ANIMAL SCIENCE (BS)

College of Agriculture and Life Sciences

Program Website (https://cals.cornell.edu/education/degrees-programs/animal-science-major-minor)

CIP: 01.0901 | **HEGIS:** 0104.00 | **NYSED:** 13019

Program Description

The Animal Science program offers a coordinated group of courses dealing with the principles of animal management, genetics, nutrition, physiology, and growth biology. Emphasis in subject matter is directed toward domestic animal species, dairy and beef cattle, horses, poultry, pigs, and sheep, while laboratory, companion, and exotic animal species are also included in research and teaching programs. Many science-oriented students elect a program emphasizing supportive preparation in the physical and biological sciences appropriate for graduate, veterinary, medical, or other professional study following graduation. The concentration in Dairy Management and the Dairy Management Fellows Program are popular options for students who want an integrated, industry-based program that can prepare them to manage a dairy business or enter a related career. These are examples of the flexibility within these programs that can be developed to meet a student's career interest related to animals. This is an in-person program at the Ithaca campus.

Academic Standards

Declaring the Major

- There are no prerequisites for first-year students entering the program with a declared major in Animal Science. However, it is highly recommended that students applying to the program have taken advanced or college-level courses (e.g., AP, IB, or dual enrollment) in biology, chemistry, physics, and/or mathematics.
- Current Cornell undergraduates who wish to change their major to Animal Science must complete one of the four core courses (BIOAP 1100, ANSC 2120, ANSC 2210, or ANSC 2400) and receive a grade of C or higher in the course before declaring the major. You must first speak with your current advisor and/or program coordinator regarding switching majors. After this, contact the undergraduate program coordinator for animal science (ANSC_Undergrad@cornell.edu) to apply for transfer into the major.
- Modifications to the curriculum for sophomore and junior transfer students are detailed below.

Transfer Curriculum Modifications

The following curriculum modifications are for students who have transferred to Cornell's Animal Science program from a different institution.

Substitutions for Statistics, Sustainability Challenges: Both sophomore and junior transfer students may substitute an equivalent transferred course for the ANSC major requirements in Statistics, Sustainability Challenges, if the course is accepted by CALS to meet the equivalent CALS Distribution Requirements. The faculty advisor verifies and approves these substitutions.

Sophomore Transfer Curriculum Modifications

Sophomore transfer students must complete a minimum of 36 total credits in Cornell Animal Science (ANSC-coded courses, as described above), select a concentration, and complete all major requirements for the Core Coursework and Concentration. Transferred courses coded as ANSC do not count toward the 36 credit minimum.

Sophomore transfers can use courses from their previous institution that are accepted by CALS and that appear on the Cornell transcript as substitutions for major requirements.

Exceptions and substitutions for major requirements are detailed below.

Exceptions for Core Coursework Requirements

- ANSC 1101 and ANSC 1105: Requirement waived. However, transfer students may elect to take these courses, and the credits can be used to fulfill the 36 total credits in Animal Science.
- Core Courses: Students may substitute an equivalent transferred course for one of the four main core courses (BIOAP 1100, ANSC 2400, ANSC 2120, or ANSC 2210). A petition must be filed for review and approval by the ANSC curriculum committee and/or instructor of the equivalent ANSC course.
- Animal Management: Students may substitute an equivalent transferred course for the core Animal Management requirement. A petition must be filed for review and approval by the ANSC curriculum committee and/or instructor of the equivalent ANSC course.

Concentration Coursework

Transfer of credits/courses accepted by CALS can substitute for the concentration requirements from the categories below. These substitutions do not require a petition and are approved by the faculty advisor.

- Biology Requisites (Pre-Vet) and Foundational Courses (Animal Ecology)
- Chemistry and/or Physical Sciences
- Biochemistry
- Physics
- Economics/Finance

Junior Transfer Curriculum Modifications

It is expected that junior transfers have already met major requirements for statistics, and physical science/chemistry.

Junior transfers must complete a minimum of 26 Cornell Animal Science credits (ANSC-coded courses, as described above) and requirements for the Core Coursework. Students select a concentration and work with their faculty advisor to determine which concentration requirements can be substituted or waived based on previous coursework. Transferred courses coded as ANSC do not count toward the 26 credit minimum.

Exceptions and Substitutions for requirements are detailed below.

Core Coursework

- ANSC 1101 and ANSC 1105: Requirement waived
- Ethics and Animal Welfare: Requirement waived.
- Core Courses: Students must complete three of the four required courses listed below and can waive one course without formal petition. The faculty advisor approves which course requirement is waived.
  - BIOAP 1100 Domestic Animal Biology
  - ANSC 2120 Animal Nutrition
  - ANSC 2210 Principles of Animal Genetics
  - ANSC 2400 Biology of Reproduction

- Fundamentals of Animal Management: Students may substitute an equivalent transferred course for the core Animal Management requirement. A petition must be filed for review and approval by the ANSC curriculum committee and/or instructor of the equivalent ANSC course.
- Credits in Animal Science: Junior transfer students must complete a total of 26 credits in ANSC courses as described above.

Special Academic Options

Accelerated 7-Year BS/DVM Early Enrollment Pathway

Outstanding undergraduate students may be admitted for professional study in he College of Veterinary Medicine (CVM) prior to completion of their undergraduate program. Established by the College of Agriculture and Life Sciences (CALS) and Cornell University College of Veterinary Medicine (CVM), this is an accelerated route to a veterinary degree for Cornell CALS students. Criteria for acceptance can be found directly on the College of Veterinary Medicine website (https://www2.vet.cornell.edu/education/doctor-veterinary-medicine/admissions/early-admission-programs/cornell-accelerated-bsdvm-program).

To be eligible for the BS/DVM accelerated pathway, students must:

1. Fulfill all University graduation requirements
2. Satisfy all college distribution requirements
3. Students must complete a minimum of 108 of their 120 academic credits toward the Bachelor of Science degree before the start of the senior year, and receive acceptance from the College of Veterinary Medicine.
4. Apply no more than 12 academic credits from the student's first semester in the pathway toward general elective requirements needed to reach the 120 credits required for the CALS Bachelor of Science degree.
5. Degree Conferral: Once a student reaches 120 credits and fulfills all undergraduate degree requirements, the bachelor's degree will be conferred at the next scheduled degree date.
6. Advising Requirement: Students interested in applying must confirm their eligibility with both their faculty advisor and an advisor in the CALS Office of Student Services (140 Roberts Hall) early in their sophomore year to discuss eligibility and application requirements. Applications should be submitted during the junior year.
   a. Note: The 12 credits from the Professional Pathway will count toward the maximum of 60 transfer credits permitted for the undergraduate degree.
7. Complete all Animal Science Major Requirements
   a. Students must complete all core coursework (30 credits). Transfer students must take BIOAP1100.
8. Students must complete a minimum of 33 credits in Animal Science (as described above). No more than 3 credits from Special Studies courses coded as ANSC can be used toward the 33 minimum credits.
9. Students accepted into the BS/DVM Accelerated Pathway select a concentration and work with their faculty advisor to develop an appropriate course plan.

Program Information

- Program Mode of Delivery: In Person
- Program Location: Ithaca, NY
- Minimum Credits for Degree: 120

Program Requirements

- The major consists of a set of 1) Core Coursework and 2) Concentration requirements, totaling about 60-72 total credits, depending on the concentration selected.
- Total Animal Science Credits: Students must complete a minimum of 36 credits in Animal Science courses. This includes BIOAP 1100 and any course coded or cross-listed with ANSC. No more than 3 of the 36 total credits can come from Special Studies courses (ANSC 4960, ANSC 4970, ANSC 4980, ANSC 4990).
- Core Coursework (30 credits): All students must complete the core coursework as detailed below.
- Concentration (30-42 credits): In addition to the core coursework, students select one concentration and complete all requirements within that concentration. Students officially declare their concentration at the end of their second year. Students declaring the concentration in Pre-Veterinary Medicine must meet additional criteria (described below) to declare and remain in the concentration.
  - Concentrations include:
    - Pre-Veterinary Medicine
    - Dairy Management
    - Animal Ecology and Conservation
    - Applied Animal Biology and Management
    - Integrative Physiology and Nutrition
- Other Criteria:
  - Students must receive a passing grade (D-) or better in a course to receive credit toward the major.
  - No more than 6 credits of S/U or non-graded coursework can be used to meet major requirements.
  - A course cannot be used more than once to fulfill requirements for both the Core Coursework and the Concentration requirements, and a course cannot fulfill more than one requirement within a concentration. The only exception is the use of ANSC 2500 to meet Core Coursework and Concentration requirements for the Dairy Management Concentration.
  - Students pursuing a double major must select a concentration and complete all requirements for the Animal Science major. No more than 6 of the 36 ANSC credits (including BIOAP 1100 and cross listed courses) can be used twice to fulfill requirements of the additional major(s). Non-ANSC courses (e.g., chemistry, physics, statistics) are not included in this restriction.
  - For students pursuing a minor, no more than 3 of the 36 required ANSC credits may be used to simultaneously fulfill requirements for the minor.
  - AP, IB, and/or dual-enrollment courses accepted by CALS and that appear on the student's degree audit cannot be used to fulfill requirements for Core Coursework, but they can be used to fulfill requirements for the Concentration. Substitutions of AP, IB, and dual-enrollment courses for Concentration requirements are approved the faculty advisor.
- Substitutions and Transfer Credits:
  - Students may use transfer courses/credits to substitute for major requirements. Transfer courses must be accepted by CALS and appear on the student's degree audit to be eligible. Substitutions are requested by the faculty advisor in Stellic and must be approved by both the faculty advisor and Animal Science Department.
  - Regardless of substitutions for specific requirements, students must complete the minimum number of Cornell ANSC credits.

