

EARTH AND ATMOSPHERIC SCIENCES (EASAG-BS)

College of Agriculture and Life Sciences

Program Website (<https://www.engineering.cornell.edu/eas/majors/ba-bs-earth-atmospheric-sciences/>)

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Program Description

The global-scale environmental challenges our society faces today demands a new generation of earth scientists who want to join in the effort to make a more sustainable planet. We work at spatial scales from atoms to solar systems and time scales from seconds to billions of years. Our aim is to understand the fundamental dynamics of our earth, ocean, and atmosphere in sufficient detail to fully reveal our planet’s past and to reliably predict its future. We study a wide range of topics that include paleontology, earthquakes, volcanos, geophysics, climate change, melting ice sheets and changes in global ocean ecosystems. EAS faculty members and graduate students carry out cutting-edge research on subjects as diverse as satellite monitoring of volcanic activity, the deep structure of the Andes Mountains and Tibetan Plateau, natural and man-made earthquakes, the nature of the earth’s ionosphere, global ocean ecosystems and climate change.

The Earth and Atmospheric Sciences (EAS) major is the undergraduate program offered by the Department of Earth and Atmospheric Sciences to Cornell students in the College of Engineering, the College of Arts and Sciences, and the College of Agriculture and Life Sciences. We offer four concentrations within the EAS major: Environmental Science, Geological Science, Atmospheric Science and Ocean Science. Each concentration will prepare students with a tailored set of skills and provide the flexibility to choose different pathways depending on their interests.

An abundance of opportunities exists for geological, oceanographic, and climate research in the field and for nationwide and international travel as well as paid research experience. Students have worked with faculty members in the Andes, the Aleutians, the Rocky Mountains, the Atacama Desert, the Caribbean, Tibet, and Hawaii, and have spent a semester at sea in the Sea Semester Program. Students are also able to probe the ionosphere of Earth and the surface of Mars by utilizing techniques in remote sensing.

The EAS major provides a strong preparation for graduate school in any one of the earth sciences, such as climate science, geological science, geophysics, geochemistry, oceanography, hydrology, biogeochemistry, and environmental science. Students seeking employment with the B.A. or B.S. degree will have many options in a wide variety of careers related to energy, the environment, and critical resources in both the private sector and government. Students with the strong science background provided by the EAS major are also highly valued by graduate programs in environmental law, public affairs, economics, and public policy.

Academic Standards

The criteria for good standing in the Earth and Atmospheric Sciences major are as follows:

- Semester GPA ≥ 2.0
- Cumulative GPA ≥ 2.3

- At least C- in all required courses
- A minimum of 12 credit hours per semester

Please note: students must take all required courses for a letter grade.

Honors Program

An honors program is offered by the Department of Earth and Atmospheric Sciences for qualified students. Students interested in applying should contact the Director of Undergraduate Studies during the second semester of their junior year or very early in the first semester of their senior year.

Program Information

- Instruction Mode: In Person
- Location: Ithaca, NY
- Minimum Credits for Degree: 120

Program Requirements

In addition to the major requirements indicated below, students must meet the College of Agriculture and Life Sciences graduation requirements.

Basic Math and Sciences

This part of the EAS curriculum builds a strong and diverse knowledge of fundamental science and mathematics, providing the student with the basic tools needed in upper-level science classes.

Code	Title	Hours
Mathematics ¹		
MATH 1910 & MATH 1920	Calculus for Engineers and Multivariable Calculus for Engineers	8
Physics		
		7-8
PHYS 2207 or PHYS 1112	Fundamentals of Physics I Physics I: Mechanics and Heat	4
PHYS 2208 or PHYS 2213	Fundamentals of Physics II Physics II: Electromagnetism	4
Chemistry		
Select one of the following options:		4
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory	
CHEM 2090 & CHEM 2091	Engineering General Chemistry and Engineering General Chemistry Laboratory	
Select one of the following:		3-4
CHEM 2080 & CHEM 2081	General Chemistry II and General Chemistry II Laboratory	
CHEM 1570	Introduction to Organic and Biological Chemistry (or)	
PHYS 2214	Physics III: Oscillations, Waves, and Quantum Physics ¹	
Biology		
Select one of the following:		3-5

