To be Adopted:

**Proposed Changes to Major Requirements for the B.A. and B.S. Degrees in Chemistry**

1. **Present**

   *For the Bachelor of Arts*

   1. Lower-division requirements (45–48 units)
      a) MATH 009A-MATH 009B-MATH 009C, MATH010A
      b) PHYS 040A, PHYS 040B, PHYS 040C (or PHYS 002A, PHYS 002B, PHYS 002C)
      c) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005

   2. Upper-division requirements (38 units)
      a) CHEM 110A, CHEM 110B, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 125; CHEM 150A, CHEM 191, and either CHEM 111 or CHEM 166
      b) Ten (10) additional upper-division units in Chemistry if the year of organic Chemistry is taken at a community college.

1. **Proposed**

   *For the Bachelor of Arts*

   1. Lower-division requirements (48–49 units)
      a) MATH 009A-MATH 009B-MATH 009C, MATH010A
      b) PHYS 040A, PHYS 040B, PHYS 040C (or PHYS 002A, PHYS 02LA, PHYS 002B, PHYS 02LB, PHYS 002C, PHYS 02LC)
      c) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005

   2. Upper-division requirements (38 units)
      A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.A. degree.
      a) CHEM 110A, CHEM 110B, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 125; CHEM 150A, CHEM 191, and either CHEM 111 or CHEM 166
      b) Ten (10) additional upper-division units in Chemistry if the year of organic Chemistry is taken at a community college.

**Justification**

The catalog text does not specifically state that the Physics 2 series should also include the associated labs, the addition of “(PHYS 02LA, PHYS 02LB, PHYS 02LC)” makes this clear. The intent has always been to have the labs required.

A minimum grade of “C-” for any upper-division course required for the B.A. degree is intended to ensure that all students who earn a degree have minimum competency in the different Chemistry sub-disciplines.

Unit changes reflect a re-calculation for CHEM01HC (which is a 5-unit course).
2. Present

For the Bachelor of Science

1. Lower-division requirements (61 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C
      (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C,
      MATH 010A-MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C,
      PHYS 040D

2. Upper-division requirements (50 units)
   a) CHEM 110A, CHEM 110B, CHEM 111,
      CHEM 112A-CHEM 112B-CHEM 112C,
      CHEM 113, CHEM 125, CHEM 150A,
      CHEM 191
   b) Two laboratory courses from the group
      CHEM 140, CHEM 166, BCH 102
   c) One course from the group
      CHEM 150B, CHEM 135/ENSC
      135/ENTX 135, CHEM 136/ENSC
      136/ENTX 136, BCH 110A

2. Proposed

For the Bachelor of Science

1. Lower-division requirements (61-62 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C
      (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C,
      MATH 010A-MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C,
      PHYS 040D

2. Upper-division requirements (50 units)
   A minimum grade of “C-” for any upper-
   division course used to fulfill the requirements
   for the B.S. degree.
   a) CHEM 110A, CHEM 110B, CHEM 111,
      CHEM 112A-CHEM 112B-CHEM 112C,
      CHEM 113, CHEM 125, CHEM 150A,
      CHEM 191
   b) Two laboratory courses from the group
      CHEM 140, CHEM 166, BCH 102
   c) One course from the group
      CHEM 150B, CHEM 135/ENSC
      135/ENTX 135, CHEM 136/ENSC
      136/ENTX 136, BCH 110A

Justification

A minimum grade of “C-” for any upper-division course required for the B.S. degree is intended to ensure that all
students who earn a degree have minimum competency in the different Chemistry sub-disciplines.