Transfer courses coded as ANSC do not count towards this requirement.

- Substitutions for ANSC-coded courses (and BIOAP 1100) must be approved by the ANSC curriculum committee and/or the ANSC Director of Undergraduate Studies through a petition process. All other substitutions may be approved by the faculty advisor.
  - Example: Substitutions for Core Coursework requirements coded as ANSC (like BIOAP 1100 or ANSC 2210) must be petitioned and approved by the ANSC curriculum committee, Director of Undergraduate Studies, and/or the instructor of the ANSC course, whereas course substitutions for statistics may be approved by the faculty advisor.

All requests for substitutions are submitted by the faculty advisor in Stellic. Requests are then approved by the ANSC DUS and/or ANSC Program Coordinator and final approval is granted by the Registrar. When applicable, petitions for course substitutions are reviewed by the ANSC Curriculum Committee and/or ANSC course instructor prior to DUS and Registrar approval.

Core Coursework (30 credits)

Minimum Animal Sciences (ANSC) Credit Requirement. Students must complete a total of 36 credits in ANSC-coded courses (including BIOAP 1100 and cross-listed courses) as described above.

Code	Title	Hours
Foundational Competency		
ANSC 1101	Contemporary Perspectives in Animal Science [1]	1
ANSC 1105	Careers in Animal Science [1]	1
BIOAP 1100	Domestic Animal Biology	4
ANSC 2120	Animal Nutrition	4
ANSC 2210	Principles of Animal Genetics	4
ANSC 2400	Biology of Reproduction	3
Fundamentals of Animal Management		
Select one of the following:		3
ANSC 2500	Dairy Cattle Principles	
ANSC 2650	Equine Biology and Management	
ANSC 3000	Avian Physiology and Management	
ANSC 3450	Reproductive Physiology and Management of Dairy Cattle	
ANSC 3600	Beef Cattle Production	
ANSC 3800	Sheep	
Ethics and Animal Welfare		
Select one of the following:		3
ANSC 3100	Animal Welfare	
ANSC 4140	Ethics and Animal Science	
Statistics [2]		
Select one of the following:		4
AEM 2100	Introductory Statistics	
STSCI 2100	Introductory Statistics and Data Science (crosslisted)	
STSCI 2150	Introductory Statistics for Biology	
STSCI 2200	Statistics I (crosslisted)	
Sustainability Challenges [3]		
Select one of the following:		3
AEM 1500	An Introduction to the Economics of Environmental and Natural Resources	
ANSC 1120	Sustainable Animal Husbandry	
ANSC 2000	Sustainable Food and Companion Animal Systems and Perspectives	
ANSC 4120	Whole-Farm Nutrient Management	
ANSC 4880	Global Food, Energy, and Water Nexus – Engage the US, China, and India for Sustainable Future (crosslisted)	
BIOEE 4690	Food, Agriculture, and Society (crosslisted)	
EAS 1108	Earth in the News	
ENTOM 3440	Insect Conservation Biology	
FDSC 1200	Farm to Label	
GDEV 2300	Food Systems and Sustainable Development	
NS 4450	Toward a Sustainable Global Food System: Food Policy for Developing Countries	
NTRES 1101	Understanding Environment and Sustainability (crosslisted)	
NTRES 2010	Environmental Conservation	
NTRES 3240	Sustainable, Ecologically Based Management of Water Resources	
NTRES 3250	Forest Management and Maple Syrup Production	
NTRES 4600	Planning for Environmental Conservation and Sustainability (crosslisted)	
PLSCI 1900	Sustainable Agriculture: Food, Farming, and the Future	
PLSCI 2400	Green World, Blue Planet	
PLSCI 4730	Agroecology	
Total Hours		**30**

[1] ANSC 1101 & ANSC 1105 waived for transfer students.

[2] Any course with the DLS-AG tag that meets CALS data literacy: statistics requirement

[3] SCH-AG courses also accepted for this requirement.

Concentrations

Concentrations allow students to follow focused pathways designed to prepare them for their specific career goals. Students select one of the concentrations below and complete all requirements for that concentration.

Students officially declare their concentration at the end of their second year. Students must meet with their faculty advisor before declaring their concentration, and the faculty advisor submits and approves the concentration. Students may change their concentration at any time but should do so before the fall semester of senior year to ensure they can meet all requirements for the new concentration. Concentration changes are initiated by the faculty advisor and approved by the registrar.

Students following the concentration in Pre-Veterinary Medicine are required to meet additional criteria (described below) and maintain good standing to successfully complete the concentration requirements. Students following other concentrations are not required to meet these additional criteria.

Pre-Veterinary Medicine

The concentration in Pre-Veterinary Medicine prepares students for careers in veterinary and human medicine, graduate study, and careers in research, industry, and academia. Requirements for the concentration

were developed based on the coursework and prerequisites required by most graduate and professional programs.

Anyone, in any major or concentration, can apply to veterinary and medical school as long as they fulfill the prerequisites for their schools of interest. Students do not have to declare the concentration in Pre-Veterinary Medicine to apply to veterinary school.

Students should be aware that each veterinary school has different prerequisites for acceptance and admission, and they may have to complete other coursework in addition to the requirements for the Pre-Veterinary Medicine Concentration in Animal Science. Therefore, students who intend on applying to veterinary school must research the prerequisites for all schools of interest and verify that their Cornell courses will meet those prerequisites before applying. Students should consult with their faculty advisor, Cornell's Health Professions Advising Center (HPAC), and the American Association of Veterinary Medical Colleges (AAVMC) for more information.

Additional Criteria:

In addition to fulfilling the concentration requirements below, students must maintain a cumulative GPA of 2.8 or higher and a grade of C- or better in all major coursework to remain in the Pre-Veterinary Medicine Concentration. Students may re-take an equivalent course at another institution and substitute that course/grade for the concentration requirement. Students who do not meet these criteria must meet with their faculty advisor and declare a different concentration.

Code	Title	Hours
Biology Requisites [1]		
BIOMG 1350	Introductory Biology: Cell and Developmental Biology	3
BIOG 1500	Investigative Biology Laboratory	2
Advanced Courses in Animal Science		
Students must complete a total of 11 credits in upper-level ANSC coded courses, including at least 3 credits in Nutrition and 6 credits in Physiology. The remaining 2 credits can be taken in either category.		11
Nutrition (3 credits minimum)		
ANSC 3550	Dairy Cattle Nutrition	
ANSC 4110	Integrated Cattle Nutrition	
ANSC 4200	Nutrition of Cats and Dogs	
ANSC 4280	Comparative Nutrition of the Horse and Pig	
Physiology (6 credits minimum)		
ANSC 3000	Avian Physiology and Management	
ANSC 3300	Fish Physiology (crosslisted)	
ANSC 3400	Comparative Mammalian Reproduction: The Adaptation of Animals to their Environment	
ANSC 3410	Biology of the Mammary Gland in Health and Disease (crosslisted)	
ANSC 3450	Reproductive Physiology and Management of Dairy Cattle	
ANSC 3540	Dairy Cattle Herd Health	
ANSC 3700	Immunology in Animal Health and Disease	
ANSC 3920	Mechanisms of Animal Growth and Development	
ANSC 4310	Animal Genomics and Epigenomics	
ANSC 4270	Endocrinology: Biology of Hormones (crosslisted)	
ANSC 4410	Metabolic Physiology	
ANSC 4500	Model Organisms in Reproductive Sciences	
Chemistry Requisites		
Students are required to take 2 courses in general chemistry with lab (8 credits) and at least 3 credits in organic chemistry (lab is not required).		
General Chemistry and Lab		*8*
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory	
CHEM 2080 & CHEM 2081	General Chemistry II and General Chemistry II Laboratory	
Organic Chemistry		*3*
CHEM 3570	Organic Chemistry for the Life Sciences [2]	
Biochemistry Requisites		
Select one of the following options:		4
Option 1: [3]		
BIOMG 3310	Principles of Biochemistry: Proteins and Metabolism	
BIOMG 3320	Principles of Biochemistry: Molecular Biology	
Option 2:		
BIOMG 3300	Principles of Biochemistry, Individualized Instruction	
Option 3:		
NS 3200	Introduction to Human Biochemistry	
Option 4:		
BIOMG 3350	Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology	
Advanced Life Sciences		
Select one of the following:		3
BIOAP 3110	Principles of Animal Physiology (crosslisted)	
BIOAP 3190	Laboratory in Physiology	
BIOAP 4130	Histology: The Biology of the Tissues (crosslisted)	
BIOEE 4700	Herpetology, Lectures	
BIOMG 3850	Developmental Biology and Disease	
BIOMI 2900	General Microbiology Lectures	
BIOMI 2911	General Microbiology Laboratory	
BIOMS 3160	Cellular Physiology (crosslisted)	
NS 3410	Human Anatomy and Physiology	
Physics Requisites		
Physics I and Physics II with Lab		*8*
PHYS 2207	Fundamentals of Physics I	
PHYS 2208	Fundamentals of Physics II	
Total Hours		**42**

1. Transfer students who have taken a general biology course with lab at their previous institution (4 credits minimum; 1 semester, or 2 quarters) can substitute their transferred courses for this requirement with approval from the faculty advisor.
2. It is highly recommended students also take CHEM 3580 Organic Chemistry for the Life Sciences and CHEM 2510 Introduction to Experimental Organic Chemistry to meet the prerequisites for application to many veterinary schools.

[3] Students are required to complete at least 4 credits in biochemistry. Several options are available, but some vet schools prefer a 2-semester sequence in biochemistry. Option 1 is recommended.

