Looking for a Major? How about majoring in the Physical Sciences?

Lower-division requirements for Physical Sciences Majors

<table>
<thead>
<tr>
<th>Majors</th>
<th>Math</th>
<th>Physics</th>
<th>Chemistry</th>
<th>Other</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Math/Math</td>
<td>1A-1B 53-54, 55</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astrophysics</td>
<td>1A-1B 53-54</td>
<td>7A-7B-7C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td>1A-1B 53-54</td>
<td>7A-7B</td>
<td>4A, 4B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Science</td>
<td>1A-1B 53, 54</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Earth &amp; Planetary Science (6 Majors):</td>
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</tr>
<tr>
<td>Atmospheric, Geophysics, Planetary Science</td>
<td>1A-1B 53-54</td>
<td>7A-7B-7C</td>
<td>1A</td>
<td></td>
<td>EPS 50</td>
</tr>
<tr>
<td>Geology</td>
<td>1A-1B 7A-7B</td>
<td>1A</td>
<td>EPS 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment Earth Science, Marine Science</td>
<td>16A-16B or 1A, 1B 8A-8B</td>
<td>7A, 7B</td>
<td>1A</td>
<td>EPS 50, Bio 1B</td>
<td></td>
</tr>
<tr>
<td>Operations Research and Management Science</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ORMS)</td>
<td>1A-1B 53-54</td>
<td></td>
<td></td>
<td>EPS 50, Engin 7; Econ 1, 2 or 3; UGBA 10</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>1A-1B 53-54</td>
<td>7A-7B-7C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics</td>
<td>1A-1B 53-54</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Stat 20 is required for the Teaching Concentration only
See Astronomy Recommended Astro 7A-7B
For more information, contact Matt Munday at munday@berkeley.edu
Visit 305 McCone for program planning for any of the six Earth and Planetary Science majors or email nspingola@berkeley.edu for an appointment.
For more information, contact Anayancy Paz at anayancypaz@ieor.berkeley.edu
Good HS Chemistry or College Chemistry recommended
Stat 2, 20, 21 or 131A recommended. Students must earn at least a 3.2 GPA in lower-division Math prerequisites with no lower than a C in each, and at least a B- in either Stat 134 or Stat 135 before declaring.

**The information provided above is subject to change. It is strongly recommended that you see an advisor from the major for more detailed information**

Applied Mathematics / Mathematics

Thomas Brown  brown@math.berkeley.edu  965 Evans Hall  (510) 643-9292  http://math.berkeley.edu/
Jennifer Sixt Pinney  jensixt@math.berkeley.edu  964 Evans Hall  (510) 643-4148

The Department of Mathematics offers two undergraduate programs leading to a B.A. degree: mathematics and applied mathematics. Both majors give the student a strong, well-rounded mathematical background and provide excellent preparation for graduate study in mathematics, statistics, computer science, or operations research as well as the professional study of law, medicine, business, or education. They also prepare students for a wide range of careers in industry and government.

The major in applied mathematics includes a cluster of courses in an area where mathematics are applied, such as actuarial science, computer science, economics, numerical analysis, operations research, quantum mechanics, or statistics.

A new teaching concentration is offered as part of the Mathematics major and is designed to increase the number and quality of math teachers. It includes a modification to the typical major course sequence and has an additional lower-division requirement of Statistics 20.
The study of astronomy provides good training in problem-solving capabilities, logical thinking, and the ability to synthesize a variety of information which is relevant to a given problem or phenomenon.

The Department of Astronomy offers undergraduate majors instruction in a wide variety of fields, including theoretical and observational astrophysics; infrared, optical, and radio astronomy; galactic structure and dynamics of stellar systems; high-energy astrophysics and cosmology; and spectroscopy. The major is also intended to be useful to students who do not contemplate a career in research astronomy, but who might want to work with government agencies (e.g. NASA), aerospace companies, or in a general quantitatively oriented career.

Computer Science  
Christopher Hunn  
ctunn@berkeley.edu  
377 Soda Hall  
(510) 642-7214  
http://www.eecs.berkeley.edu/

Our emphasis is on the science of computer science. It includes the design and analysis of algorithms, complexity theory, artificial intelligence, computer graphics, database systems, machine architecture and logic design, operating systems, programming systems, security, and programming languages and compiler design. Our goal is to prepare students both for a possible research career and long-term technical leadership in industry. We must give students the big ideas and the learning skills that will prepare them to teach themselves about tomorrow’s technology. A bachelor’s degree in CS qualifies one for a diverse variety of interesting positions: design teams on large systems projects; applications programming or technical writing; positions that are only partly technical, such as in computer marketing or sales; work for Fortune 500 companies, small Silicon Valley start-ups, or to be self-employed.

Earth and Planetary Science  
Nadine Spingola-Hutton  
nspingola@berkeley.edu  
305 McCone Hall  
(510) 643-4068  
http://eps.berkeley.edu/

If you love the planet earth and beyond, EPS may be the major for you. Students choose from one of six majors – geology, geophysics, atmospheric science, planetary science, environmental earth science, and marine science. Our classes are relatively small and highly interactive, allowing students ample opportunities to interact personally with faculty and graduate students; many of our courses include field trips to a variety of sites in the western region and opportunities to learn computer and global positioning systems applications. The department also offers a number of research opportunities for undergraduates.

