The major in **Chemical Biology** provides an understanding of the chemical principles of biological function by emphasizing the development of a solid background in chemistry. In addition to an introductory set of math and physics courses and a broad selection of the same chemistry courses required for the chemistry major, students pursuing the chemical biology major take general and cell biology, biochemistry, biological macromolecular synthesis, and bioinorganic chemistry. The curriculum highlights organic chemistry, quantitative thermodynamics, and kinetics, subjects necessary for understanding the logic of biological systems. The Chemical Biology major is intended for students who are interested in careers as professional chemists, or in the biological sciences including the biomedical, biotechnology, and pharmaceutical industries.

Please note that Chemical Biology is distinct from Biochemistry. Biochemistry at UC Berkeley is an emphasis within the Molecular and Cell Biology major, housed in the College of Letters and Science. For a detailed understanding of distinctions between Chemical Biology and Molecular and Cell Biology, review and compare upper-division course requirements and descriptions for both majors.

Transfer applicants are expected to complete, at a minimum, coursework equivalent to Berkeley's:

- CHEMISTRY 1A + 1AL + 1B + 3A + 3AL + 3B + 3BL
- MATH 1A + 1B + 53
- PHYSICS 7A or 8A
- ENGLISH R1A + R1B

**Coursework must be completed by the end of the spring term that precedes fall enrollment at Berkeley.**

IGETC is not required. Students who choose to complete the entire IGETC pattern by the end of the spring term preceding fall enrollment at Berkeley may use IGETC to fulfill the Reading and Composition and Foreign Language Requirements.

Lower division courses required for graduation (but not for admission) are also listed in this Guidelines. Completion of those courses is strongly recommended in order to strengthen one's application. All major courses must be taken for a letter grade. High grades in major courses (B and A grades exclusively) are essential for applicants to be both competitive in the admissions process and to be adequately prepared to continue with junior year coursework at Berkeley.

The applicant's personal statement is important in the admissions process. The personal statement is reviewed for evidence of the student's interest in the chosen field and a thoughtful match between the intended major and academic and career objectives.
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Chemical Biology, Lower Division B.S. (continued)

For more information on College of Chemistry policies and degree programs:
http://chemistry.berkeley.edu/ugrad/degrees/chembio

For more information on admission to UC Berkeley:
http://admissions.berkeley.edu

For more information on majors at UC Berkeley:
Berkeley Academic Guide: http://guide.berkeley.edu

Additional questions about transferring to the College of Chemistry may be addressed to:
Sanjeev Chahal, Academic Adviser
sanjeev@berkeley.edu
(510) 642-7919

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CHEMISTRY

Courses that satisfy the combination of CHEM 1A + 1AL + CHEM 1B + CHEM 15 are considered equivalent to CHEM 4A + 4B at Berkeley.

CHEM 1A & General Chemistry (3) | CHEM 1A General Chemistry (5)
CHEM 1AL General Chemistry (1) | Laboratory |

CHEM 1B General Chemistry (4) | CHEM 1B General Chemistry (5)

CHEM 15 Analytical and Biological Chemistry (3) | NO COURSE ARTICULATED

NOTE: Chemical Biology majors who transfer without having covered analytical chemistry are required to take CHEM 15 or CHEM 105 after transfer.

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ORGANIC CHEMISTRY

CHEM 12A + 12B (organic chemistry) are required for the Chemical Biology B.S. degree.

Completion of CHEM 3A + 3AL + 3B + 3BL combined with a score in the 75th percentile or higher on the American Chemical Society (ACS) Organic Chemistry Exam will constitute satisfactory completion of Berkeley's CHEM 12A + 12B.

Students are encouraged to take the exam through their community college, if possible. NOTE: The College of Chemistry does not accept results from the 1994 and 1998 versions of the ACS Organic Chemistry Exam.

CHEM 3A & Chemical Structure and Reactivity (3) | CHEM 12A & Organic Chemistry (5)
CHEM 3AL & Organic Chemistry (2) | Laboratory |
CHEM 3B & Chemical Structure and Reactivity (3) |
CHEM 3BL Organic Chemistry (2) | Laboratory |
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Chemical Biology, Lower Division B.S. (continued)

**MATHEMATICS**

You may also satisfy this requirement with a score/grade of:

3 or higher on the AP Calculus AB exam satisfies MATH 1A;

3 or 4 on the AP Calculus BC exam satisfies MATH 1A;

5 on the AP Calculus BC exam satisfies MATH 1A + 1B.