Dairy Management

The Dairy Management Concentration prepares students for careers in managing a dairy farm or in the agricultural industry. Integral to the concentration is the Dairy Fellows Program, which provides students with engaged and applied experiences in the dairy industry.

Code	Title	Hours
Core Requirements		
The following course is a required prerequisite to concentration courses:		
ANSC 2500	Dairy Cattle Principles [1]	
Core Concentration Requisites		
ANSC 3450	Reproductive Physiology and Management of Dairy Cattle	3
or ANSC 4040	Data Science Applications in Agriculture	
ANSC 3510	Dairy Herd Management	4
ANSC 3540	Dairy Cattle Herd Health	3
ANSC 3550	Dairy Cattle Nutrition	3
ANSC 4510	Dairy Herd Business Management	4
ANSC 4560	Dairy Management Fellowship	2
ALS 3020	Farm Business Management	4
Chemistry		
CHEM 1560 & CHEM 1561	Introduction to General Chemistry and Introduction to General Chemistry Laboratory	4
Economics/Finance		
Select two of the following:		6
AEM 1200	Introduction to Business Management	
AEM 1500	An Introduction to the Economics of Environmental and Natural Resources	
AEM 2210	Financial Accounting	
AEM 2220	Dilemmas in Entrepreneurship	
AEM 2241	Finance	
ALS 2050	Introduction to Agricultural Finance	
ECON 1110	Introductory Microeconomics	
ECON 1120	Introductory Macroeconomics	
HADM 2230	Financial Accounting Principles	
HADM 2250	Finance	
Additional Courses		
Select one of the following:		3
AEM 2011	Spreadsheet Modeling for Non-Dyson Majors	
AEM 2310	Business and Economics of Food	
AEM 2400	Marketing	
AEM 2480	Food and Consumer Packaged Goods Industry Dynamics	
AEM 2820	Introduction to Database Management Systems	
AEM 2830	VBA for Data Analysis and Business Modeling	
AEM 2850	R Programming for Business Analytics and Data Visualization	
AEM 3040	The Economics of Dairy Markets & Policy	
ALS 1110	Introduction to Digital Agriculture	
ANSC 4110	Integrated Cattle Nutrition	
ANSC 4120	Whole-Farm Nutrient Management	
ANSC 4880	Global Food, Energy, and Water Nexus – Engage the US, China, and India for Sustainable Future	
HADM 4150		
ILRHR 2600	Managing Talent	
NBA 3000	The Business of Entrepreneurship	
PLSCI 2110	Field Crop Systems	
PLSCI 2200	Introduction to Mapping and Spatial Analysis with GIS	
PLSCI 2600	Soil Science	
PLSCI 3030	FoodCycle: Systems Thinking Toward Circular Economy for Organic Resources	
PLSCI 3150	Weed Biology and Management	
PLSCI 3210	Soil and Crop Management for Sustainability [2]	
Total Hours		**36**

[1] ANSC 2500 can be used to meet both the core animal management requirement and the prerequisite requirement for the Dairy Management Concentration.

[2] Prerequisite: PLSCI 1900 or PLSCI 2600.

Animal Ecology and Conservation

The concentration in Animal Ecology and Conservation prepares students for careers in wildlife and environmental conservation. Students completing this concentration may look for careers in wildlife medicine, research and academia, or positions in state and local government, like the DEC.

Code	Title	Hours
Foundational Courses		
Select one of the following options:		3
BIOEE 1610	Introductory Biology: Ecology and the Environment	
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity	
BIOSM 1610	Ecology and the Marine Environment	
BIOSM 1780		
Core Physiological Principles		
Select 12 credits of the following:		12
ANSC 2300	Introduction to Domestic Mammalian Behavior	
ANSC 3000	Avian Physiology and Management	
ANSC 3300	Fish Physiology	
ANSC 3400	Comparative Mammalian Reproduction: The Adaptation of Animals to their Environment	
ANSC 3410	Biology of the Mammary Gland in Health and Disease (crosslisted)	
ANSC 3700	Immunology in Animal Health and Disease	
ANSC 3920	Mechanisms of Animal Growth and Development	
ANSC 4200	Nutrition of Cats and Dogs	
ANSC 4270	Endocrinology: Biology of Hormones (crosslisted)	
ANSC 4280	Comparative Nutrition of the Horse and Pig	
ANSC 4310	Animal Genomics and Epigenomics	
ANSC 4410	Metabolic Physiology	
ANSC 4500	Model Organisms in Reproductive Sciences (crosslisted)	

Species Diversity and Evolution		
Select five credits of the following:		5
ANSC 1130	Captive Raptor Husbandry & Handling	
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity	
BIOEE 2740	The Vertebrates: Form, Function, and Evolution	
BIOEE 3730	Biodiversity and Biology of the Marine Invertebrates	
BIOEE 4530	Speciation: Genetics, Ecology, and Behavior (crosslisted)	
BIOEE 4700	Herpetology, Lectures	
BIOEE 4750	Ornithology, Lectures	
BIOEE 4751	Ornithology, Laboratory	
BIOSM 1640	Introduction to the Biology of Sharks, Skates, and Rays	
BIOSM 1650	Marine Vertebrates of the Gulf of Maine	
BIOSM 2780	Marine Biodiversity	
BIOSM 3210	Anatomy and Function of Marine Vertebrates	
BIOSM 3450	Marine Mammal Biology	
BIOSM 3740	Field Ornithology	
BIOSM 4650	Shark Biology and Conservation	
ENTOM 2030	Honey Bees: Their Intriguing Biology and Interactions with Humans and More	
ENTOM 2120	Insect Biology	
ENTOM 3310 & ENTOM 3311	Insect Diversity and Evolution and Insect Diversity Laboratory	
Ecosystem and Conservation		
Select 3 credits of Ecosystem and Conservation		3
ANSC 4880	Global Food, Energy, and Water Nexus – Engage the US, China, and India for Sustainable Future	
BIOEE 3610	Advanced Ecology	
BIOEE 4660	Physiological Ecology, Lectures	
BIOEE 4780	Ecosystem Biology and Global Change	
BIOMI 3500	Marine Microbes and Disease in a Changing Ocean	
BIOSM 2800	Sustainable Fisheries	
BIOSM 3750	Marine Ecosystem Research and Management	
EAS 2680	Climate and Global Warming	
NTRES 2010	Environmental Conservation	
NTRES 3220	Global Biodiversity	
NTRES 4600	Planning for Environmental Conservation and Sustainability	
Physical Sciences		
Students must complete at least 4 credits in general chemistry, including lab, and 3 additional credits in organic chemistry or physics.		
General Chemistry and Lab		
Select one of the following options:		4
CHEM 1560 & CHEM 1561	Introduction to General Chemistry and Introduction to General Chemistry Laboratory	
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory	
Organic Chemistry or Physics		
Select one of the following:		3
CHEM 1570	Introduction to Organic and Biological Chemistry	
CHEM 3570	Organic Chemistry for the Life Sciences	
EAS 1600	Environmental Physics	
PHYS 1203	Physics of the Heavens and the Earth	
Economics/Finance		
Select one of the following:		3
AEM 1200	Introduction to Business Management	
AEM 1500	An Introduction to the Economics of Environmental and Natural Resources	
AEM 2210	Financial Accounting	
AEM 2220	Dilemmas in Entrepreneurship	
ALS 2050	Introduction to Agricultural Finance	
ECON 1110	Introductory Microeconomics	
ECON 1120	Introductory Macroeconomics	
HADM 2230	Financial Accounting Principles	
Applied Laboratory and Research Techniques		
Select one of the following:		3
ANSC 2410	Biology of Reproduction Lab	
ANSC 4020	Research Communication and Thesis Development	
ANSC 4310	Animal Genomics and Epigenomics	
ANSC 4990	Undergraduate Research in Animal Science [1]	
BIOG 1500	Investigative Biology Laboratory	
BIOEE 3611	Field Ecology	
BIOMI 2911	General Microbiology Laboratory	
BIOMG 4810	Principles of Population Genetics	
BIOSM 1500	Investigative Marine Biology Laboratory	
BIOSM 2350	R by the Sea: Data Analysis in the Marine Sciences	
BIOSM 2450	Field Bioacoustics and Soundscape Ecology	
BIOSM 3750	Marine Ecosystem Research and Management	
ENTOM 3030	Applied Statistics: Biological Experiments in Practice	
NTRES 2100	Introductory Field Biology	
NTRES 2400	Field Methods in Avian Ecology	
NTRES 3100	Applied Population Ecology	
NTRES 3150	Introduction to Conservation Bioacoustics	
NTRES 3400	Molecular Tools for Ecology, Conservation, and Natural Resource Management	
NTRES 4100	Advanced Conservation Biology	
NTRES 4120	Wildlife Population Analysis: Techniques and Models	
Total Hours		**36**

[1] Research credits (4990) can be earned in any department (e.g., BIOG 4990 Independent Undergraduate Research in Biology, ANSC 4990 Undergraduate Research in Animal Science, etc.). Up to 3 credits of research can be used to meet the requirement with approval of the faculty advisor.

Applied Animal Biology and Management

The concentration in Applied Animal Biology and Management prepares students for careers in the agricultural industry, research, and extension, as well as farm management positions outside the dairy industry.