BIOG 1140	Foundations of Biology (or)
BIOG 1440	Introductory Biology: Comparative Physiology (or)
BIOEE 1610	Introductory Biology: Ecology and the Environment (or)
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity (or)
BIOMG 1350	Introductory Biology: Cell and Developmental Biology (or)
BIOSM 1610	Ecology and the Marine Environment (or)
BIOSM 1780	Evolution and Marine Diversity

Complete one Advisor-Approved Course in Mathematics, Statistics, Computer Science, or Natural Science

In addition to the math, physics, chemistry, and biology requirements listed above, students are required to take an advisor-approved course in statistics, computer science, mathematics, or natural science (including, but not limited to, a course in astronomy, a second course in biology, or an additional course in physics or chemistry). Students in the College of Agriculture and Life Sciences must select a second course in biology.

¹ Students in the College of Engineering are additionally required to take EAS 2250 and EAS 2500.
² PHYS 2214 may only be substituted for a second semester of Chemistry if student has taken PHYS 1112 Physics I: Mechanics and Heat and PHYS 2213 Physics II: Electromagnetism

Code	Title	Hours
Required introductory course		
EAS 2250	The Earth System (crosslisted)	4

Focused Elective in the EAS Major

Climate Science Focused Elective

The curriculum in Climate Science Focused Elective emphasizes the scientific study of the behavior of climate and applications to the important practical problems of understanding how humans are modifying the climate system, the changing hazards caused by climate change, and the impacts of proposed mitigation efforts on the climate system. Students develop a fundamental understanding of the climate system, focused on the atmosphere and ocean, and develop skills to allow the analysis of changes in climate and their impacts on hazards such as extreme precipitation, drought, air quality, and the interactions with renewable energies. The curriculum includes a strong foundation in basic mathematics and science courses; core courses in atmospheric thermodynamics, atmospheric dynamics, and climate dynamics among a variety of Climate Science electives, including electives that teach students about how science and policy interact, as well as understanding the controversies and conclusions from the United Nations Intergovernmental Panel on Climate Change.

Code	Title	Hours
Climate Science Focused Elective Core Required Courses		
EAS 3050	Climate Dynamics	3
EAS 3410	Atmospheric Thermodynamics and Hydrostatics	3
EAS 3420	Atmospheric Dynamics	3

Code	Title	Hours
Climate Science Focused Elective Courses (5 courses)		
Students must complete 5 focused elective courses at the 3000-level or above. Students should speak with their advisor about which focused elective courses are most appropriate for their program of study:		
EAS 3010	Evolution of the Earth System	4
EAS 3030	Introduction to Biogeochemistry	4
EAS 3340	Microclimatology	3
EAS 3530	Physical Oceanography	3
EAS 4350	Statistical Methods in Meteorology and Climatology	3
EAS 4470	Physical Meteorology	3
EAS 4720	Fundamentals of Glaciology	3
EAS 4800	Atmospheric Chemistry: From Air Pollution to Global Change	3
EAS 5555	Numerical Techniques for Weather and Climate Modeling	2

Climate Science Focused Elective Field Course
Exposure to the basic observations of earth science in the field is necessary to fully understand the chosen area of focused elective in the major. A minimum of 3 credits of appropriate coursework is required, although more experience with fieldwork is encouraged. The following field course is recommended:

EAS 2500 Meteorological Observations and Instruments

- Other field options:**
- Field courses offered by another college or university¹
 - Experience gained participating in field research with Cornell faculty (or REU at another institution)¹
 - 3-semester credits of advisor-approved Independent Research (EAS 4910 Undergraduate Research/EAS 4920 Undergraduate Research). Independent research must conclude with formal paper describing results and conclusions or else a poster or oral presentation of results presented at a public venue.

¹ Require pre-approval by the faculty advisor and the EAS Curriculum Committee. These courses/internships/REUs should require observations to be taken in the field and interpreted by the student. Field courses should generally require 40+ hours of active observation and data collection in the field. Students using a non-credit research option for the field course requirement are required to complete an additional EAS concentration course.

