SCIENCE

The core science requirement aims to develop critical awareness of the methods and limits of scientific inquiry, while fostering observational and analytical skills, particularly in reference to the natural and physical world. When choosing a science course, students should make sure they have reviewed and met the specified prerequisites for the course prior to enrollment.

Students who are considering careers in science-related fields, including health-related professions, are urged to begin their study of science within the first two semesters after matriculation at GS.

Science Requirement

To fulfill the science requirement, students must successfully complete three courses selected from two of the following Columbia departments or from the list of approved courses below, no more than two of which should be from the same department:

- Astronomy
- Biological Sciences
- Chemistry
- Earth and Environmental Sciences
- Ecology, Evolution, and Environmental Biology
- Physics
- Psychology (Columbia department only, excluding courses numbered at the 2600, 3600, or 4600 level)

Students may also use international high school leaving exams for which they received at least three transfer credits on the Entrance Credit Report (ECR) in one of the disciplines listed above to fulfill one of the three science requirement courses.

List of Approved Science Courses

The list of approved courses that fulfill the science requirement includes recommended sequences, science courses for non-science majors, and approved courses from departments not listed above and Barnard.

The following two courses may satisfy both the QR requirement and one science requirement when passed with a letter-grade of C or above. The P/D/F-grading option is not available for either of these two courses.

- Foundations of Science (SCNC UN1212)

  Using modern, student-centered, active and collaborative learning techniques, students will engage — through field observations, in-class experiments, computer simulations, and selected readings — with a range of ideas and techniques designed to integrate and anchor scientific habits of mind. Topics covered will include statistics, basic probability, a variety of calculations skills, graph reading and estimation, all aimed at elucidating such concepts as energy, matter, cells, and genes in the context of astronomy, biology, chemistry, earth sciences, neuroscience, and physics.

- Frontiers of Science (SCNC CC1000)

  The principal objectives of Frontiers of Science are to engage students in the process of discovery by exploring topics at the forefront of science and to inculcate or reinforce the specific habits of mind that inform a scientific perspective on the world. Sample topics include the evolution of human language, brain dynamics, global climate change, the nanoworld, and biodiversity, among others.

GS students interested in taking this course should have earned a minimum score of 16 on the GS Quantitative Reasoning Exam and/or meet the specific criteria listed for this course in the Quantitative Requirements Core section of the website by the specified timelines. Prior to enrolling in the course, students should also read the first chapter of the electronic textbook *Scientific Habits of Mind* and take the self-exam.

Courses Designed For Nonscience Majors

<table>
<thead>
<tr>
<th>Astronomy</th>
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<tbody>
<tr>
<td>ASTR UN1234</td>
<td>The Universal Timekeeper</td>
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<td>Reconstructing History Atom by Atom</td>
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<tr>
<td>ASTR UN1403</td>
<td>Earth, Moon and Planets (Lecture)</td>
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<td>ASTR UN1404</td>
<td>Stars, Galaxies and Cosmology (Lecture)</td>
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<td>ASTR UN1420</td>
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<td>ASTR UN1610</td>
<td>Theories of the Universe: From Babylon to the Big Bang</td>
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<tr>
<td>ASTR UN1836</td>
<td>Stars and Atoms</td>
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<tr>
<td>ASTR BC1753</td>
<td>Life in the Universe</td>
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<tr>
<td>ASTR BC1754</td>
<td>Stars, Galaxies, and Cosmology</td>
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</tbody>
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Recommended Sequences:

- ASTR UN1403
  - ASTR UN1404
  - Earth, Moon and Planets (Lecture) and Stars, Galaxies and Cosmology (Lecture)

- ASTR UN1403
  - ASTR UN1420
  - Earth, Moon and Planets (Lecture) and Galaxies and Cosmology

- ASTR UN1403
  - ASTR UN1836
  - Earth, Moon and Planets (Lecture) and Stars and Atoms