Code	Title	Hours
Nutrition		
Select one of the following:		3
ANSC 3550	Dairy Cattle Nutrition	
ANSC 4110	Integrated Cattle Nutrition	
ANSC 4200	Nutrition of Cats and Dogs	
ANSC 4280	Comparative Nutrition of the Horse and Pig	
Physiology		
Select five credits of the following:		5
ANSC 3000	Avian Physiology and Management	
ANSC 3300	Fish Physiology (crosslisted)	
ANSC 3400	Comparative Mammalian Reproduction: The Adaptation of Animals to their Environment	
ANSC 3410	Biology of the Mammary Gland in Health and Disease (crosslisted)	
ANSC 3700	Immunology in Animal Health and Disease	
ANSC 3920	Mechanisms of Animal Growth and Development	
ANSC 4270	Endocrinology: Biology of Hormones (crosslisted)	
ANSC 4310	Animal Genomics and Epigenomics	
ANSC 4410	Metabolic Physiology	
ANSC 4500	Model Organisms in Reproductive Sciences	
Animal Management		
Select 9 credits of the following:		9
ANSC 1130	Captive Raptor Husbandry & Handling	
ANSC 2100	Practical Large Animal Handling	
ANSC 2300	Introduction to Domestic Mammalian Behavior	
ANSC 2500	Dairy Cattle Principles	
ANSC 2650	Equine Biology and Management	
ANSC 3000	Avian Physiology and Management	
ANSC 3100	Animal Welfare	
ANSC 3310	Applied Dairy Cattle Genetics	
ANSC 3450	Reproductive Physiology and Management of Dairy Cattle	
ANSC 3500	Meat	
ANSC 3510	Dairy Herd Management	
ANSC 3540	Dairy Cattle Herd Health	
ANSC 3600	Beef Cattle Production	
ANSC 3800	Sheep	
ANSC 4120	Whole-Farm Nutrient Management	
Physical Sciences		
Students must complete at least 4 credits in general chemistry with lab, and 3 additional credits in either organic chemistry or physics.		
General Chemistry and Lab		
Select one of the following options:		4
CHEM 1560 & CHEM 1561	Introduction to General Chemistry and Introduction to General Chemistry Laboratory	
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory	
Organic Chemistry or Physics		
Select one of the following:		3
CHEM 1570	Introduction to Organic and Biological Chemistry	
CHEM 3570	Organic Chemistry for the Life Sciences	
EAS 1600	Environmental Physics	
PHYS 1203	Physics of the Heavens and the Earth	
Economics/Finance		
Select one of the following:		3
AEM 1200	Introduction to Business Management	
AEM 1500	An Introduction to the Economics of Environmental and Natural Resources	
AEM 2210	Financial Accounting	
AEM 2220	Dilemmas in Entrepreneurship	
ALS 2050	Introduction to Agricultural Finance	
ALS 3020	Farm Business Management	
ECON 1110	Introductory Microeconomics	
ECON 1120	Introductory Macroeconomics	
HADM 2230	Financial Accounting Principles	
Additional Courses		
Select one of the following:		3
BIOEE 1610	Introductory Biology: Ecology and the Environment	
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity	
BIOEE 2740	The Vertebrates: Form, Function, and Evolution	
BIOEE 4700	Herpetology, Lectures	
BIOEE 4750	Ornithology, Lectures	
BIOMI 2900	General Microbiology Lectures	
BIOSM 1500	Investigative Marine Biology Laboratory	
BIOSM 1610	Ecology and the Marine Environment	
BIOSM 1780		
EAS 1600	Environmental Physics	
ENTOM 2030	Honey Bees: Their Intriguing Biology and Interactions with Humans and More	
ENTOM 2120	Insect Biology	
FDSC 2000	Introduction to Physiochemical and Biological Aspects of Foods	
NS 1150	Nutrition, Health, and Society	
NS 2750		
NS 3410	Human Anatomy and Physiology	
NTRES 1101	Understanding Environment and Sustainability	
NTRES 2010	Environmental Conservation	
NTRES 2100	Introductory Field Biology	
NTRES 2201	Society and Natural Resources	
PLSCI 1101	Plant Science and Systems	
PLSCI 1115	The Nature of Plants	
PLSCI 2410	Introductory Plant Diversity and Evolution	
PLSCI 2600	Soil Science	
PLSCI 3440	Evolutionary Plant Biology	
Total Hours		**30**

Integrative Physiology and Nutrition

The concentration in Integrative Physiology and Nutrition prepares students for careers in research, academia, and industry.

Code	Title	Hours
Animal Physiology and Nutrition		
Students must complete a total of 12 credits in Animal Physiology and Nutrition, including at least 3 credits in Physiology and 3 credits in Nutrition. The remaining 6 credits can come from either category.		12

Physiology	
ANSC 3000	Avian Physiology and Management
ANSC 3300	Fish Physiology (crosslisted)
ANSC 3400	Comparative Mammalian Reproduction: The Adaptation of Animals to their Environment
ANSC 3410	Biology of the Mammary Gland in Health and Disease (crosslisted)
ANSC 3450	Reproductive Physiology and Management of Dairy Cattle
ANSC 3700	Immunology in Animal Health and Disease
ANSC 3920	Mechanisms of Animal Growth and Development
ANSC 4270	Endocrinology: Biology of Hormones (crosslisted)
ANSC 4310	Animal Genomics and Epigenomics
ANSC 4410	Metabolic Physiology
ANSC 4500	Model Organisms in Reproductive Sciences
Nutrition	
ANSC 3550	Dairy Cattle Nutrition
ANSC 4110	Integrated Cattle Nutrition
ANSC 4200	Nutrition of Cats and Dogs
ANSC 4280	Comparative Nutrition of the Horse and Pig
Physical Sciences	
Students must complete at least 4 credits in general chemistry with lab, and 3 additional credits in either organic chemistry or physics.	
General Chemistry and Lab	*4*
Select one of the following options:	
CHEM 1560 & CHEM 1561	Introduction to General Chemistry and Introduction to General Chemistry Laboratory
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory
Organic Chemistry or Physics	*3*
Select one of the following:	
CHEM 1570	Introduction to Organic and Biological Chemistry
CHEM 3570	Organic Chemistry for the Life Sciences
EAS 1600	Environmental Physics
PHYS 1203	Physics of the Heavens and the Earth
Economics/Finance	
Select one of the following:	3
AEM 1200	Introduction to Business Management
AEM 1500	An Introduction to the Economics of Environmental and Natural Resources
AEM 2210	Financial Accounting
AEM 2220	Dilemmas in Entrepreneurship
ALS 2050	Introduction to Agricultural Finance
ECON 1110	Introductory Microeconomics
ECON 1120	Introductory Macroeconomics
HADM 2230	Financial Accounting Principles
Applied Laboratory and Research Techniques	
Select five credits of the following:	5
ANSC 2410	Biology of Reproduction Lab
ANSC 3310	Applied Dairy Cattle Genetics
ANSC 4020	Research Communication and Thesis Development
ANSC 4310	Animal Genomics and Epigenomics
ANSC 4990	Undergraduate Research in Animal Science [1]
BIOG 1500	Investigative Biology Laboratory
BIOAP 3190	Laboratory in Physiology
BIOMI 2911	General Microbiology Laboratory
BIOEE 3611	Field Ecology
BIOMG 4810	Principles of Population Genetics
ENTOM 3030	Applied Statistics: Biological Experiments in Practice
NTRES 2100	Introductory Field Biology
NTRES 3100	Applied Population Ecology
NTRES 3150	Introduction to Conservation Bioacoustics
NTRES 3400	Molecular Tools for Ecology, Conservation, and Natural Resource Management
Additional Courses	
Select one of the following:	3
BIOEE 1610	Introductory Biology: Ecology and the Environment
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity
BIOEE 2740	The Vertebrates: Form, Function, and Evolution
BIOEE 4700	Herpetology, Lectures
BIOEE 4750	Ornithology, Lectures
BIOMI 2900	General Microbiology Lectures
BIOSM 1500	Investigative Marine Biology Laboratory
BIOSM 1610	Ecology and the Marine Environment
BIOSM 1780	
EAS 1600	Environmental Physics
ENTOM 2030	Honey Bees: Their Intriguing Biology and Interactions with Humans and More
ENTOM 2120	Insect Biology
FDSC 2000	Introduction to Physiochemical and Biological Aspects of Foods
NS 1150	Nutrition, Health, and Society
NS 2750	
NS 3410	Human Anatomy and Physiology
NTRES 1101	Understanding Environment and Sustainability
NTRES 2010	Environmental Conservation
NTRES 2100	Introductory Field Biology
NTRES 2201	Society and Natural Resources
PLSCI 1101	Plant Science and Systems
PLSCI 1115	The Nature of Plants
PLSCI 2410	Introductory Plant Diversity and Evolution
PLSCI 3440	Evolutionary Plant Biology
PLSCI 2600	Soil Science
Total Hours	**30**

[1] Research credits (4990) can be earned in any department (e.g., BIOG 4990 Independent Undergraduate Research in Biology, ANSC 4990 Undergraduate Research in Animal Science, etc.). No more than 3 credits in research can be used to fulfill this category.

University Graduation Requirements Requirements for All Students

In order to receive a Cornell degree, a student must satisfy academic and non-academic requirements.

Academic Requirements

A student's college determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. It is the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing their chosen program of study. See the individual requirements listed by each college or school or contact the college registrar's office (https://registrar.cornell.edu/service-resources/college-registrar-directory) for more information.

Non-academic Requirements

Conduct Matters. Students must satisfy any outstanding sanctions, penalties or remedies imposed or agreed to under the Student Code of Conduct (Code) or Policy 6.4. Where a formal complaint under the Code or Policy 6.4 is pending, the University will withhold awarding a degree otherwise earned until the adjudication process set forth in those procedures is complete, including the satisfaction of any sanctions, penalties or remedies imposed.