Environmental Science Focused Elective
The curriculum in the Environmental Science Focused Elective focuses on the scientific study of the environment. Students in the Environmental Science Focused Elective of Earth and Atmospheric Sciences develop knowledge and understanding necessary to characterize environmental conditions, make informed predictions about the future, and prevent or address environmental problems. Environmental problems can involve physical, chemical, and biologic processes within the air, water, rock, and soil, and thus often require multidisciplinary solutions. The curriculum for the Environmental Science Focused Elective in Earth and Atmospheric Sciences prepares students to tackle these challenges through a strong foundation in basic math and science courses; core courses in Earth materials, environmental geophysics, and biogeochemistry; as well as

elective Focused Elective courses involving the fields of groundwater and surface water hydrology, biogeochemistry, the geology sediments and soils, and geophysical methods of characterization; and includes field course options that focus on building practical experience. Beyond coursework, students also often take advantage of opportunities for work experience through internships, undergraduate research projects, and environmental-themed project teams.

Code	Title	Hours
Environmental Science Focused Elective Core Required Courses		
EAS 3090	Earth Materials	3
EAS 3030	Introduction to Biogeochemistry	4
EAS 3450	Environmental Geophysics	3

Code	Title	Hours
Environmental Science Focused Elective Courses (5 courses)		

Students must complete 5 focused elective courses at the 3000-level or above. Students should speak with their advisor about which focused elective courses are most appropriate for their program of study:

BEE 4270	Water Measurement and Analysis Methods	3
BEE 4730	Watershed Engineering	4
BEE 4750	Environmental Systems Analysis	3
EAS 3010	Evolution of the Earth System	4
EAS 3530	Physical Oceanography	3
EAS 3540	Ocean Satellite Remote Sensing	3
PLSCI 3650	Environmental Chemistry: Soil, Air, and Water	3
EAS 4190	Geofluids	3
EAS 4710	Introduction to Groundwater	3
EAS 4720	Fundamentals of Glaciology	3
EAS 4740	Quantitative Data Analysis for the Geosciences	3
EAS 4870	Introduction to Radar Remote Sensing	3

Environmental Science Focused Elective Field Courses

Exposure to the basic observations of earth science in the field is necessary to fully understand the chosen area of focused elective in the major. A minimum of 3 credits of appropriate coursework is required, although more experience with fieldwork is encouraged. The following field course is recommended:

EAS 4370 Field Geophysics

Other field options:

- Field courses offered by another college or university¹
- Experience gained participating in field research with Cornell faculty (or REU at another institution)¹
- 3-semester credits of advisor-approved Independent Research (EAS 4910 Undergraduate Research / EAS 4920 Undergraduate Research). Independent research must conclude with formal paper describing results and conclusions or else a poster or oral presentation of results presented at a public venue.

¹ Require pre-approval by the faculty advisor and the EAS Curriculum Committee. These courses/internships/REUs should require observations to be taken in the field and interpreted by the student. Field courses should generally require 40+ hours of active observation and data collection in the field. Students using a non-credit research

option for the field course requirement are required to complete an additional EAS concentration course.

Geological Sciences Focused Elective

Geological Science studies processes involved in Earth's origin and evolution, its relationship with the solar system, and its structure and composition. Geological Science is also interconnected to society's needs, including the responsible use of natural resources, preserving the environment, and studying and mitigating natural hazards (earthquakes, volcanic eruptions, landslides, etc.). With exponential population growth, we face the challenge of securing resources (water, minerals, food) sustainably. The Focused Elective on Geological Science Focused Elective focuses the Earth's fundamental processes with numerical, analytical, field, and communications skills needed to conduct scientific research and work on solving some of the most critical challenges of the 21st century. The Focused Elective requirements and flexibility to design your curriculum with many specialized Focused Elective courses to choose from, and field and lab opportunities provide excellent preparation for graduate school and careers in the geoscience industry, sustainable use of resources, land use planning, material science, remote sensing, law, etc. The gorgeous landscape of New York's Finger Lakes and the proximity to the Adirondack mountains provide natural laboratories to study geologic processes in the field as well as field opportunities abroad. The program features small classes with personalized mentorship offered by our world-class faculty.

