ENTOMOLOGY (BS)

College of Agriculture and Life Sciences

Program Website (https://cals.cornell.edu/entomology)

CIP: 26.0702 | **HEGIS:** 0421.00 | **NYSED:** 13158

Program Description

The Entomology curriculum provides students with a basic background in biological and physical sciences, with a special emphasis on the study of insects. The majority of majors pursue graduate studies in entomology or related sciences upon completion of the B.S. degree. Alternatively, students may immediately begin careers in various aspects of basic or applied insect biology, including integrated pest management, insect pathology, environmental assessment, medical or veterinary entomology, insect toxicology, apiculture, insect systematics, or insect ecology. Because of the diversity of career options, the major includes flexibility among the core requirements and electives that can be selected by students in consultation with their advisors.

Academic Standards

Program Policies

- All entomology courses must be completed with a grade of C- or better, or with a grade of S, unless otherwise noted
- No prerequisite courses are necessary before declaring this major as first-years.
- The major requires between 48-68 credits depending on the courses selected in each category.

Honors Program

The research honors program in entomology may be pursued by any qualified student in the College of Agricultural and Life Sciences.

Program Information

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

Program Requirements

Physical Sciences (17-21 credits)

Code	Title	Hours
Statistics or Biometry [1]		
Select one of the following:		
ENTOM 3030	Applied Statistics: Biological Experiments in Practice	
or STSCI 2150	Introductory Statistics for Biology	
or STSCI 2200	Statistics I	
Physics		
One semester of physics [2]		
Chemistry [3,4]		
General Chemistry		
Select one of the following:		
Option 1		
CHEM 2070 & CHEM 2071	General Chemistry I and General Chemistry I Laboratory	
CHEM 2080 & CHEM 2081	General Chemistry II and General Chemistry II Laboratory	
Option 2:		
CHEM 2150	Honors General and Inorganic Chemistry (with AP Chem)	
Organic Chemistry		
Select one of the following:		
Option 1:		
CHEM 1570	Introduction to Organic and Biological Chemistry	
Option 2: [5]		
CHEM 3570 & CHEM 3580	Organic Chemistry for the Life Sciences and Organic Chemistry for the Life Sciences	

Introductory Life Science (19-26 credits)

Code	Title	Hours
BIOG 1500	Investigative Biology Laboratory	2
or BIOSM 1500	Investigative Marine Biology Laboratory	
Evolutionary Biology		
BIOEE 1780	An Introduction to Evolutionary Biology and Diversity	4-5
or BIOEE 1781	Introduction to Evolution and Diversity	
or BIOSM 1780		
Genetics		
BIOMG 2800	Lectures in Genetics and Genomics	3-4
or NTRES 2830	DNA, Genes and Genetic Diversity	
BIOMG 2801	Laboratory in Genetics and Genomics	2
Ecology [1]		
BIOEE 1610	Introductory Biology: Ecology and the Environment	3-4
or ENTOM 4550	Insect Ecology	
Additional Courses: Two courses from two of the following three areas:		
Biochemistry		
Area 1		
BIOMG 3300	Principles of Biochemistry, Individualized Instruction	
or BIOMG 33	Principles of Biochemistry: Proteins and Metabolism	
or BIOMG 33	Principles of Biochemistry: Molecular Biology	
or BIOMG 33	Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology	
Cell biology		
Area 2		
BIOMG 1350	Introductory Biology: Cell and Developmental Biology	
Physiology [1]		
Area 3		
BIOG 1440	Introductory Biology: Comparative Physiology	
or BIOG 144	Introduction to Comparative Anatomy and Physiology, Individualized Instruction	
or ENTOM 4	Insect Physiology	

Entomology (16-20 credits)

Code	Title	Hours
ENTOM 2120	Insect Biology	4
Group A (Core Courses) [1]		
Select two of the following:		
ENTOM 3030	Applied Statistics: Biological Experiments in Practice	
ENTOM 3310 & ENTOM 3311	Insect Diversity and Evolution and Insect Diversity Laboratory	
ENTOM 3410	Applied Entomology	
ENTOM 4100	Advanced Conservation Biology	
ENTOM 4520 & ENTOM 4521	Biology of Disease Vectors and Introduction to Disease Vectors Lab	
ENTOM 4550	Insect Ecology	
ENTOM 4610	Model-Based Phylogenetics and Hypothesis Testing	
ENTOM 4830	Insect Physiology	
Two additional entomology courses from Groups A or B: [6]		
Group B (advanced electives)		
ENTOM 2030	Honey Bees: Their Intriguing Biology and Interactions with Humans and More	
ENTOM 2300	Biology of Sex: Diversity and Evolution	
ENTOM 2440	Integrated Pest Management	
ENTOM 2500	Biological Diversity of the Sonoran Desert	
ENTOM 3150	Spider Biology	
ENTOM 3350	Naturalist Outreach Practicum	
ENTOM 3440	Insect Conservation Biology	
ENTOM 3630	Bugs in Bugs– Insect Pathology and Immunity	
ENTOM 3690	Chemical Ecology	
ENTOM 3755	Social Animal Behavior: Arthropods to Apes	
ENTOM 3800	Animal Thermal Biology	
ENTOM 4000	Ecology and Evolution of Infectious Diseases	
ENTOM 4700	Ecological Genetics	

1 If ENTOM 3030 Applied Statistics: Biological Experiments in Practice, ENTOM 4550 Insect Ecology or ENTOM 4830 Insect Physiology have been used to satisfy a physical life science requirement above, they may not be used to satisfy the Group A or B requirements below.

2 One semester of Physics includes EAS 1600; may need two semesters depending on future plans. Excluding PHYS 1200-level course for non-science majors.

3 2-4 courses required depending on course selection.

4 AP Chem may only be used to satisfy CHEM 2070/CHEM 2071.

5 CHEM 3570 and CHEM 3580 for students planning on medical school.

6 For a complete list of Entomology Courses, please visit the course catalog, roster or department website.

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 Entomology major, students will be able to:

- Think critically and use principles and modes of analysis in chemistry, physics and mathematics.
- Design basic statistical analyses and evaluate basic statistical information.
- Apply and judge the scientific method in conducting inquiry-based research in the laboratory and in the field.

- Be able to critically evaluate information in primary research articles in entomology.
- Apply concepts and analytical approaches in evolutionary biology, genetics and two other areas of biology of the student's choice.
- Demonstrate phylogenetic "tree thinking" and be able to categorize insects based on basic ecological, behavioral, morphological, physiological, or developmental attributes.
- Examine insects and other arthropods deeply within a biological level of analysis and compare strategies used by different groups.
- Identify the potential impact of different insect species on agriculture, human health, and society in general and be knowledgeable about potential control strategies.
- Locate, comprehend and synthesize information important for informed decisions about broader issues in our society.
- Effectively communicate in written, oral, and graphical form.
- Value, and demonstrate an understanding of, diverse perspectives in entomological science and application when meeting the needs of multiple stakeholders; identify how racism, bias, and exclusion impedes effective engagement and participation; and help to create inclusive learning and working environments.