Financial Obligations. Outstanding financial obligations will not impact the awarding of a degree otherwise earned or a student's ability to access their official transcript. However, the University may withhold issuing a diploma until any outstanding financial obligations owing to the University are satisfied.

Additional Requirements for Undergraduate Students

The University has two requirements for graduation that must be fulfilled by all undergraduate students: the swim requirement, and completion of two physical education courses. For additional information about fulfilling University Graduation Requirements, see the Physical Education website (https://scl.cornell.edu/pe/).

Physical Education

All undergraduate students are required to take two credits (two courses) of Physical Education prior to graduation. It is recommended they complete the two courses during their first year at Cornell. Credit in Physical Education may be earned by participating in courses offered (https://catalog.cornell.edu/courses/pe/) by the Department of Athletics and Physical Education and Cornell Outdoor Education, by being a registered participant on a varsity athletic team, or performing in the marching band.

Students with medical concerns should contact the Office of Student Disability Services (http://sds.cornell.edu/).

Swim Requirement

The Faculty Advisory Committee on Athletics and Physical Education has established a basic swimming and water safety competency requirement for all undergraduate students. Normally, the requirement is taken during the Fall Orientation process at Helen Newman Hall or Teagle Hall pools. The requirement consists of the following: jump or step feet-first into the deep end of the pool, float or tread for one minute, turn around in a full circle, swim 25 yards using any stroke(s) of choice without touching the bottom or holding on to the sides (there is no time limit) and exit from the water. Students who do not complete the swim requirement during their first year, during a PE swim class or during orientation in subsequent years, will have to pay a $100 fee. Any student who cannot meet this requirement must register for PE 1100 Beginning Swimming as their physical education course before electives can be chosen.

If a student does not pass the swim requirement in their first Beginning Swimming PE class, then the student must take a second Beginning Swimming PE class (PE 1100 or PE 1101). Successful completion of two Beginning Swimming classes (based on attendance requirements) with the instructor's recommendation will fulfill the University's swim requirement.

Students unable to meet the swim requirement because of medical reasons should contact the Office of Student Disability Services (http://sds.cornell.edu/). When a waiver is granted by the Faculty Committee on Physical Education, an alternate requirement is imposed. The alternate requirement substitute is set by the Director of Physical Education.

CALS Graduation Requirements for the Bachelor of Science

Students are responsible for tracking their progress toward graduation and ensuring all degree requirements are met. Students must promptly notify the college of any discrepancies or issues with their academic records.

CALS undergraduate students must follow the college distribution requirements corresponding to their matriculation (entry) term and class standing. Students matriculating/entering Cornell before Fall 2025 and junior transfers entering in Fall 2026 will complete the pre-2025 CALS distribution requirements. All other students will be subject to the new CALS 2025+ distribution requirements. All students must adhere to the requirements designated for their matriculation/entry term and class standing. *There are no exceptions to this policy.*

Although specific requirements vary between the curricula, all students must complete the following Graduation Requirements to earn the Bachelor of Science degree:

1. University Graduation Requirements
2. Credit Requirements
3. Distribution Requirements
4. Residency Requirement
5. GPA Requirement
6. Major Requirements

Credit Requirement Policies

1. **Minimum total credits:** 120 academic credits are required for graduation.
   - Important Exceptions:
     - **Repeated Cornell courses:** If a course does not allow repeat credit, the repeated credits do not count toward the 120 credits required for graduation. They do count toward the 12 credits required for full-time status and good academic standing.
     - **Forbidden overlaps:** Credits from courses with a forbidden overlap do not count toward graduation credits. They do count toward the 12 credits required for full-time status and good academic standing. More information is available on the Course Enrollment and Credits (https://catalog.cornell.edu/

enrollment-credit-requirements/course-enrollment-credits/) page.
- **Review or supplemental courses:** Courses at the 1000–1099 level do not count toward graduation credits. They also do not count toward the 12 credits required for full-time status or good academic standing.
- **Physical Education (PE) courses:** PE courses do not count toward the 120 academic credits required for graduation. They also do not count toward the 12 credits required for full-time status or good academic standing.

2. **Minimum Credits Completed at Cornell:** Students must complete at least 60 academic credits at Cornell. This includes Education Abroad, Cornell in Rome, Capital Semester, the Brooks School Cornell in Washington, DC, Connect Program, and Shoals Marine Laboratory.
3. **Maximum Non-Cornell Credits:** Students may apply up to 60 non-Cornell credits toward their degree requirements. This includes AP, CASE, IB, GCE, French Baccalauréat, Cambridge Pre-University, and pre-approved external transfer coursework. Refer to Non-Cornell (Transfer) Credit under Policies and Procedures (https://catalog.cornell.edu/agriculture-life-sciences/#policiesandproceduresteext) for additional information.
   - Students may transfer up to 15 academic credits earned before matriculating as a first-year student at an accredited college or university. These 15 credits include credits earned through programs such as AP, CASE, IB, GCE, and French Baccalauréat.
4. In addition to the 120-credit minimum, all CALS students must meet minimum requirements for CALS credits, structured credits, and letter-graded credits. See the curriculum sections below for details.

Residency Requirements

- **Residency Requirement:** Students are expected to complete eight (8) semesters of full-time study. External transfer students receive one (1) semester in residence for each full-time semester (or equivalent) completed at another accredited institution before matriculating at Cornell.
- Internal transfer students must complete at least two (2) semesters in residence in CALS.
- The final semester before graduation must be completed as a full-time student in a Cornell program during the fall or spring semester. Summer and winter terms do not satisfy the final-semester residency requirement. The School of Continuing Education (SCE) does not count toward this requirement.
- Students in their ninth semester (9th) (or equivalent) and final semester may be eligible for prorated tuition. Eligibility criteria are available online (https://cals.cornell.edu/undergraduate-students/cals-student-services/degree-advising/cals-graduation-requirements-for-bachelor-of-science).
- **The following programs are in residency**: Cornell in Rome, Cornell in Washington, D.C. Connect Program (Fall or Spring only), Capital Semester, OGL Approved Education Abroad Programs, and Shoals Summer Semester.

Grade Point Average (GPA) Requirements

Minimum cumulative GPA: 2.00 or above must be maintained. Students must earn a minimum cumulative GPA of 2.00 or better to graduate. The cumulative GPA includes all letter grades earned at Cornell.

CALS Degree Requirements Prior to 2025 (applies to Transfers entering Fall 2026)

These requirements apply to: First-year students who matriculated before Fall 2025, sophomore transfers who matriculate prior to Fall 2026, and junior transfers who matriculate before Fall 2027. All students must follow the requirements based on their matriculation and expected graduation dates. *There are no exceptions to this policy.*

Students are required to fulfill:

1. **University Graduation Requirements:**
   a. Physical Education.
   b. Swim Requirement.
2. **Credit Requirements:** Students must complete 120 academic credits for graduation. Of those, at least 55 credits must be taken in the College of Agriculture and Life Sciences at Cornell, and at least 100 credits must be earned for a letter grade. PE and supplemental courses do not count as academic credit.
   - **CALS Credits:** Students must complete at least 55 CALS credits for graduation.
     - CALS credits include courses offered in CALS and in the following affiliated areas: Applied Economics and Management, Biological Sciences, Biology & Society, Earth and Atmospheric Sciences, Environment and Sustainability, Information Science, Nutritional Science, and Statistics and Data Science.
     - CALS credits also include courses with these subject codes: AGSCI, AIISP, ALS, AEM, ANSC, BEE, BIOG, BIOAP, BIOCB, BIOEE, BIOMG, BIOMI, BIOMS, BIONB, BIOSM, BSOC, BTRY, COMM, DSOC, EAS, EDUC, ENTOM, ENVS, FDSC, GDEV, IARD, INFO, LA, LEAD, NS, NTRES, PLBIO, PLBRG, PLHRT, PLPPM, PLSCI, PLSCS, STSCI, VIEN.
   - **Minimum Letter-Graded Credits:** Students must complete at least 100 letter-graded credits. This requirement may be prorated for students who transfer non-Cornell credits. (see Proration Chart for non-Cornell credit (https://experience.cornell.edu/sites/default/files/resource-files/Proration%20Chart%20for%20Students%20with%20Non%20Cornell%20Credit.pdf)).
   - **Structured Credit Requirement:** To graduate, students must complete at least 105 structured credits. After they meet this requirement, they may apply unstructured coursework toward the 120 credits required for graduation. Unstructured coursework includes Special Studies, such as independent study, research, teaching assistantships, and internships. The structured credit requirement may be prorated for students who transfer non-Cornell credits. (see Proration Chart for non-Cornell credit (https://experience.cornell.edu/sites/default/files/resource-files/Proration%20Chart%20for%20Students%20with%20Non%20Cornell%20Credit.pdf)).
3. **Residency:** Students are expected to complete eight semesters of full-time study. External transfer students receive one semester of residency credit for each full-time semester (or equivalent) completed at another accredited institution before matriculating at Cornell.
4. **GPA:** Students must earn a minimum cumulative GPA of 2.00 to graduate. The cumulative GPA includes all letter grades earned at Cornell.
5. **Physical and Life Sciences:** Students must complete 18 credits in the physical and life sciences. This must include at least 6 credits in introductory life sciences/biology and at least 3 credits in chemistry or physics.

6. **Quantitative Literacy:** Students must demonstrate minimum competency in quantitative literacy. This requirement may be satisfied by completing an approved calculus or statistics course.
7. **Social Sciences and Humanities:** Students must complete 4 courses across the 7 categories of humanities and social sciences. These courses must span at least 3 different categories. Human Diversity (D-AG) is required. Humanities courses must be at least 3 credits.
8. **Written and Oral Expression:** Students must complete 9 credits total, including at least 6 credits in Written Expression. Oral Expression is not required by the college, but it may be required by some majors. If a student's major does not require Oral Expression, all 9 credits may be in Written Expression.
9. **Major:** See the individual department listings for major requirements.