<table>
<thead>
<tr>
<th>MATH 1A</th>
<th>Calculus</th>
<th>(4)</th>
<th>MATH 3A</th>
<th>Calculus I</th>
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<tbody>
<tr>
<td>MATH 1B</td>
<td>Calculus</td>
<td>(4)</td>
<td>MATH 3B</td>
<td>Calculus II</td>
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<tr>
<td>MATH 53</td>
<td>Multivariable Calculus</td>
<td>(4)</td>
<td>MATH 3C</td>
<td>Calculus III</td>
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<tr>
<td>MATH 54</td>
<td>Linear Algebra and Differential Equations</td>
<td>(4)</td>
<td>MATH 3E &amp;</td>
<td>Linear Algebra Differential Equations</td>
<td>(3)</td>
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</tbody>
</table>

**PHYSICS**

PHYSICS 7C is not required for the Chemical Biology major, but it is acceptable toward the 7-Unit Upper Division Chemistry and Allied Subjects Requirement.

| PHYSICS 7A | Physics for Scientists and Engineers | (4) | PHYS 4A | General Physics with Calculus | (5) |
| PHYSICS 7B | Physics for Scientists and Engineers | (4) | PHYS 4B | General Physics with Calculus | (5) |
| PHYSICS 7C | Physics for Scientists and Engineers | (4) | PHYS 4C | General Physics with Calculus | (5) |

**-- OR --**

| PHYSICS 8A | Introductory Physics | (4) | PHYS 3A | General Physics | (5) |
| PHYSICS 8B | Introductory Physics | (4) | PHYS 3B | General Physics | (5) |

**BIOLOGY**

You may also satisfy this requirement with a score/grade of:

4 or higher on the AP Biology exam.

| BIOLOGY 1A | General Biology | (3) | BIOL 1A | General Biology | (5) |
| BIOLOGY 1AL | General Biology | (2) | Laboratory | |
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Chemical Biology, Lower Division B.S. (continued)

READING AND COMPOSITION REQUIREMENT

Coursework equivalent to Berkeley's:
   English R1A + R1B; or
   Entire IGETC pattern completed by the end of the spring term preceding fall enrollment at Berkeley.

NOTE: You may also satisfy this requirement with a score/grade of:
   4 or 5 on the AP exam in English Language and Composition satisfies ENGLISH R1A;
   4 on the AP exam in English Literature and Composition satisfies ENGLISH R1A;
   5 on the AP exam in English Literature and Composition satisfies ENGLISH R1A + R1B.

LANGUAGE OTHER THAN ENGLISH (LOTE) REQUIREMENT

The Language Other Than English (LOTE) Requirement may be satisfied after transfer, but it should be satisfied by the end of the student's third (junior) year.

To satisfy this Requirement:

Complete a course equivalent to the third year of a language other than English in high school with a grade of C- or higher, or the second semester of a language other than English as taught at Berkeley; or

Complete the entire IGETC pattern by the end of the spring term preceding fall enrollment at Berkeley; or

You may satisfy this Requirement with a score/grade of:
   550 on the SAT II Foreign Language Subject Exam, if taken before May 1995;
   590 on the SAT II Subject Exam, if taken May 1995 or later;
   3 or better on an AP Foreign Language Exam;
   C or better on a GCE "A" or "O" Level Foreign Language Exam.
   5 or better on a Higher Level IB Foreign Language A or B Exam.

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Chemical Biology, Lower Division B.S. (continued)

| Courses that satisfy the Language Other Than English requirement: |
| ARAB 1B | Elementary Modern | (5) |
| ASL 51 | American Sign Language | (4) |
| ASL 52 | American Sign Language | (4) |
| ASL 53 | American Sign Language | (4) |
| ASL 55B | History and Culture of Deaf People in America | (3) |
| ASL 57 | Structure of American Sign Language | (3) |
| FREN 1B | Elementary French | (5) |
| PORT 1B | Elementary Portuguese | (5) |
| SPAN 1B | Elementary Spanish | (5) |

(May be taken for a letter grade or pass/no pass).

END OF MAJOR