

College of Arts and Sciences

Distribution Requirements

In satisfying the distribution requirements, students become acquainted with a broad range of subject matter and points of view among disciplines in the college and explore areas that may be entirely new to them. Or, to look at it the other way, as first-year students explore subjects that interest them, they begin to satisfy distribution requirements. Consequently, first-year students should take courses to prepare for possible majors and to explore subjects new to them and take no course only in order to satisfy a distribution requirement. Although students may complete distribution requirements over eight semesters, they can take advanced courses in subjects they (perhaps unexpectedly) find intriguing only if they have completed the introductory prerequisites. Consequently, students should not postpone satisfying distribution requirements until the last semesters. Once sure of a major, students should consider which distribution requirements are yet unfulfilled and how to fulfill them with courses that complement their overall program. Courses in the major may be applied to the distribution requirements (unless prohibited by one of the restrictions noted under restrictions on applying AP credit, transfer credit, and Cornell courses to distribution requirements).

Students must complete four courses in science and quantitative reasoning, identified below under the categories Physical and Biological Sciences (PBS) and Mathematics and Quantitative Reasoning (MQR). In addition, they must complete five courses of 3 or more credits each from four of the five categories of courses in the humanities and social sciences with no more than three in the same department. The five categories of courses fulfilling the distribution requirements in humanities and social sciences are: Cultural Analysis (CA-AS), Historical Analysis (HA-AS), Knowledge Cognition and Moral Reasoning (KCM-AS), Literature and the Arts (LA-AS), and Social and Behavioral Analysis (SBA-AS). How an individual course is categorized is indicated with the appropriate abbreviation in its description under its department.

It is important to recognize that only courses with the proper designation in the Arts and Sciences section of the catalog can be used toward fulfilling the distribution requirements in Arts and Sciences.

*In fulfilling the four courses in science and quantitative reasoning, students must take at least two science courses. At least one of these must be from the primary list of courses in science departments in the College of Arts and Sciences:

Included on the Primary list:

(The courses listed individually are all cross-listed in an A&S science department.)

Earth and Atmospheric Sciences:

all 3- or 4-credit courses except 2900, 2500, 4350, 4940

Engineering

1220 Earthquake!

**In completing four courses in science and quantitative reasoning, students must take at least one of the following courses (note that EDUC 1150 Introductory College Mathematics counts neither toward the college degree nor toward distribution):

Included on the list:

Earth and Atmospheric Sciences

4350 Statistical Methods in Meteorology and Climatology

The Major

In their last two years, students devote roughly one-half of their time to acquiring depth and competence in a major subject. The major does not necessarily define a student's intellect or character or lead directly to a lifetime occupation, although it sometimes does some of each. Through the major, students focus and develop their imaginative and intellectual capacities through a subject they find especially interesting.

Most departments and programs specify certain prerequisites for admission to the major; they are found on the following pages in the descriptions of each department and program.

Students may apply for acceptance into the major as soon as they have completed the prerequisites and are confident of their choice. This may be as early as the second semester of freshman year, and must be no later than second semester of sophomore year. To apply, they take a copy of

their official transcript to an appointment with the director of undergraduate studies in their prospective major. A department or program may refuse admission into the major if the applicant's performance does not meet established standards. A student without a major at the beginning of the junior year is not making satisfactory progress toward the degree and risks not being allowed to continue in the college. That student must meet with an advising dean.

Available majors:

Majors are offered by each of the departments. There are also majors in American Studies, Archaeology, Biology and Society, Information Science, Religious Studies, Science of Earth Systems, and Feminist, Gender, and Sexuality Studies.

Some students want to pursue a subject that cannot be met within an established major. They may plan, with the help of their faculty advisor, an independent major that includes courses from several departments and even colleges. See "Independent Major and College Scholar Program," under "Special Academic Options." Whatever the major—chemistry, math, philosophy, or music—graduates from the College of Arts and Sciences earn the one degree the college awards, a Bachelor of Arts.

Double majors:

Only one major is required for graduation. Some students choose to complete two or even more majors. No special permission or procedure is required; students simply become accepted into multiple majors and find an advisor in each department. All completed majors are posted on the official transcript. However, even though courses in a second major count among the required 15 credits of electives (see immediately below), double majoring can constrict the variety of electives that might be valuable for an education in the liberal arts and sciences. Students should "double major" only if their intellects and deep interests direct them to do so.

Minors

Students may pursue minors in any department in any college that offers them, subject to limitations placed by the department offering the minor or by the students' major. Completed minors will appear on the student's transcript. Not all departments offer minors. Consult the appropriate department or program listing in this Courses of Study or contact the appropriate department for information on minors offered and how to pursue a minor.

Electives

Of the 34 courses and 120 credits required for graduation, almost one-third are free electives. How students use these electives frequently makes the difference between an ordinary and a truly interesting course of study. Students must complete at least four courses and at least 15 credits offered outside the major field and not used to fill another requirement except breadth. AP credits not otherwise used may fulfill elective requirements. Students may group electives to complete one of the established interdisciplinary minors. Students may also group electives into a second major. Since only one major is required, students may count courses in a second major as electives. Some students choose to explore a variety of subjects; some develop a concentration in a department or subject outside Arts and Sciences to gain applied training or specialized knowledge.