Distribution Requirements

The purpose of the distribution requirement is to have all students achieve common learning outcomes. It is expected that through college and major course requirements graduates will be able to:

- Explain, evaluate, and effectively interpret factual claims, theories, and assumptions in the student's discipline(s) (especially in one or more of the college's priority areas of Food & Energy Systems, Social Sciences, Life Sciences, and Environmental Sciences) and more broadly in the sciences and humanities.
- Find, access, critically evaluate, and ethically use information.
- Integrate quantitative and qualitative information to reach defensible and creative conclusions.
- Communicate effectively through writing, speech, and visual information.
- Articulate the views of people with diverse perspectives.
- Demonstrate the capability to work both independently and in cooperation with others.

Through the study of Physical and Life Sciences, students develop their understanding and appreciation of the physical sciences, enhance their quantitative reasoning skills, and gain an appreciation of the variability of living organisms. Social Sciences and Humanities gives students perspective on the structure and values of the society in which we live and prepares them to make decisions on ethical issues that will affect their work and role in society. Written and Oral Expression is designed to help students become competent and confident in the use of oral and written communication to express themselves and their ideas.

Important Notes:

- Credits received for independent study, fieldwork, teaching, research, work experience, and internships cannot be used to fulfill the distribution requirements
- Review or supplemental courses, such as 1000- to 1099-level courses, will not be counted in the distribution areas.
- First-Year Writing Seminars (FWS) cannot be used to satisfy the Physical and Life Sciences distribution area.
- Courses that fulfill distributions are approved by the CALS Curriculum Committee. Distributions cannot be applied to a course retroactively, and individual student petitions for Cornell courses to fulfill distributions will not be accepted. Students may request a review of external transfer courses for fulfilling distribution requirements.

Physical and Life Sciences:

Eighteen (18) credits, of which six (6) credits must be Introductory Life Sciences/Biology and three (3) credits in Chemistry or Physics. Courses that count for Introductory Life Sciences/ Biology, Chemistry/Physics, Quantitative Literacy, and Other Physical and Life Sciences count towards the eighteen (18) credits for this requirement

Introductory Life Sciences/Biology Requirement (BIO-AG):
Students must complete at least six (6) academic credits of Introductory Life Sciences/Biology. Courses that count towards this requirement have the BIO-AG distribution attribute. Note: CALS does NOT accept BIO-AS for BIO-AG. BCS-AG does not automatically fulfill BIO-AG.

Offerings in the area provide a foundation in the field of biology. Courses must include: an evolutionary component, instruction on applying the process of science and a significant student-centered teaching component.

Chemistry/Physics (CHPH-AG):
Students must complete a minimum of three (3) credits of Chemistry or Physics. Includes all Cornell courses with the CHEM or PHYS prefix (excluding courses that are supplemental, independent study, research, TA, internship, and First-Year Writing Seminar). Courses that count towards this requirement have a CHPH-AG distribution attribute. Additionally, courses with the prefix CHEM or PHYS of at least 11xx numbering and a minimum of three (3) credits are accepted as fulfilling CHPH-AG. PSC-AG does not automatically fulfill CHPH-AG.

Courses that meet the CALS Chemistry or Physics (CHPH) requirement provide students with a foundational understanding of key scientific principles. These courses delve into the study of chemistry (focusing on the composition, properties, and transformations of substances) or physics (exploring the principles of matter, energy, and their interactions). Fulfilling this requirement equips students with essential scientific knowledge that supports practical and innovative applications in fields like agriculture, environmental science, and food science, thereby fostering their ability to address and solve critical challenges within these domains.

Quantitative Literacy (MQL-AG):
Students must complete one (1) Quantitative Literacy course. Courses that count towards these requirements have an MQL-AG distribution attribute. Additionally, courses of at least 11xx numbering with the MATH prefix may fulfill this category. Calculus courses and Introductory Statistics courses may also fulfill MQL-AG. DLG-AG and DLS-AG do not automatically fulfill MQL-AG.

Faculty legislation requires minimum competency in quantitative literacy. Courses that fulfill the Mathematics and Quantitative Literacy distribution in CALS enhance students' problem-solving skills by teaching them to understand abstract, logical relationships. These classes focus on the mathematical analysis of data, modeling natural and man-made systems, and developing algorithms critical for computation. Students will learn various quantitative methods and how to apply quantitative reasoning across different fields.

This requirement can also be satisfied by earning a score of four (4) or five (5) on the AP Calculus exam or a score of five (5) on the AP Statistics exam, or transfer of an approved calculus or statistics course with a minimum letter grade of "C" or better.

Other Physical Life Sciences (OPHLS-AG):
Other Physical Life Sciences courses count towards the eighteen (18) credit total for the Physical and Life Sciences requirement. Courses that count towards this requirement have the OPHLS-AG distribution attribute. The number of OPHLS-AG courses taken will vary by student. Courses with the following distributions are also accepted for the CALS OPHLS-AG

distribution: PBS-HE, BIO-AS, PHS,AS, SDS-AS. Additionally, any course with BIO-AG, CHPH-AG or MQL-AG may alternatively fulfill OPHLS-AG.

Offerings in this area explore additional physical and life science subjects as well as quantitative literacy (math) courses. Courses satisfying this requirement help students understand and appreciate the physical sciences, enhance quantitative reasoning skills, or explore the variability of living organisms.

Social Sciences and Humanities:

Students must complete four (4) courses within the seven (7) categories of Humanities and Social Sciences. The courses MUST span at least three (3) different categories. Human Diversity (D) is a required category. Humanities courses must be a minimum of three (3) credits.

No more than two (2) courses in the same department will be counted toward the distribution requirement. Social Sciences & Humanities Categories:

(Also refer to Distribution Requirement Codes (https://catalog.cornell.edu/enrollment-credit-requirements/distribution-codes/agriculture-life-sciences/))

Cultural Analysis (CA-AG)
These courses study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion), expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community), and power and politics (states, colonialism, inequality).

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling CA-AG: ALC-AS, ALC-HA, ALC-AAP, CA-HE, CA-AAP, GLC-AS

Foreign Language (FL-AG)
Foreign Language courses available for CALS students at Cornell are offered by several departments, including Africana Studies and Research Center (AS&RC – language courses only), Asian Studies with languages such as Bangla-Bengali, Burmese, Chinese, Hindi, Indonesian, Japanese, Khmer, Korean, Sanskrit, Tagalog, Thai, and Vietnamese, and Classics (CLASS – language courses only). Additional offerings are provided by German Studies, which includes German, Dutch, and Swedish (language courses only), Linguistics (LING – language courses only), Near Eastern Studies (NES - language courses only), Romance Studies with languages like Catalan, French, Italian, Portuguese, Quechua, and Spanish, and Russian Studies, covering Russian, Hungarian, Polish, Serbian/Croatian, and Ukrainian. CALS will recognize these Foreign Language (FL) classifications by any college at Cornell, provided the class is taken for three (3) or more credits. Transfer students may have non-Cornell courses that meet SUNY World Languages requirements and are a minimum of three (3) credits reviewed as fulfilling FL-AG.

Human Diversity (D-AG)
These courses analyze historical or contemporary marginalized communities and the culturally specific contexts that produce unequal power relations in terms of race, nationality, ethnicity, indigeneity, sexuality, disability, religion, gender, or economic status.

Definition of "marginalize": Any groups with reduced access to social status, political influence, economic advancement, educational advancement, healthcare, information, or any of the goods, services, and powers of a society can be considered "marginalized." Causes of marginalization may be related to ethnic status, religion, country of origin, sexual orientation, geography, economics, and government policies. Those who exist on the furthest margins of a society are frequently subject to several of these forces.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling D-AG: SCD-AS, SCD-HA, D-HE.

Non-equated external transfer courses will only be considered for junior transfer students who have taken an appropriate course at their prior institution and whose schedule does not allow space to take a Human Diversity (D-AG) course at Cornell. These situations will be reviewed individually after a required appointment with CALS Student Services.

Historical Analysis (HA-AG)
These courses interpret continuities and changes—political, social, economic, diplomatic, religious, intellectual, artistic, scientific—through time. The focus may be on groups of people, dominant or subordinate, a specific country or region, an event, a process, or a time period.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling HA-AG: HA-AAP, HST-AAP, HST-AS, HST-HA, HA-HE

Knowledge, Cognition, and Moral Reasoning (KCM-AG)
These courses investigate the bases of human knowledge in its broadest sense, ranging from cognitive faculties shared by humans and animals such as perception, to abstract reasoning, to the ability to form and justify moral judgments. Courses investigating the sources, structure, and limits of cognition may use the methodologies of science, cognitive psychology, linguistics, or philosophy. Courses focusing on moral reasoning explore ways of reflecting on ethical questions that concern the nature of justice, the good life, or human values in general.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling KCM-AG: ETM-AAP, ETM-AS, ETM-HA, KCM-AAP, KCM-HE. ETH-AG does not automatically fulfill KCM-AG.

Literature and the Arts (LA-AG)
These courses explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge, and creative imagination.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling LA-AG, ALC-AS, ALC-HA, ALC-AAP, LA-AAP

Social and Behavioral Analysis (SBA-AG)
These courses examine human life in its social context through the use of social scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g., in friendship, love, conflict) to larger social organizations (e.g., the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g., discrimination, inequality, prejudice, stigmas, conflict resolution).