Code	Title	Hours
Geological Sciences Focused Elective Core Required Courses		
EAS 3090	Earth Materials	3
EAS 3880	Global Geophysics	3
EAS 3010	Evolution of the Earth System	4

Code	Title	Hours
Geological Science Focused Elective Courses (5 courses)		

Students must complete 5 focused elective courses at the 3000-level or above. Students should speak with their advisor about which focused elective courses are most appropriate for their program of study:

EAS 4010	Fundamentals of Energy and Mineral Resources	3
EAS 4040	Geodynamics	3
EAS 4050	Active Tectonics and Structural Geology	3
EAS 4060	Geodesy	3
EAS 4550	Geochemistry	3
EAS 4561	Isotope Geochemistry	3
EAS 4580	Volcanology	3
EAS 4720	Fundamentals of Glaciology	3
EAS 4740	Quantitative Data Analysis for the Geosciences	3
EAS 4790	Paleobiology	4
EAS 4840	Inverse Methods in the Natural Sciences	3
EAS 5770	Planetary Surface Processes	3

Geological Science Focused Elective Field Courses

Exposure to the basic observations of Earth science in the field is necessary to fully understand the chosen area of focused elective in the major. A minimum of 3 credits of appropriate coursework is required, although more experience with fieldwork is encouraged. The following field course is recommended:

- EAS 4370 Field Geophysics
- Field courses offered by another college or university with pre-approval by the faculty advisor
- Experience gained participating in field research with Cornell faculty (or REU at another institution) with pre-approval by the faculty advisor.

Other field options:

- Field courses offered by another college or university¹
- Experience gained participating in field research with Cornell faculty (or REU at another institution)¹
- 3-semester credits of advisor-approved Independent Research (EAS 4910 Undergraduate Research / EAS 4920 Undergraduate Research). Independent research must conclude with formal paper describing results and conclusions or else a poster or oral presentation of results presented at a public venue.

¹ Require pre-approval by the faculty advisor and the EAS Curriculum Committee. These courses/internships/REUs should require observations to be taken in the field and interpreted by the student. Field courses should generally require 40+ hours of active observation and data collection in the field. Students using a non-credit research option for the field course requirement are required to complete an additional EAS concentration course.

Ocean Sciences Focused Elective

The field of ocean science encompasses four subdisciplines covering marine geology, marine chemistry, physical oceanography, and biological oceanography. There is a strong interdisciplinary overlap among all four of these sub-disciplines. An EAS Focused Elective in ocean sciences touches on all four subdisciplines but is often tailored to emphasize one of the sub-disciplines over the other three. Marine geology often involves the study of seafloor processes associated with plate tectonic motion (e.g., spreading centers and seafloor subduction). It may also address the issue of coastal erosion and the impact of sea-level rise on coastline stability. Marine chemistry involves the study of global-scale cycles of the major elements on earth such as carbon or nitrogen. Or it might involve the use of chemical tracers to delineate deep ocean water mass movements. More recently, this discipline has been in a race to understand human-caused ocean acidification and ocean de-oxygenation resulting from global warming. Physical oceanography is the study of fluid dynamics at geophysical scales. This involves the study of coastal wave dynamics, coastal upwelling, open-ocean eddies, air-sea exchanges of heat, freshwater and momentum or global-scale heat transport via meridional overturning circulation (aka, conveyor belt circulation). Biological oceanography is the study of marine food webs and their role in the global biogeochemical cycling of major elements. More recently, biological oceanographers have been in a race to understand the impacts of global warming and ocean acidification on marine ecosystems.

Code	Title	Hours
Ocean Sciences Focused Elective Core Required Courses		
EAS 3050	Climate Dynamics	3
EAS 3530	Physical Oceanography	3
EAS 3030	Introduction to Biogeochemistry	4

Code	Title	Hours
Ocean Sciences Focused Elective Courses (5 courses)		
Students must complete 5 focused elective courses at the 3000-level or above. Students should speak with their advisor about which focused elective courses are most appropriate for their program of study:		
BIOSM 3210	Anatomy and Function of Marine Vertebrates	3
BIOEE 4570	Limnology: Ecology of Lakes, Lectures	3
BIOEE 4780	Ecosystem Biology and Global Change	4
BIOEE 6680	Principles of Biogeochemistry	4
EAS 3010	Evolution of the Earth System	4
EAS 3420	Atmospheric Dynamics	3
EAS 3540	Ocean Satellite Remote Sensing	3
EAS 3555	Marine Microbes and Disease in a Changing Ocean	3
EAS 4720	Fundamentals of Glaciology	3

Ocean Sciences Field Courses

Exposure to the basic observations of earth science in the field is necessary to fully understand the chosen area of Focused Elective in the major. A minimum of 3 credits of appropriate coursework is required, although more experience with fieldwork is encouraged. Students can choose from the following course options.