- ASTR UN1403
  - ASTR BC1754
  - Earth, Moon and Planets (Lecture) and Stars, Galaxies, and Cosmology

- ASTR BC1753
  - ASTR UN1404
  - Life in the Universe and Stars, Galaxies and Cosmology (Lecture)

- ASTR BC1753
  - ASTR BC1754
  - Life in the Universe and Stars, Galaxies, and Cosmology

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<thead>
<tr>
<th>Biology</th>
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<td>Theory and Practice of Science: Biology</td>
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<td>BIOL UN1130</td>
<td>Genes and Development</td>
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<tr>
<th>Computer Science</th>
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<tbody>
<tr>
<td>COMS W1001</td>
<td>Introduction to Information Science</td>
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<tr>
<td>COMS W1002</td>
<td>Computing in Context</td>
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<tr>
<th>Earth and Environmental Engineering</th>
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<tbody>
<tr>
<td>EAE E2100</td>
<td>A better planet by design</td>
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<tr>
<th>Earth and Environmental Sciences</th>
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<tbody>
<tr>
<td>EESC UN1001</td>
<td>Dinosaurs and the History of Life: Lectures and Lab</td>
</tr>
<tr>
<td>EESC UN1003</td>
<td>Climate and Society: Case Studies</td>
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<tr>
<td>EESC UN1011</td>
<td>Earth: Origin, Evolution, Processes, Future</td>
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<tr>
<td>EESC UN1030</td>
<td>Oceanography</td>
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<td>EESC UN1053</td>
<td>Planet Earth</td>
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<tr>
<td>EESC UN1201</td>
<td>Environmental Risks and Disasters</td>
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<tr>
<td>EESC UN1401</td>
<td>Dinosaurs and the History of Life: Lectures</td>
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<td>EESC UN1411</td>
<td>Earth: Origin, Evolution, Processes, Future: Lectures</td>
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<tr>
<td>EESC UN2330</td>
<td>SCIENCE FOR SUSTAINABLE DEVPT</td>
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<thead>
<tr>
<th>Ecology, Evolution, and Environmental Biology</th>
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<tr>
<td>EEEB W1001</td>
<td>Biodiversity</td>
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</tbody>
</table>
**EEEB UN1010** Human Origins and Evolution
**EEEB UN1011** Behavioral Biology of the Living Primates
**EEEB S1115S** The Life Aquatic

Recommended Sequences:
- **EEEB UN1001** Biodiversity
- **EEEB UN3087** Conservation Biology
- **EEEB UN1010** Human Origins and Evolution
- **EEEB UN1011** Behavioral Biology of the Living Primates

**Electrical Engineering**
**ELEN E1101** The digital information age

**Food Studies**
**FSEB UN1020** Food and the Body
**FSPH UN1100** FOOD, PUBLIC HEALTH & PUBLIC POLICY

**Philosophy**
**PHIL UN3411** Symbolic Logic
**PHIL GU4424** Modal Logic

**Physics**
**PHYS UN1001** Physics for Poets
**PHYS UN1018** Weapons of Mass Destruction

Recommended Sequences:
- **PHYS UN1001** Physics for Poets
- **PHYS C1002** and Physics for Poets

**Psychology**

Columbia Department only:
- **PSYC UN1001** The Science of Psychology
- **PSYC UN1010** Mind, Brain and Behavior

Recommended Sequences:
- **PSYC UN1001** The Science of Psychology
- **PSYC UN1010** and Mind, Brain and Behavior
- **PSYC UN1001** The Science of Psychology ((and any PSYC course numbered 22xx or 24xx***))

**Science**
**SCNC UN1212** Foundations of Science
**SCNC UN1800** Energy and Energy Conservation

**Statistics**
**STAT UN1001** Introduction to Statistical Reasoning
**STAT UN1010** Statistical Thinking for Data Science with Python Labs

**Additional Courses Approved for the Science Requirement**

Most of the following courses have required prerequisites and/or require instructor approval. Prerequisite and instructor approval requirements can be found in the course descriptions for each course or on the department website.