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling SBA-AG: SSC-AS, SBA-HE, SBA-AAP, SSC-AAP

Written and Oral Expression:

Nine (9) credits total, of which at least six (6) must be in Written Expression. Oral Expression is not required by the college but may be required for some majors. If Oral Expression is not required by the major, all nine (9) credits may be in Written Expression. Writing in the Majors (WIM) courses do not count towards Written Expression.

Written Expression (WRT-AG)

All students are required to take at least six (6) credits of Written Expression and may take nine (9) credits to fulfill the Written and Oral Expression requirement. Courses that fulfill the Written Expression requirement in CALS focus on enhancing students' writing skills. Courses meeting this requirement devote at least 50% of class time to writing proficiency, involve at least five (5) writing assignments with detailed feedback, and emphasize revision and development. These courses ensure personalized attention and help students articulate ideas clearly, argue effectively, and engage with evidence critically. This structure supports students in improving both their writing mechanics and their ability to communicate persuasively across contexts.

CALS also accepts FWS courses as fulfilling WRT-AG. Transfer students may have courses that meet the SUNY Writing Requirement considered to fulfill this requirement.

Oral Expression (ORL-AG)

Students may take one (1) Oral Expression course towards the nine (9) required credits for Written and Oral Expression. Courses that fulfill the CALS Oral Expression requirement enhance students' public speaking and communication skills. Courses meeting this requirement center on improving oral proficiency, dedicating over 50% of class time to the principles of effective communication. Each course involves at least five (5) formal oral presentations, with four (4) undergoing detailed revisions based on structured feedback that focuses on speech organization, clarity, evidence use, and delivery. These courses offer personalized guidance and encourage students to apply feedback to subsequent presentations. The aim is to refine students' abilities to articulate ideas persuasively and adapt messages for different contexts, ensuring they can communicate effectively on any topic.

CALS 2025+ Degree Requirements

The 2025+ CALS Curriculum applies to all students who entered Cornell Fall 2025 and after, with the exception of Junior transfer students entering Fall 2026. There are no exceptions to this policy.

All students are required to complete:

1. University Graduation Requirements
2. Credit Requirements
3. 120 Credits are required to graduate, of the 120:
    - A minimum of seventy-five (75) CALS Credits (fifty-five (55) for external transfer students) must be earned.
    - A minimum of 105 structured academic credits is required (transfer courses and education abroad courses can count toward this requirement).
    - A minimum of one hundred (100) letter-graded academic credits (transfer courses and education abroad courses can count towards this requirement).
    - The following courses do not count towards the 120: PE course, courses numbered 1000-1099, forbidden overlap courses, and repeated courses (that do not allow repeats).
4. Residency Requirement
5. GPA Requirement
6. Distribution Requirements
7. E3 Learning Milestone
8. Major Requirements: See individual department listings for major requirements.

75 CALS Credits

Students are required to take seventy-five (75) CALS Credits. The following counts as CALS Credit for students entering Fall 2026 who are following the CALS 25+ Curriculum:

- Any course with the following prefixes: AGSCI, AIIS, ALS, ANSC, BEE, BIOG, BIOAP, BIOCB, BIOEE, BIOMG, BIOMI, BIOMS, BIONB, BIOSM, COMM, EAS, EDUC, ENTOM, ENVS, FDSC, GDEV, INFO, LA, LEAD, NS, NTRES, PLSCI, STSCI, VIEN*
    - *For students who entered Fall 2025 or earlier, the prefix BSOC counts as CALS credit. The prefix BTRY was previously listed as CALS credit but is no longer an active prefix, effective Fall 2026.
- Courses of any prefix the FWS attribute (two (2) courses maximum) may count as CALS credit
- The AEM prefix will not count towards the required seventy-five (75) CALS Credits, except for students who have officially been accepted to the AEM major. CALS students who choose to complete an AEM minor cannot count AEM courses towards their seventy-five (75) required CALS courses.
- Any course that is cross-listed with a course that has CALS prefix noted above will count for CALS credit. For example an AEM course cross with ALS will count as CALS credit.

Students with matriculation status of Transfer will have a requirement of fifty-five (55) CALS Credits.

Distribution Requirements

The College of Agriculture and Life Sciences (CALS) college distribution requirements are the cornerstone of a diverse and comprehensive education.

These requirements encourage our students to venture beyond familiar subjects, develop a deeper understanding of others, uncover insights that can spark new interests, and pave the way toward meaningful careers that can shape a just and sustainable future.

*The CALS distribution requirements consist of:

- A minimum of thirty-nine (39) credit hours of coursework.
- A single course may not fulfill more than one college distribution requirement. However, a single course can simultaneously fulfill college and major requirements.
- College distributions may be fulfilled by S/U or Letter grades. Some majors may require letter grades and students should consult with their major.
- Non-academic credit courses (numbered 1000-1099 and PE) do not fulfill distribution requirements. Special Topics Courses (numbered 4940) do not fulfill distribution requirements.
- Courses that fulfill distributions are approved by the CALS Curriculum Committee. Distributions cannot be applied to a course retroactively, and individual student petitions for Cornell courses to fulfill

distributions will not be accepted. Students may request a review of external transfer courses for fulfilling distribution requirements.
- All distributions, with the exception of EEE-AG (E3), must be a minimum of 3 credits.

***Quarter-System Transfer Credit for New External Transfer Students**: For new external transfer students matriculating into CALS, an approved quarter-system transfer course converted to 2.67 semester credits may fulfill a CALS distribution requirement that requires a minimum 3-credit course, provided the course has been pre-approved for that distribution category.

This adjustment applies only to approved quarter-system transfer credit completed before matriculation for new external transfer students. After matriculation, coursework completed elsewhere must meet standard CALS and university transfer credit requirements, including any minimum-credit requirements for the applicable distribution category.

Students must complete all of the following:

Agriculture, Food Systems & Human Nutrition (AFS-AG)
- Take one (1) Agriculture, Food Systems & Human Nutrition (AFS-AG) course.

The Agriculture, Food Systems & Human Nutrition distribution requirement at CALS emphasizes a comprehensive understanding of the food system, including production, processing, distribution, consumption, and waste, with a focus on the integration of these multiple components. Students must learn to describe, analyze, and understand the interdependent nature and the environmental and nutritional impacts of the food system. To fulfill the requirement, a course must be a minimum of three (3) credits, cover at least two components of the food system, analyze their interactions, and dedicate at least half of its content to this holistic view, potentially including topics like agricultural history, food sustainability, and nutrition access.

Biological Sciences (BSC-AG)
- Take one (1) Biological Sciences (BSC-AG) course. Note: the following are NOT accepted as fulfilling BSC-AG: BIO-AG, BIO-AS.

Courses that meet the Biological Sciences requirement for CALS must be a minimum of three (3) credits and dedicate most of their content (at least 75%) to exploring one or more of the following biological concepts: evolution, structure and function, the flow, exchange and storage of information, pathways and transformations of energy and matter, or living systems. These courses include an evolutionary component, teach students how to apply scientific methods, and include at least one of the following competencies: quantitative reasoning, modeling and simulation, interdisciplinary thinking, interdisciplinary collaboration and communication, or science and society relational understanding. Courses also emphasize student-centered learning activities such as labs, problem solving, case studies, research projects, or collaborative projects. Some courses within this distribution are identified as suitable for non-life sciences majors— these courses have no prerequisites and require only high school-level science knowledge.

Physical Sciences (PSC-AG)
- Take one (1) Physical Sciences (PSC-AG) course.

CALS Physical Sciences must be a minimum of three (3) credits courses and cover at least 75% of their content in fields such as chemistry, physics, earth science, atmospheric science, or astronomy, connecting theoretical knowledge to practical applications. Courses also emphasize student-centered learning activities such as labs, problem solving, case studies, research projects, or collaborative projects. Some courses within this distribution are identified as suitable for non-sciences majors - these courses have no prerequisites and require only high school-level science knowledge.

Sustainability Challenges (SCH-AG)
- Take one (1) Sustainability Challenges (SCH-AG) course.

Courses that satisfy the sustainability distribution requirement in CALS must be a minimum of three (3) credits and must allocate at least 30% of content or learning outcomes to examining the intricate interplay between economic, socio-political, and environmental aspects of sustainability issues or their solutions or to exploring the connections among three or more UN Sustainable Development Goals in relation to the main class topic. Additionally, the course must incorporate a learning outcome focused on one of three key proficiencies: systems thinking, decision-making amidst uncertainty, or understanding the factors that constrain sustainability, thereby ensuring students gain a comprehensive and interdisciplinary perspective on sustainability challenges.

Data Literacy (DLG-AG and DLS-AG)
Two required courses:

- Take one (1) course with attribute Data Literacy Statistics (DLS-AG).
- Take one (1) course with attribute Data Literacy General (DLG-AG) OR one (1) course with attribute Data Literacy Statistics (DLS-AG).

CALS courses fulfilling the Data Literacy General (DLG-AG) requirement are designed to teach students how to interpret and articulate insights from both quantitative and qualitative data, with an emphasis on various competencies such as data analysis, acquisition methods, curation, and security. Students will be expected to understand the types of data, their applications, and the ethical implications of data misuse upon completion of these courses. The courses must be a minimum of three (3) credits and dedicate a significant portion of content to at least three (3) specific data literacy competencies and include at least one of these competencies as a main learning outcome.

Courses that fulfill Data Literacy Statistics (DLS-AG) additionally provide explicit instruction on mathematical approaches to collection, description, analysis, and inference of conclusions from quantitative data. Course content focuses on the Data Manipulating & Analysis competency: Ability to draw conclusions from data with quantitative and/or qualitative methods, which may include statistical or computational methods and may include tools like R, Python, Stata, Tableau, Unix, NVivo, QGIS, Excel, SPSS, etc.

