Industry
 - BIOMG 4870: Human Genomics
3. Statistics
 - BTRY 3010: Biological Statistics I
 - BTRY 3020: Biological Statistics II
4. Pre-Professional
 - BIOMG 3300: Principles of Biochemistry
 - BIOMG 3310: Principles of Biochemistry
 - BIOMG 3320: Principles of Biochemistry
 - BIOMG 4400: Laboratory in Biochemistry and Molecular Biology

DEPARTMENT OF ANIMAL SCIENCE

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