Marine Science

Shoals Marine Laboratory is a seasonal field station that offers more than 30 college courses that award Cornell credit and paid internships, a variety of courses and experiences designed to introduce undergraduates to marine science. The laboratory is located on Appledore Island, six miles off the Maine/New Hampshire coasts. Students should contact the Shoals Marine Laboratory Office, G14 Stimson Hall, or e-mail shoals-lab@cornell.edu, for further information.

For further information including: Acceleration, Ninth Semester, Part-time Study, Special Circumstances, Summer Session Credit, Special Academic Option, Graduation, etc. see: <http://cuinfo.cornell.edu/Academic/Courses/AS.php>

EARTH AND ATMOSPHERIC SCIENCES

The Department of Earth and Atmospheric Sciences covers the breadth of modern earth sciences. We live on a planet with finite resources and a finite capacity to recover quickly from human-induced environmental stresses. It is a naturally powerful planet, with geologic hazards such as earthquakes and volcanic eruptions that alter the course of history with little prior warning. As the human population grows, understanding the earth and its resources becomes progressively more important to both future policymakers and ordinary citizens, who must find new energy sources and sustain the quality of our environment.

During the past several decades, with the increasing concern about air and water pollution, nuclear waste disposal, the destruction of the ozone layer, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The department is the home of the major and minor in the College of Arts and Sciences titled Science of Earth Systems (SES). The Science of Earth Systems major emphasizes study of the interactions among rock, water, air, and life in our planet's operation. The SES major grew out of recognition of the fundamental interconnectedness of the components of the Earth system, and the importance of understanding both the system's operation at present and in the geological past. The SES major reflects the new strategy of modern earth science. Thus, starting in fall 2006, the former geological sciences major became a specialization within the SES major. The geology specialization within SES provides an equivalent to the geological sciences major, but with an increased breadth. Other specializations include atmospheric sciences, ocean sciences, biogeochemistry, and other student-created choices.

The SES major prepares students for a number of career paths in basic or applied sciences of our planet. The major can lead to graduate study and research in geology, geophysics, geochemistry, biogeochemistry, atmospheric sciences, ocean sciences, hydrology, or environmental engineering. Career opportunities in university research groups, governmental agencies, or the private sector deal with energy, mineral and water resources; natural hazards; weather and climate forecasting; ocean resources; and a host of environmental issues. The major can also prepare students for careers in environmental management and policy, law or medicine, science journalism, and K-12 science teaching.

Requirements for the Science of Earth Systems major

1. The Science of Earth Systems curriculum includes strong preparation in mathematics, physics, chemistry, and biology, including the following:

MATH 1110-1120 (or MATH 1910-1920);

Two semesters of chemistry: CHEM 2070-2080 or 2090-2080 or CHEM 2070-1570;

PHYS 2207-2208 or 1112-2213;

BIOG 1109-1110, 1101/1103-1102/1104 or 1105-1106 (a second semester of biology can be replaced by CHEM 1570 if CHEM 2070-2080 is selected; or replaced by a third semester of mathematics).

2. The required introductory course in earth science, EAS 2200, The Earth System.

3. The core courses emphasize the interconnectedness of the Earth system, and are founded on the most modern views of the planet as an interactive and ever-changing system. Each crosses the traditional boundaries of disciplinary science. Three courses selected from the following four core courses are required for the major.

EAS 3010 Evolution of the Earth System

EAS 3030 Biogeochemistry

EAS 3040 Interior of the Earth

EAS 3050 Climate Dynamics

4. The specialization requirement is achieved by four intermediate to advanced-level courses (3000 level and up) that build on the core courses and have prerequisites in the required basic sciences and/or mathematics courses. Note that additional basic math and science courses may be required to complete the specialization courses, depending upon the student's choice of specialization. The specialization courses build depth and provide the student with a specific expertise in some facet of Earth system science. Four specializations are defined for the major: geology, biogeochemistry, atmospheric sciences, and ocean sciences. Other specializations can be tailored to a student's interests in concert with the student's advisor and approval of the curriculum committee. The specialization should be chosen during the junior year or before in consultation with the student's advisor and the approval of the Director of Undergraduate Studies.

5. Exposure to the basic observations of earth science, whether directly in the field, or indirectly by various techniques of remote sensing or in the laboratory, is necessary to understand fully the chosen area of specialization. Means of satisfying this requirement generally include 3 credits of course work. Possibilities for fulfilling the field/observation requirement include the following:

Courses in the Hawaii Environmental Semester program;

Courses given by the Shoals Marine Laboratory;

EAS 2500 Meteorological Observations and Instruments;

EAS 3520 Synoptic Meteorology I;

EAS 4170 Field Mapping in Argentina;

EAS 4910 and/or 4920 Undergraduate Research, with appropriate choice of project;

Field courses taught by another college or university (3-credit minimum).

Honors

An honors program is offered by the Department of Earth and Atmospheric Sciences for superior students. Candidates for honors must maintain an overall 3.0 GPA, a cumulative average of 3.5 in the major, and complete an honors thesis (usually through EAS 4910 and/or 4920). Students interested in applying should contact the director of undergraduate studies during the second semester of the junior year or early in the first semester of the senior year.

For more information contact John Cisne, Department of Earth and Atmospheric Sciences, john-cisne@cornell.edu, and visit the web site: <http://www.eas.cornell.edu>.