Many of our majors continue to graduate school. A number of geoscientists work in private industry. Petroleum companies, mining and quarrying companies, engineering and environmental consulting and construction firms are among potential employers. The government, at the federal and state level, colleges and universities, non-profit research institutions, and museums also hire EPS graduates.

Operations Research and Management Science (ORMS)  
Anayancy Paz  
anayancy@berkeley.edu  
4145 Etcheverry Hall  
(510) 642-5485  
http://www.ieor.berkeley.edu/

ORMS is a discipline-spanning major. It provides a unique opportunity to develop analytical and math-modeling skills, as well as a deep understanding of an area of application, such as sociology, economics, or industrial and service systems. The major is new, but we expect our graduates to help understand issues and solve problems in health care, public policy, human resource management, etc.

Physics  
Claudia Trujillo  
trujillo@physics.berkeley.edu  
368 LeConte Hall  
(510) 642-0481  
http://physics.berkeley.edu/

Kathy Lee  
kathyl@berkeley.edu  
376 LeConte Hall  
(510) 643-5261  
http://physics.berkeley.edu/

Physics is the study of the universe, from the very large (star formation, cosmic microwave background radiation) to the very small (nanotechnology, atomic cooling and trapping, string theory), and everything in between (biophysics, and the physics of solid state devices, just to name a few). Our undergraduate program aims to provide a broad and solid background in fundamental physics through introductory course work, and then to engage all our majors who are interested in current research with some of the top research groups worldwide.

We believe a Physics degree represents strong training for a broad range of careers. Approximately half of our recent graduates have continued to graduate school in Physics and related fields; others have taken jobs in high tech industries or as management consultants, and still others have entered medical school. We aim to help our majors develop strong mathematical and analytical skills, good laboratory skills, effective written and oral communication skills, and of course a solid understanding of the fundamental laws that govern the universe.

Statistics  
Denise Yee  
dyee@berkeley.edu  
367A Evans Hall  
(510) 643-6131  
http://statistics.berkeley.edu/

Statistics provides a mathematical and conceptual framework for understanding randomness and uncertainty and the computational framework for working with data, including massive datasets that arise in fields such as computational biology, astrophysics, and the Internet. The educational and research activities of the faculty and students span a broad range of topics in statistics and probability. Many faculty are actively involved in statistical problems that arise in such diverse fields as finance, genetics, molecular biology, astronomy, geophysics and planetary physics, the US Census, clinical trials, neurophysiology, sociology, political science, education, elections, and demography. Typical future careers for statistics graduates are in the quantitative side of finance and banking, biotechnology, the pharmaceutical industry, web search, targeted marketing, market research and polling, actuarial and insurance work, and various arms of the government such as the Census Bureau and the National Security Agency.
### MCB & IB Major Prerequisite Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>AP Scores that satisfy</th>
<th>Prerequisites</th>
<th>Alternatives</th>
<th>Recommendations/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1A or 10A*</td>
<td>4</td>
<td></td>
<td>3 1/2 years of H.S. math, incl trig &amp; analytic geometry, plus a satisfactory grade in one of the following: CEEB MAT test, Math AP test, the UC/CSU math diagnostic test, or Math 32 (Precalculus).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 1B or 10B*</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chem 1A/1AL</td>
<td>3/1</td>
<td>4 on AP Chem for MCB only</td>
<td>H.S. Chemistry. No credit after taking Chem 4A.</td>
<td></td>
<td>•Chem P (Fall only) - review of H.S. chemistry/preview of Chem 1A. Recommended before Chem 1A if Chem was last taken in soph/jr yr of H.S. Offered by the Student Learning Center. 3 hrs/wk. No units or grade.</td>
</tr>
<tr>
<td>Chem 3A/AL</td>
<td>3/2</td>
<td></td>
<td>C- or higher in Chem 1A or an AP Chem score of 4 or 5.</td>
<td>Biological Chemistry students (BMB, track 2) must take Chemistry 1B and Chemistry 112A/112B instead of Chem 3A and Chem 3B.</td>
<td>3AL may be taken concurrently or after earning at least a C- in Chem 3A.</td>
</tr>
<tr>
<td>Chem 3B/BL</td>
<td>3/2</td>
<td></td>
<td>Chem 3B: C- or higher in Chem 3A or Chem 112A.</td>
<td></td>
<td>3BL may be taken concurrently or after earning at least a C- in Chem 3B. If you take Chem 3B, Bio 1A, and Bio 1AL together (NOT RECOMMENDED), take Chem 3BL another semester.</td>
</tr>
<tr>
<td>Biology 1A/AL</td>
<td>3/2</td>
<td>4/5 on AP Chem exam 4AP Bio=1A &amp; 1B MCB only.</td>
<td>C- or higher in Chem 1A/1AL Chem 3A/3AL or Chem 112A recommended.</td>
<td></td>
<td>Bio 1A strongly recommended regardless of AP score and only after earning at least a C- in Chem 3A. Lab must be taken concurrently.</td>
</tr>
<tr>
<td>Biology 1B</td>
<td>4</td>
<td></td>
<td>Usually taken before Bio 1A/AL.</td>
<td></td>
<td>Bio 1B is taken before Bio 1A and recommended regardless of AP score. Lab is part of enrollment in the lecture.</td>
</tr>
<tr>
<td>Physics 8A</td>
<td>4</td>
<td></td>
<td>Math 16A or equivalent, or consent of instructor.</td>
<td></td>
<td>H.S. Physics, or some intro exposure to concepts, problems &amp; calculations is strongly recommended.</td>
</tr>
<tr>
<td>Physics 8B</td>
<td>4</td>
<td></td>
<td>Physics 8A or equivalent.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Switching between the math 1 series and the math 10 series is not allowed. For example, you cannot take Math 1A and then Math 10B. Students who enroll in the 10 series are expected to complete both parts.**

