Principles of Chemistry 120

Principles of Chemistry 120 is a one-semester course to introduce you to the central ideas and theories of chemistry

• What are the basic properties of nuclei and atoms?
• How are atoms linked together to form compounds?
• What interactions between atoms determine the states of matter?
• What determines whether or not a chemical reaction will form products?
• How fast do the products of a reaction form?
• How much of the product is formed in a reaction?

Chemistry 120 is the first course in the sequence for chemistry for those students interested in science majors (chemistry, geology, biology, physics, neuroscience) and pre-professional students (the health professions and engineering). Although there are no prerequisite courses for Chemistry 120, some high school chemistry is helpful. A thorough knowledge of algebra and trigonometry, but not calculus, is highly recommended.

Instructor
Professor Karen S. Brewer

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Room 1075, Science Center

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Telephone
859-4726, office

Office Hours
Monday evening 9:00 pm–12:00 midnight
Thursday 12:00 noon–3:00 pm
Friday 11:00 am–2:00 pm (variable, as announced)
Other times available by appointment or announcement during the semester

Class Meetings
Section 01 9:00–9:50 am MWF Saunders 111
Section 02 10:00–10:50 am MWF Saunders 111
All lab sections meet in Science Center 1068

Course Web Pages
All announcements concerning assignments, laboratory work, tutorial sessions, exams, etc. will be posted using the College’s BlackBoard course management system, which can be accessed through the Hamilton College portal (my.hamilton.edu) or through the URL http://cms.hamilton.edu/. Your e-mail user name and password will log you in.

Texts & Materials
Lecture Handouts/Notes (available at the College Bookstore and posted on BlackBoard)
Solutions Manual (optional)
Study Guide (optional)
Chemistry 120 Lab Manual (available at the College Bookstore)
Laboratory Notebook (available at the College Bookstore)
Laboratory Safety Glasses (available from your lab instructor)

Class Attendance
Your attendance at every class meeting is expected. If, however, you must be absent from a class meeting because of illness or other pressing reason, please follow up with one of your classmates and/or the instructor to find out what you missed.

Assignments
Practice problems from the text will be assigned daily for your practice but not collected or graded. If you have questions on the assigned problems, consult your tutor or the instructor. It is to your advantage to work all of the assigned problems and do as many unassigned problems as possible.
Problem Sets
There will be weekly graded take-home problem sets designed to provide you with practice and feedback on your progress. You may view these as homework sets in which you are encouraged to collaborate. Grading for these assignments will be: 10 points for completed worksheet with impeccable answers, 7-9 points for completed worksheet with reasonable answers, 5 points for an incomplete worksheet or unreasonable answers, and 0 points for not turning in a worksheet. After the answers have been posted on the web site, completed problem sets will not be accepted for credit.

Exams
You will be given no more than 2 hours to complete each exam.
Exam I: 7:00 pm Wednesday, September 22
Exam II: 7:00 pm Thursday, October 14
Exam III: 7:00 pm Tuesday, November 2
Exam IV: 7:00 pm Monday, November 22
Final Exam: 7:00 pm Thursday, December 16

Final Exam
The final exam in Chemistry 120 will be comprehensive, covering material from the beginning of the semester. You will then have a chance to “redeem” yourself from a less than satisfactory performance on any regular exam during the semester. Also, if you receive an A on the final exam provided that you have passed the laboratory portion of the course with a C or better and participated in the course by returning problem sets and taking each exam, you will receive an A in the course. For example, if you meet the criteria and earn an A− on the final exam, you will receive an A− as your final grade even if your average in the course places you lower. Please note that the final exam will be given at the time scheduled by the Registrar during finals week. In planning travel for the break, please keep in mind that the exam will not be offered at any other time during exam week unless you have a direct conflict with the scheduled time.

Grades
Your grade for this course will be determined from the following distribution

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam I</td>
<td>120</td>
<td>12%</td>
</tr>
<tr>
<td>Exam II</td>
<td>120</td>
<td>12%</td>
</tr>
<tr>
<td>Exam III</td>
<td>120</td>
<td>12%</td>
</tr>
<tr>
<td>Exam IV</td>
<td>120</td>
<td>12%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>170</td>
<td>17%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>250</td>
<td>25%</td>
</tr>
<tr>
<td>Problem sets</td>
<td>100</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1000</td>
<td>100%</td>
</tr>
</tbody>
</table>

You must earn a passing grade both in the laboratory and in the exams in order to pass the course. Typically those earning 88-100% receive an A, those earning 78–87% receive a B, those earning 68–77% receive a C, those earning 58–67 receive a D, and those lower than 57% will fail.

Academic Honesty
The rules concerning the Academic Honor Code are described in Article 3, section 2 and 3, of the Honor Court Constitution. These rules apply to all examinations and written work, including laboratory reports, submitted for a grade. If you find yourself questioning whether an action could violate the Honor Code, chances are that it does. You are also responsible to the academic community of Hamilton College and are bound to report instances of academic dishonesty that you witness.

