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 options 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. 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>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR UN1234</td>
<td>The Universal Timekeeper</td>
</tr>
<tr>
<td>ASTR UN1403</td>
<td>Earth, Moon and Planets (Lecture)</td>
</tr>
<tr>
<td>ASTR UN1404</td>
<td>Stars, Galaxies and Cosmology (Lecture)</td>
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<tr>
<td>ASTR UN1420</td>
<td>Galaxies and Cosmology</td>
</tr>
<tr>
<td>ASTR UN1453</td>
<td>Another Earth</td>
</tr>
<tr>
<td>ASTR UN1610</td>
<td>Theories of the Universe: From Babylon to the Big Bang</td>
</tr>
<tr>
<td>ASTR UN1836</td>
<td>Stars and Atoms</td>
</tr>
<tr>
<td>ASTR BC1753</td>
<td>Life in the Universe</td>
</tr>
<tr>
<td>ASTR BC1754</td>
<td>Stars, Galaxies, and Cosmology</td>
</tr>
</tbody>
</table>

Recommended Sequences:

- ASTR UN1403 and ASTR UN1404
- ASTR UN1403 and ASTR UN1420
- ASTR UN1403 and ASTR UN1836
- ASTR UN1403 and ASTR BC1754
- ASTR UN1404 and ASTR UN1404
- ASTR BC1753 and ASTR BC1754

List of Approved Science Courses

<table>
<thead>
<tr>
<th>Biology</th>
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</thead>
<tbody>
<tr>
<td>BIOL UN1002</td>
<td>Theory and Practice of Science: Biology</td>
</tr>
<tr>
<td>BIOL UN1130</td>
<td>Genes and Development</td>
</tr>
</tbody>
</table>

Computer Science

| Introduction to Information Science |
| Computing in Context |

Earth and Environmental Engineering

| A better planet by design |

Earth and Environmental Sciences

| Dinosaurs and the History of Life: Lectures and Lab |
| Climate and Society: Case Studies |
| Earth: Origin, Evolution, Processes, Future |
| Oceanography |
| Planet Earth |
| Environmental Risks and Disasters |
| Dinosaurs and the History of Life: Lectures |
| Earth: Origin, Evolution, Processes, Future: Lectures |
| SCIENCE FOR SUSTAINABLE DEVPT |

Ecology, Evolution, and Environmental Biology

| Biodiversity |

EEEB W1001
**Recommended Sequences:**

- EEEB UN1010 - EEEB UN1011
- EEEB UN1001 - EEEB UN3087

**Electrical Engineering**

ELEN E1101 - The digital information age

**Food Studies**

FSEB UN1020 - Food and the Body

**Philosophy**

PHIL UN3411 - Symbolic Logic

**Physics**

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

**Psychology**

- PSYC UN1001 - The Science of Psychology
- PSYC UN1010 - Mind, Brain and Behavior

**Science**

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

**Statistics**

- STAT UN1001 - Introduction to Statistical Reasoning

### 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 - Intensive General Chemistry (Lecture)
- CHEM UN2507 - Intensive General Chemistry Laboratory

#### 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

#### 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

#### 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<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>
<tr>
<td>Any 3-point course numbered 2000 or higher</td>
<td></td>
</tr>
<tr>
<td><strong>Psychology</strong></td>
<td></td>
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<tr>
<td>Any 3-point course numbered 32xx, 34xx, 42xx, or 44xx **</td>
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</tr>
<tr>
<td><strong>Statistics</strong></td>
<td></td>
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<tr>
<td>Any 3-point course except STAT W3997</td>
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</tbody>
</table>

**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.