Chem 1A/1AL & Math 1A or 10A are a good 1st semester combination.

* Most medical, dental, pharmacy, and graduate schools require these courses regardless of AP scores.

Mrl 3/5/13
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
<th>Recommendations/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 2 of the following - 32, 16A, 16B, H16B, 1A, 1B, H1B, 10A, 10B (may be able to use AP work for major*)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 32 (Precalculus)</td>
<td>3</td>
<td>3 years of H.S. math, plus a satisfactory grade on one of the following: CEEB MAT test, Math SAT, or the UC/CSU math diagnostic test.</td>
<td></td>
</tr>
<tr>
<td>Math 1A</td>
<td>4</td>
<td>3 1/2 years of H.S. math, including trig and analytic geometry, plus a satisfactory grade on one of the following: CEEB MAT test, Math AP test, the UC/CSU math diagnostic test, or Math 32 (Precalculus).</td>
<td></td>
</tr>
<tr>
<td>Math 1B</td>
<td>4</td>
<td>Math 1A</td>
<td></td>
</tr>
<tr>
<td>Math 10A</td>
<td>4</td>
<td>Same as Math 1A</td>
<td></td>
</tr>
<tr>
<td>Math 10B</td>
<td>4</td>
<td>Math 10A</td>
<td></td>
</tr>
<tr>
<td>Math 16A</td>
<td>3</td>
<td>Same as Math 1A</td>
<td></td>
</tr>
<tr>
<td>Math 16B</td>
<td>3</td>
<td>Math 16A</td>
<td></td>
</tr>
</tbody>
</table>

**Biological Science: Bio 1B & either Bio 1A/1AL or 2 of the following: MCB 11, 32, 41, 50, 55, or 61, or Nutri Sci 10 **

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
<th>Recommendations/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology 1A/1AL</td>
<td>3/2</td>
<td>C- or higher in Chem 3A or Chem 112A. Chem 3B recommended.</td>
<td>If you take Bio 1A, Bio 1AL, and Chem 3B together (NOT RECOMMENDED), take Chem 3BL another semester.</td>
</tr>
<tr>
<td>Biology 1B</td>
<td>4</td>
<td>Usually taken before Bio 1A/AL.</td>
<td>A grade of B- or higher is required to declare Public Health.</td>
</tr>
<tr>
<td>MCB 11</td>
<td>3</td>
<td>No prereqs, but students will receive no credit after taking Bio 1A or 11, or Chem 3A-3B, 10, 112A, 112B, or 112H.</td>
<td></td>
</tr>
<tr>
<td>MCB 32</td>
<td>3</td>
<td>One year H.S. or college chemistry.</td>
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</tr>
<tr>
<td>MCB 41</td>
<td>3</td>
<td></td>
<td>Primarily for students not specializing in biology.</td>
</tr>
<tr>
<td>MCB 50</td>
<td>3</td>
<td>H.S. chemistry or Chem 1A and H.S. biology or Bio 1A.</td>
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</tr>
<tr>
<td>MCB 55</td>
<td>3</td>
<td>No prereqs, but students will receive no credit after taking MCB 100, C100A, 100B, 103, C103, C130, PMB C103, or Public Health C102.</td>
<td></td>
</tr>
<tr>
<td>MCB 61</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutri Sci 10</td>
<td>3</td>
<td>No prereqs, but students will receive no credit after taking NS 103 or 160.</td>
<td></td>
</tr>
</tbody>
</table>

**Social Science: three courses from at least two of the following groups (may be able to use AP work*)

Anthropology 3 or 3AC  Economics 1, 2, or 3  Political Science 2 or 4  Psychology 1 or 2  Sociology 1, 3, 3AC, or 5

Public Health 14 is recommended.

* See the Public Health Undergraduate Major adviser for details. Medical, dental, pharmacy, and graduate schools may require these courses regardless of AP scores.

** Bio 1A/1AL strongly preferred.