**Astronomy**
Any 3-point course numbered 2000 or higher

**Biology**
Any 3-point course numbered 2000 or higher

**Chemistry**
- **CHEM UN1403** General Chemistry I (Lecture)
- **CHEM UN1404** General Chemistry II (Lecture)
- **CHEM UN1500** General Chemistry Laboratory
- **CHEM UN1604** 2ND TERM GEN CHEM (INTENSIVE)
- **CHEM UN2507** Intensive General Chemistry Laboratory

Any 3-point course numbered 3000 or higher

**Computer Science**
- **COMS W1004** Introduction to Computer Science and Programming in Java
- **COMS W1005** Introduction to Computer Science and Programming in MATLAB
- **ENGI E1006** Introduction to Computing for Engineers and Applied Scientists
- **COMS W1007** Honors Introduction to Computer Science

Any 3-point course numbered 3000 or higher

**Computing Science - Philosophy (CSPH)**
- **CSPH G4801** Mathematical Logic I
- **CSPH G4802**

**Earth and Environmental Sciences**
- **EESC UN2100** Earth's Environmental Systems: The Climate System
- **EESC UN2200** Earth's Environmental Systems: The Solid Earth System
- **EESC UN2300** Earth's Environmental Systems: The Life System

Any 3-point course numbered 3000 or higher

**Ecology, Evolution, and Environmental Biology**
- **EEEB UN2001** Environmental Biology I: Elements to Organisms
- **EEEB UN2002** Environmental Biology II: Organisms to the Biosphere
- **EEEB UN3087** Conservation Biology (Any 3-point course numbered 3000 or higher except EEEB GU4321 or EEEB GU4700)

**History-Applied Math**
**HSAM UN2901** Data: Past, Present, and Future

**Mathematics**
Any 3-point course numbered 1100 or higher

**Physics**
- **PHYS UN1201** General Physics I
- **PHYS UN1202** General Physics II
- **PHYS UN1401** Introduction To Mechanics and Thermodynamics
- **PHYS UN1402** Introduction To Electricity, Magnetism, and Optics

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*Note:* Students electing to take Human Origins and Evolution (EEEB UN1010) and Behavioral Biology of the Living Primates (EEEB UN1011) as a sequence are recommended, but not required, to take EEEB UN1010 before EEEEB UN1011.

**Note:** 2600-, 3600-, or 4600-level psychology courses may not be used to fulfill the science requirement.

**Note:** The Science of Psychology (PSYC UN1001) or Mind, Brain and Behavior (PSYC UN1010) must be taken as a prerequisite to any psychology course numbered 22xx or 24xx.

**Students may not receive credit for both PSYC BC 1101 and PSYC UN 1001. Psychology majors should consult the Psychology department for additional restrictions on overlapping courses.
Science 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PHYS UN1403</td>
<td>Introduction to Classical and Quantum Waves</td>
</tr>
<tr>
<td>PHYS UN1601</td>
<td>Physics, I: Mechanics and Relativity</td>
</tr>
<tr>
<td>PHYS UN1602</td>
<td>Physics, II: Thermodynamics, Electricity, and Magnetism</td>
</tr>
</tbody>
</table>

Any 3-point course numbered 2000 or higher

**Psychology**

Any 3-point course numbered 32xx, 34xx, 42xx, or 44xx **

**Statistics**

Any 3-point course except STAT W3997

* **Note:** 2600-, 3600-, or 4600-level psychology courses may not be used to fulfill the science requirement.

** **Note:** These courses may serve as a second term of a recommended sequence starting with Mind, Brain and Behavior (PSYC UN1010) or The Science of Psychology (PSYC UN1001).

**Special Summer Program**

The following special program fulfills two of the three terms of the science requirement.

**Earth Institute Center for Environmental Sustainability [EICES]**

- Summer Ecosystem Experience for Undergraduates (SEE-U): Locations change yearly. Check with the center in the spring semester for details.