- Shoals Marine Lab Courses
- Sea Education Association Courses
- Woods Hole Oceanographic Courses

Other field options:

- Field courses offered by another college or university¹
- Experience gained participating in field research with Cornell faculty (or REU at another institution)¹
- 3-semester credits of advisor-approved Independent Research (EAS 4910 Undergraduate Research/EAS 4920 Undergraduate Research). Independent research must conclude with formal paper describing results and conclusions or else a poster or oral presentation of results presented at a public venue.

¹ Field course options marked by an asterisk (*) require pre-approval by the faculty advisor and the EAS Curriculum Committee. These courses/internships/REUs should require observations to be taken in the field and interpreted by the student. Field courses should generally require 40+ hours of active observation and data collection in the field. Students using a non-credit research option for the field course requirement are required to complete an additional EAS concentration course.

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 incoming 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 by the Department of Athletics and Physical Education (https://courses.cornell.edu/preview_program.php?catoid=60&poid=30232) 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 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 understanding and fulfilling all the requirements necessary for graduation. Additionally, students must promptly notify the college of any discrepancies or issues with their academic records.

CALS undergraduate students follow college distribution requirements corresponding to their matriculation/entry term and class standing. Students matriculating/entering before Fall 2025 will complete the existing CALS distribution requirements. First-year students matriculating/entering Fall 2025 or later will be subject to the new CALS 2025+ distribution requirements. However, sophomore and junior transfer students matriculating/entering in Fall 2025 will follow the existing CALS distribution requirement to align with students in their corresponding cohort year. 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 curriculums, 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
7. Application to Graduate

Credit Requirement Policies

1. Minimum total credits: 120 academic credits are required for graduation.
 - Important Exceptions:
 - Repeated Cornell courses that do not allow repeat for credit will not count towards the number of credits required for graduation. These credits do count toward the minimum twelve (12) credits required for full-time status and good academic standing.
 - Forbidden Overlaps will not count towards credits required for graduation. These credits do count toward the minimum twelve (12) credits required for full-time status and good academic standing. More information can be found under the Course Enrollment and Credits page.
 - Review or supplemental courses (e.g., 1000- to 1099-level) do not count towards the number of credits required for graduation. These credits do not count toward the minimum twelve (12) credits required for full-time status or good academic standing.
 - Physical Education courses do not count toward the required 120 credits for graduation. They also do not count toward the minimum twelve (12) credits required for full-time status or good academic standing.

2. Minimum Credits at Cornell: Sixty (60) academic credits must be completed at Cornell (includes Cornell in Rome, Capital Semester, and Brooks School Cornell in Washington DC Connect Program, and Shoals Marine Laboratory).
3. Maximum Non-Cornell Credits: Sixty (60) non-Cornell credits (AP, CASE, IB, GCE, French Baccalauréat, Cambridge Pre-University, and external transfer coursework) can be applied toward degree requirements. A student can transfer in a maximum of fifteen (15) academic credits earned before matriculation as a first-year student at any accredited college/university (AP, CASE, IB, GCE, French Baccalauréat, and external transfer credits). Refer to Non-Cornell (Transfer) Credit under Policies and Procedures for additional information.
4. All CALS students are required to fulfill a minimum number of CALS Credits, structured credits, and letter-graded credits. Specific policies are in the curriculum sections below.

Residency Requirements

- Eight (8) semesters of full-time study are expected. External transfer students are credited with one (1) semester in residence for each full-time semester (or equivalent) completed at another accredited institution prior to matriculation at Cornell.
- Internal transfer students must complete two (2) semesters in residence in CALS.
- The final semester before graduation must be completed in a Cornell program as a full-time student. Summer or winter semesters cannot be counted as a final semester. (The School of Continuing Education does not count towards a final semester in residency.)
- Students in the ninth (9th) (or equivalent) and final semester may be eligible to apply for prorated tuition. The eligibility criteria are listed 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 Washington DC Connect Program (Fall or Spring only), Capital Semester, 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 2025)

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: 120 academic credits, of which a minimum of fifty-five (55) must be taken from the College of Agriculture and Life Sciences at Cornell. A minimum of one hundred (100) credits must be in courses for which a letter grade was received. PE and supplemental courses do not count as academic credit.