During exams, only a standard scientific calculator will be allowed. No other electronic devices will be permitted including notebook computers, pagers, cell phones, personal digital assistants, iPod/MP3 players, and other data-saving/text-messaging electronic devices.
Schedule of Topics

You will find details for each class period, exams, assignments, and laboratories on the course web site as the semester progresses. Please keep current, by checking the web site at least every few days. The schedule below provides a general overview of the semester’s topics.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
<th>Chapter in textbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 30</td>
<td>Introduction to the course</td>
<td></td>
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<tr>
<td>September 1</td>
<td>Matter</td>
<td>1</td>
</tr>
<tr>
<td>September 3, 6</td>
<td>Nuclear Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>September 8, 10, 13</td>
<td>Electrons</td>
<td>3</td>
</tr>
<tr>
<td>September 15, 17</td>
<td>Stoichiometry</td>
<td>4</td>
</tr>
<tr>
<td><strong>Wednesday, September 22</strong></td>
<td><strong>EXAM I</strong></td>
<td></td>
</tr>
<tr>
<td>September 20, 22</td>
<td>Solution Chemistry</td>
<td>part of 5</td>
</tr>
<tr>
<td>September 24, 27, 29</td>
<td>Chemical Bonding</td>
<td>6</td>
</tr>
<tr>
<td>October 1</td>
<td>Molecular Shape</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>FALL BREAK</td>
<td></td>
</tr>
<tr>
<td>October 6, 8</td>
<td>Molecular Shape (continued)</td>
<td>7</td>
</tr>
<tr>
<td><strong>Thursday October 14</strong></td>
<td><strong>EXAM II</strong></td>
<td></td>
</tr>
<tr>
<td>October 11, 13, 15</td>
<td>Properties of Gases</td>
<td>8</td>
</tr>
<tr>
<td>October 15, 18, 20</td>
<td>Intermolecular Forces &amp; Liquids</td>
<td>part of 9</td>
</tr>
<tr>
<td>October 20, 22, 25</td>
<td>Thermochemistry</td>
<td>11</td>
</tr>
<tr>
<td>October 27, 29, November 1</td>
<td>Entropy &amp; Free energy</td>
<td>13</td>
</tr>
<tr>
<td><strong>Tuesday, November 2</strong></td>
<td><strong>EXAM III</strong></td>
<td></td>
</tr>
<tr>
<td>November 3, 5, 8, 10</td>
<td>Chemical Kinetics</td>
<td>14</td>
</tr>
<tr>
<td>November 10, 12, 15, 17, 19</td>
<td>Chemical Equilibrium</td>
<td>15</td>
</tr>
<tr>
<td><strong>Monday, November 22</strong></td>
<td><strong>EXAM IV</strong></td>
<td></td>
</tr>
<tr>
<td>November 22, 29 December 1, 3, 6, 8, 10</td>
<td>Equilibrium in the Aqueous Phase</td>
<td>16</td>
</tr>
<tr>
<td><strong>Thursday, December 16</strong></td>
<td><strong>FINAL EXAM</strong></td>
<td></td>
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Laboratory Schedule

The laboratory for Principles of Chemistry emphasizes the experimental nature of chemistry and previews or reinforces concepts you learn in the classroom. The schedule below will help you plan your semester. Laboratory sessions will not be held in the days immediately following Fall Break or preceding Thanksgiving Break.

Attendance and completion of the laboratories for Principles of Chemistry 120 is required. Your laboratory grade will contribute 25% to your grade in the course. You must earn a passing grade in the laboratory component of the course in order to pass Principles of Chemistry.

<table>
<thead>
<tr>
<th>Week</th>
<th>Experiment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 30–September 2</td>
<td>What kinds of chemical reactions are there?</td>
<td>25</td>
</tr>
<tr>
<td>September 6–9</td>
<td>What makes color?</td>
<td>25</td>
</tr>
<tr>
<td>September 13–16</td>
<td>How much copper is in a penny?</td>
<td>25</td>
</tr>
<tr>
<td>September 20–23</td>
<td>Are springs good model for chemical bonds?</td>
<td>25</td>
</tr>
<tr>
<td>September 27–30</td>
<td>How can we measure the gas constant?</td>
<td>25</td>
</tr>
<tr>
<td>October 4–7</td>
<td>FALL BREAK—NO LABORATORIES</td>
<td></td>
</tr>
<tr>
<td>October 11–14</td>
<td>How big are polymers?</td>
<td>25</td>
</tr>
<tr>
<td>October 18–21</td>
<td>How does hydrogen peroxide decompose?</td>
<td>25</td>
</tr>
<tr>
<td>October 25–28</td>
<td>How is entropy measured?</td>
<td>25</td>
</tr>
<tr>
<td>November 1–4</td>
<td>Chemical demonstrations projects: lab work</td>
<td></td>
</tr>
<tr>
<td>November 8–11</td>
<td>Chemical demonstrations projects: presentations</td>
<td>45</td>
</tr>
<tr>
<td>November 15–18</td>
<td>How do buffers work?</td>
<td>25</td>
</tr>
<tr>
<td>November 22–25</td>
<td>THANKSGIVING BREAK —NO LABORATORIES</td>
<td></td>
</tr>
<tr>
<td>November 29–December 2</td>
<td>How fast does a reaction go?</td>
<td>25</td>
</tr>
<tr>
<td>December 6–9</td>
<td>Can you retrieve you investment?</td>
<td>25</td>
</tr>
</tbody>
</table>