Ethics (ETH-AG)
- Take one (1) course with attribute Ethics (ETH-AG). Note the following are NOT accepted as fulfilling ETH-AG: KCM-AG, ETM-AAP, ETM-AS, ETM-HA, KCM-AAP, KCM-HE.

Courses that fulfill the CALS Ethics requirement are designed to immerse students in the study of ethical principles impacting various facets of life, including personal, social, and global spheres, as well as in research and professional practices. These courses aim for students to critically engage with their values, understand diverse ethical perspectives, and articulate reasoned ethical positions. To satisfy the Ethics requirement, a course be a minimum of three (3) credits and must devote over half of its content to ethical issues relevant to its main topic, incorporate historical or modern ethical debates, foster personal ethical reflection, and include specific learning outcomes focused on ethics.

Human Diversity (D-AG)

- Take one (1) course with attribute Human Diversity (D-AG).

CALS Human Diversity courses foster a comprehensive understanding of the complexities surrounding historically or contemporarily marginalized communities, emphasizing the critical analysis of unequal power dynamics shaped by factors such as race, nationality, ethnicity, indigeneity, sexuality, disability, religion, gender, or economic status. To meet this requirement, a course must allocate at least 50% of its content to examining these issues, be a minimum of three (3) credits, and achieve specific learning outcomes. These outcomes include demonstrating knowledge of diverse cultural practices, understanding systemic oppression, and assessing personal cultural perspectives to identify potential biases.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling D-AG: SCD-AS, SCD-HA, D-HE.

Non-equated external transfer courses will only be considered for junior transfer students who have taken an appropriate course at their prior institution and whose schedule does not allow space to take a Human Diversity (D-AG) course at Cornell. These situations will be reviewed individually after a required appointment with CALS Student Services.

Cultural, Social & Historical Understanding

Take two (2) courses of the below distributions, with a maximum of one (1) course in each category: CA-AG, FL-AG, HA-AG, LA-AG, SBA-AG.

Cultural Analysis (CA-AG)

These courses study human life in particular cultural contexts through interpretive analysis of individual behavior, discourse, and social practice. Topics include belief systems (science, medicine, religion), expressive arts and symbolic behavior (visual arts, performance, poetry, myth, narrative, ritual), identity (nationality, race, ethnicity, gender, sexuality), social groups and institutions (family, market, community), and power and politics (states, colonialism, inequality).

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling CA-AG: ALC-AS, ALC-HA, ALC-AAP, CA-HE, CA-AAP, GLC-AS.

Foreign Language (FL-AG)

Foreign Language - Foreign Language courses available for CALS students at Cornell are offered by several departments, including Africana Studies and Research Center (AS&RC – language courses only), Asian Studies with languages such as Bangla-Bengali, Burmese, Chinese, Hindi, Indonesian, Japanese, Khmer, Korean, Sanskrit, Tagalog, Thai, and Vietnamese, and Classics (CLASS – language courses only). Additional offerings are provided by German Studies, which includes German, Dutch, and Swedish (language courses only), Linguistics (LING – language courses only), Near Eastern Studies (NES - language courses only), Romance Studies with languages like Catalan, French, Italian, Portuguese, Quechua, and Spanish, and Russian Studies, covering Russian, Hungarian, Polish, Serbian/Croatian, and Ukrainian. CALS will recognize these Foreign Language (FL) classifications by any college at Cornell, provided the class is taken for three (3) or more credits. Transfer students may have non-Cornell courses that meet SUNY World Languages and are a minimum of three (3) credits reviewed as fulfilling FL-AG.

Historical Analysis (HA-AG)

These courses interpret continuities and changes - political, social, economic, diplomatic, religious, intellectual, artistic, scientific - through time. The focus may be on groups of people, dominant or subordinate, a specific country or region, an event, a process, or a time period.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling HA-AG: HA-AAP, HST-AAP, HST-AS, HST-HA, HA-HE.

Literature and the Arts (LA-AG)

These courses explore literature and the arts in two different but related ways. Some courses focus on the critical study of artworks and on their history, aesthetics, and theory. These courses develop skills of reading, observing, and hearing and encourage reflection on such experiences; many investigate the interplay among individual achievement, artistic tradition, and historical context. Other courses are devoted to the production and performance of artworks (in creative writing, performing arts, and media such as film and video). These courses emphasize the interaction among technical mastery, cognitive knowledge, and creative imagination.

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling LA-AG: ALC-AS, ALC-HA, ALC-AAP, LA-AAP.

Social and Behavioral Analysis (SBA-AG)

These courses examine human life in its social context through the use of social scientific methods, often including hypothesis testing, scientific sampling techniques, and statistical analysis. Topics studied range from the thoughts, feelings, beliefs, and attitudes of individuals to interpersonal relations between individuals (e.g., in friendship, love, conflict) to larger social organizations (e.g., the family, society, religious or educational or civic institutions, the economy, government) to the relationships and conflicts among groups or individuals (e.g., discrimination, inequality, prejudice, stigmas, conflict resolution).

CALS also accepts courses of at least three (3) credits with the following distributions as fulfilling SBA-AG: SSC-AS, SBA-HE, SBA-AAP, SSC-AAP.

Written and Oral Expression

Nine (9) credits total, of which at least six (6) must be in Written Expression. Oral Expression is not required by the college but may be required for some majors. If Oral Expression is not required by the major, all nine (9) credits may be in Written Expression. Writing in the Majors (WIM) courses do not count towards Written Expression.

Written Expression (WRT-AG)

All students are required to take at least six (6) credits of Written Expression and may take nine (9) credits to fulfill the Written and Oral Expression requirement. Courses that fulfill the Written Expression requirement in CALS focus on enhancing students' writing skills. Courses meeting this requirement devote at least 50% of class time to writing proficiency, involve at least five (5) writing assignments with detailed feedback, and emphasize revision and development. These courses ensure personalized attention and help students articulate ideas clearly, argue effectively, and engage with evidence critically. This structure supports students in improving both their writing mechanics and their ability to communicate persuasively across contexts.

CALS also accepts FWS courses as fulfilling WRT-AG. Transfer students may have courses that meet the SUNY Writing Requirement considered to fulfill this requirement.

Oral Expression (ORL-AG)

Students may take one (1) Oral Expression course towards the nine (9) required credits for Written and Oral Expression. Courses that fulfill the CALS Oral Expression requirement enhance students' public speaking and communication skills. Courses meeting this requirement center

on improving oral proficiency, dedicating over 50% of class time to the principles of effective communication. Each course involves at least five (5) formal oral presentations, with four (4) undergoing detailed revisions based on structured feedback that focuses on speech organization, clarity, evidence use, and delivery. These courses offer personalized guidance and encourage students to apply feedback to subsequent presentations. The aim is to refine students' abilities to articulate ideas persuasively and adapt messages for different contexts, ensuring they can communicate effectively on any topic.

Engaged, Experiential, Entrepreneurial (E3) Learning Milestone

The E3 Learning Milestone allows students to blend experiential learning with academics, apply theory to practice, and deepen their community and professional engagement. This milestone emphasizes learning through experience, engagement, and/or entrepreneurship, encouraging students to apply their academic knowledge in real-world settings in collaboration with diverse groups and community partners. By completing an E3-designated course or experience, students are able to link their classroom learning with practical application, understand how their experiences align with their academic goals at Cornell, and recognize their contributions to a broader community. Eligible E3 experiences include community-engaged courses, undergraduate research, internships, study-abroad programs, and more—each designed to foster these outcomes and enhance the student's role in their field and community. There is no credit minimum for the E3 milestone and non-credit bearing experiences may fulfill the milestone.

Learning Outcomes

Upon completion of a course or experience that fulfills the E3 Learning Milestone requirement, students should be able to:

- Make connections between their disciplinary and scholarly learning and the practice or application of that knowledge.
- Explain how their course/experience contributes to and is informed by their learning goals at Cornell (i.e. in their major or course of study, as they define it).
- Explain how they engaged with and contributed to, or served, a community or cause greater than themselves.

The E3 Learning Milestone can be fulfilled by courses or non-course-based experiences. Courses cannot apply to another distribution requirement if used for E3.

The following courses are accepted as fulfilling E3:

- Any course with CU-CEL attribute.
- Any course with EEE-AG distribution.
- With advisor approval some Research (4990), Learning Assistantship (4980), Independent Study (4970) and Internship academic components (4960) may fulfill this requirement.

Courses and experiences that fulfill the E3 Learning Milestone must meet the following requirements:

1. Involve practice and application of knowledge in a real context.
2. Provide learning outcomes at the outset of the course or experience, including but not limited to the learning outcomes articulated above.
3. Include an assignment or activity that promotes student reflection on their experience.

Non course based experiences are subject to approval by either the major or the college.

Learning Outcomes

Upon graduating with the Animal Science major, students should be able to:

- Apply integrated principles of nutrition, physiology, and genetics to define issues, enable reasoning, and devise solutions for progress in animal health and production.
- Demonstrate hands-on skills for optimal care and management of farm and companion animals.
- Apply principles of animal welfare to guide evolving practices for the ethical treatment and management of animals.
- Articulate the environmental impacts of animal agriculture and develop sustainable practices to mitigate any adverse local and global effects.
- Communicate effectively to deliver evolving scientific content in animal science to producers and the public.
- Employ analytical skills to think critically, identify knowledge gaps, and devise solutions to animal-related issues relevant to health and well-being of society.