- a. Fifty-five (55) CALS Credits are required for graduation. CALS Credits consist of courses offered within CALS and in Applied Economics and Management, Biological Sciences, Biology & Society, Earth and Atmospheric Sciences, Environment and Sustainability, Information Science, Nutritional Science, and the Department of Statistics and Data Science. CALS Credits include all courses with the following subjects: 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.
- b. Minimum Letter-Graded Credits: One hundred (100) credits. Proration of letter-graded credits may be applicable to students that 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>)).
- c. Maximum Credits earned through Special Studies (Independent Study, Research, Teaching Assistantships, and/or Internships): Fifteen (15) credits of "unstructured" coursework can be applied towards graduation requirements. Proration of structured credits may be applicable to students that 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: Eight (8) semesters of full-time study are expected. External transfer students are credited with one (1) semester of residence for each full-time semester (or equivalent) completed at another accredited institution prior to matriculating at Cornell.
4. GPA: Students must earn a minimum cumulative GPA of 2.00 or better to graduate. The cumulative GPA includes all letter grades earned at Cornell.
5. Physical and Life Sciences: Eighteen (18) credits, of which six (6) credits must be Introductory Life Sciences/Biology and three (3) credits must be Chemistry or Physics.
6. Quantitative Literacy: Faculty legislation requires minimum competency in quantitative literacy. This requirement can be satisfied by taking an approved calculus or statistics class.
7. Social Science 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.
8. 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 credits may be in Written Expression.
9. Major: See individual department listings for major requirements.
10. Application to Graduate: See Graduation Resources (<https://cals.cornell.edu/undergraduate-students/cals-student-services/graduation-resources/>).

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.

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.

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.

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/general-information/distribution-codes/>))

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

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 (applies to first-year students who start Fall 2025 or after)

The 2025+ CALS Curriculum applies to first-year students who enter CALS starting Fall 2025 and all semesters after. Transfer students entering Fall 2025 and all continuing students will follow the Prior to Fall 2025 Requirements. 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 seventy-five (75) must be CALS Credits (fifty-five (55) for transfer students).
 - A minimum of 105 must be structured academic credits (transfer courses can count towards this requirement).
 - A minimum of one hundred (100) letter-graded academic credits (transfer 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.
9. Application to Graduate: Information can be found on graduation webpage.

75 CALS Credits

Students are required to take seventy-five (75) CALS Credits. The following counts as CALS Credit:

- Any course with the following prefixes: AGSCI, AIIS, ALS, ANSC, BEE, BIOG, BIOAP, BIOCB, BIOEE, BIOMG, BIOMI, BIOMS, BIONB, BIOSM, BSOC, BTRY, COMM, EAS, EDUC, ENTOM, ENVS, FDSC, GDEV, INFO, LA, LEAD, NS, NTRES, PLSCI, STSCI, VIEN
- Courses with the FWS attribute (two (2) courses maximum)
- For BSBU students only: prefix AEM
 - AEM courses 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.

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.
- Students in CALS have the option to take some of these courses either for a grade or using S/U grading. However, letter grades may be required for some majors.
- 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.

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 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 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 courses 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 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 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 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.

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.

- CALS E3 Research and Teaching courses with EEE-AG. With advisor approval some 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.

Learning Outcomes

Earth and Atmospheric Science students learn to:

- Obtain working knowledge of scientific method.
- Discover the way that data are collected.
- Construct and evaluate scientific hypotheses from Earth sciences data.
- Design, conduct and analyze experiments to test hypotheses.
- Collect, analyze, and interpret field and laboratory data.
- Identify, formulate, and solve scientific problems using appropriate mathematical tools.
- Compile and interpret spatial and temporal earth science data.
- Explain and assess important concepts in the chosen concentration.
- Utilize computer systems and programming to find, analyze and present data and evaluate hypotheses.
- Communicate the earth sciences effectively in written and oral mediums.
- Demonstrate the ability to work in teams.
- Have a broad education, including liberal studies.