Unit changes reflect a re-calculation for CHEM01HC (which is a 5-unit course).
3. **Present**

Major Requirements for the Bachelor of Science in Chemistry with a Chemical Physics option are as follows:

1. Lower-division requirements (61 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C, MATH 010A-MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D (or, with permission of the Undergraduate Advisor, PHYS 002A, PHYS 002B, PHYS 002C)

2. Upper-division requirements (74 units)
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 140, CHEM 150A, CHEM 150B, CHEM 191
   b) Twenty-four (24) units of upper-division course work in Mathematics or Physics (110 or above excluding 190 series)
   c) Nine (9) additional units in physical chemistry

**Justification**

(or, with permission of the Undergraduate Advisor, PHYS 002A, PHYS 002B, PHYS 002C) removed to be consistent with other options.

A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.S. degree in Chemistry with a Chemical Physics option.

Unit changes reflect a re-calculation for CHEM01HC (which is a 5-unit course).

3. **Proposed**

Major Requirements for the Bachelor of Science in Chemistry with a Chemical Physics option are as follows:

1. Lower-division requirements (61-62 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C, MATH 010A-MATH 010B, MATH 046
   c) PHYS 040A, PHYS 040B, PHYS 040C, PHYS 040D (or, with permission of the Undergraduate Advisor, PHYS 002A, PHYS 002B, PHYS 002C)

2. Upper-division requirements (74 units)
   A minimum grade of “C-” for any upper-division course required for the B.S. degree in Chemistry with a Chemical Physics option is intended to ensure that all students who earn a degree have minimum competency in the different Chemistry sub-disciplines.
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 140, CHEM 150A, CHEM 150B, CHEM 191
   b) Twenty-four (24) units of upper-division course work in Mathematics or Physics (110 or above excluding 190 series)
   c) Nine (9) additional units in physical chemistry

A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.S. degree in Chemistry with a Chemical Physics option.

Unit changes reflect a re-calculation for CHEM01HC (which is a 5-unit course).
4. Present

Major Requirements for the Bachelor of Science in Chemistry with an Environmental Chemistry option are as follows:

Students must consult with the Undergraduate Advisor before electing this option.

1. Lower-division requirements (73 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C, MATH 010A-MATH 010B, and MATH 046
   c) PHYS 040A-PHYS 040B-PHYS 040C-PHYS 040D
   d) BIOL 005A-BIOL 005B-BIOL 005C

2. Upper-division requirements (65-67 units)
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 125, CHEM 135, CHEM 136, CHEM 140, CHEM 150A, CHEM 166, CHEM 191
   b) One course from GEO 137 or SLSC 104
   c) Two additional courses from the group CHEM 150B, CHEM 197, CHEM 199, ENSC 140, ENSC 142, ENSC 155, ENSC 163, ENTX 101, GEO 137, GEO 158, GEO 160e A, SLSC 104 (4 units total from CHEM 197 and/or CHEM 199)

Undergraduate research is strongly encouraged for students with the requisite ability. Students wishing to participate in this activity should contact individual staff members concerning areas of interest.

Justification

A minimum grade of “C-” for any upper-division course used to fulfill the requirements for the B.S. degree in Chemistry with an Environmental Chemistry option is intended to ensure that all students who earn a degree have minimum competency in the different Chemistry sub-disciplines.

Unit changes reflect a re-calculation for possible course choices offered in 2b) and 2c).

GEO 160A was renamed to GEO 160 effective 98F.

4. Proposed

Major Requirements for the Bachelor of Science in Chemistry with an Environmental Chemistry option are as follows:

Students must consult with the Undergraduate Advisor before electing this option.

1. Lower-division requirements (73-74 units)
   a) CHEM 001A-CHEM 001B-CHEM 001C (or CHEM 01HA-CHEM 01HB-CHEM 01HC), CHEM 005
   b) MATH 009A-MATH 009B-MATH 009C, MATH 010A-MATH 010B, and MATH 046
   c) PHYS 040A-PHYS 040B-PHYS 040C-PHYS 040D
   d) BIOL 005A-BIOL 005B-BIOL 005C

2. Upper-division requirements (64-68 units)
   a) CHEM 110A, CHEM 110B, CHEM 111, CHEM 112A-CHEM 112B-CHEM 112C, CHEM 113, CHEM 125, CHEM 135, CHEM 136, CHEM 140, CHEM 150A, CHEM 166, CHEM 191
   b) One course from GEO 137 or SLSC 104
   c) Two additional courses from the group CHEM 150B, CHEM 197, CHEM 199, ENSC 140, ENSC 142, ENSC 155, ENSC 163, ENTX 101, GEO 137, GEO 158, GEO 160e A, SLSC 104 (4 units total from CHEM 197 and/or CHEM 199)

Undergraduate research is strongly encouraged for students with the requisite ability. Students wishing to participate in this activity should contact individual faculty members concerning areas of interest.

Justification

A minimum grade of “C-” for any upper-division course required for the B.S. degree in Chemistry with a Environmental Chemistry option is intended to ensure that all students who earn a degree have minimum competency in the different Chemistry sub-disciplines.

Unit changes reflect a re-calculation for possible course choices offered in 2b) and 2c).

GEO 160A was renamed to GEO 160 effective 98F.
### Proposed Changes to Chemistry Sample Programs

#### 5. Present

**SAMPLE PROGRAM**

Student programs are planned on an individual basis with their advisors, and there is considerable flexibility in the sequence in which courses required for the major are taken. For example, Physics 40A-40B-40C can be started equally well during either the freshman or sophomore year. The sample program is typical for a well-prepared entering freshman who seeks the B.S. degree.

<table>
<thead>
<tr>
<th>5230 Freshman Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1A-1B-1C</td>
<td>4</td>
<td>4 (or 5)</td>
</tr>
<tr>
<td>(or 1HA-1HB-1HC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 40A-40B</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 9A-9B-9C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>English 1A-1B-1C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Elective (optional)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>16 (or 12)</strong></td>
<td><strong>17 (or 18)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5230 Sophomore Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 112A-112B-112C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Physics 40C, 40D</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 10A, 10B, 46</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Biology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>17</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5230 Junior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 110A-110B, 113</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 111, 140</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 5, 125, 191</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>17</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5230 Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 150A-150B</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 166</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>12</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

#### Justification

CHEM 150A/B needs to be moved to Winter/Spring to accommodate taking the CHEM 110A prerequisite in the Fall quarter. We propose to add CHEM 110A (Physical Chemistry: Chemical Thermodynamics), or CHEM 109, as a prerequisite to better prepare students for CHEM 150A. (Note: Nearly fifty percent of CHEM 150A students in Fall 1998 received grades below “C-”). The Physical Chemistry (and the corresponding Math and Physics prerequisites) will better prepare students for the structure, bonding, and oxidation states of inorganic compounds covered in CHEM 150A.

The addition of the phrase “Biological Science w/Lab” was included for Breadth requirement clarification.

**Effective:** Fall Quarter, 1999

Approved by the Chemistry Department Faculty: March 17, 1999
Approved by CNAS Executive Committee: April 14, 1999
Approved by Committee on Educational Policy: April 20, 1999

#### 5. Proposed

**SAMPLE PROGRAM**

Student programs are planned on an individual basis with their advisors, and there is considerable flexibility in the sequence in which courses required for the major are taken. For example, Physics 40A-40B-40C can be started equally well during either the freshman or sophomore year. The sample program is typical for a well-prepared entering freshman who seeks the B.S. degree.

<table>
<thead>
<tr>
<th>6430 Freshman Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 1A-1B-1C</td>
<td>4</td>
<td>4 (or 5)</td>
</tr>
<tr>
<td>(or 1HA-1HB-1HC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 40A-40B</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 9A-9B-9C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>English 1A-1B-1C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>16</strong></td>
<td><strong>17 (or 18)</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6430 Sophomore Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 112A-112B-112C</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Physics 40C, 40D</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 10A, 10B, 46</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Biological Science w/Lab</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>17</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6430 Junior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 110A-110B, 113</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 111, 140</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 5, 125, 191</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>17</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6430 Senior Year</th>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 150A-150B</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 166</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total Units</strong></td>
<td><strong>12</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>