Course: Basic General Chemistry (CHEM F103X); 4 credits

Prerequisites: Placement in ENGL F111X or higher AND placement in DEVM F105 or higher. Students who do not satisfy these requirements MAY be admitted with permission of instructor.

Locations and meeting times:

- **Lecture:** REIC 201; TR 9:45 am – 11:15 am
- **Lab:** REIC 242
  - F01 (74319): M 2:15 pm – 5:15 pm
  - F02 (74320): M 6:00 pm – 9:00 pm
  - F03 (74321): T 11:30 am – 2:30 pm
  - F04 (74322): T 2:45 pm – 5:45 pm

Blackboard link: [http://classes.uaf.edu](http://classes.uaf.edu)

All course information, supporting documents and exam scores for this course will be maintained on the UAF Blackboard website. It is therefore important that you check the site regularly for updates. Moreover, time-sensitive information and reminders will occasionally be sent by email to all students enrolled in the course, so it is important that you verify that your email address (listed on the Blackboard website) is correct.

Instructor: Dr. Brian Edmonds

Office hours: MWF 10:15 am – 12:00 pm (or by appointment)

Office: Department of Chemistry and Biochemistry
Reichardt Building (REIC)
Room 180

Research Lab: REIC, Room 145

Phone: (907) 474-6527

E-mail: bwedmonds@alaska.edu

Preferred contact method: e-mail

Required course material:

- **Text:** *General, Organic, and Biological Chemistry, Fifth Edition* (2010)
  - Author: Stoker, H. Stephen
  - Publisher: Brooks/Cole, Cengage Learning
  - ISBN: 0-547-15281-7 or 978-0-547-15281-3

Clicker:

A wireless TurningPoint clicker (ResponseCard RF) should be purchased from the bookstore or online. For information on how to use the clicker, visit: [http://www.turningtechnologies.com/studentresponsesystems/studentresources/studentlounge/](http://www.turningtechnologies.com/studentresponsesystems/studentresources/studentlounge/)

Clickers will not work unless registered. Register by logging on to Blackboard and selecting this course (CHEM F103X…). Now click on “Tools” (NOT “Course Tools”) and scroll down to “TurningPoint Registration Tool”. Click on this and then enter your TurningPoint device ID as requested. The alphanumeric device ID is located on the back of your clicker.
Be prepared to use the device in class next Tuesday (9/6/11).

Clicker responses will be used to assess attendance and to provide short-latency feedback of comprehension of the material discussed in class. You will receive credit (1 point) for each response regardless of your answer.

Sapling Learning Account:
You must set up an account with Sapling Learning in order to complete mandatory homework assignments.
1. Go to http://saplinglearning.com
2. If you already have a Sapling Learning account, log in, click “View Available Courses”, then skip to step 6.
3. Otherwise, click “create account” located under the Username box.
4. Choose a new username and password, and supply the other requested information. Click “Create my new account”.
5. Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
6. Find this course in the list (listed by school and instructor) and click on the link (UAF – CHEM F103X – Fall11 EDMONDS)
7. Select your payment option and follow the instructions.
8. Once you have an account and enrolled in the course, you can log in at any time to complete or review your homework assignments.
9. If you have problems, email a description of the problem to support@saplinglearning.com.

Scientific calculator:
You must have a calculator capable of scientific notation.

Laboratory Manual:
The labs will be made available on Blackboard.

Course Description:
This course covers the fundamentals of general chemistry including historical and descriptive aspects. Students also receive instruction on the application of basic mathematical methods to solve problems in chemistry. This course fulfills the laboratory component of the natural science requirement, and prepares the student for CHEM F105X. Note: CHEM F103X satisfies elective credit only.

Specific Coverage:
I. Basic properties of matter
II. Structure of the atom
III. Chemical bonding and chemical reactions
IV. Physical states (phases) of matter
V. Properties of solutions
VI. Reaction rates and chemical equilibrium
VII. Fundamentals of acid-base chemistry

Course Goals:
Students who successfully complete this course will have an understanding of the fundamentals of general chemistry. Specifically, students will have an understanding of atomic structure, and how the properties of atoms govern the types of chemical bonds that join them together in particular arrangements to form compounds. Students will also acquire a detailed understanding of the fundamentals of chemical reactions, including concepts such as chemical equilibrium and chemical reaction rates. The emphasis on problem solving in this course will provide excellent preparation for subsequent training in chemistry.
Learning Outcomes:

1. What is the difference between matter and energy?
2. What are the fundamental particles of an atom and how are those particles arranged?
3. What feature of the atom gives it its identity?
4. How does the electronic structure of an atom govern how it reacts with other atoms?
5. What are the fundamental types of chemical bonds, and how are they formed?
6. How are ionic and covalent compounds named?
7. What is a “chemical reaction”? How does one balance a reaction? What is the definition of a “mole”, and how does it allow for the determination of mass-mass relationships?
8. What are states (phases) of matter and how do intermolecular forces affect the phase at a given temperature?
9. What is the ideal gas law, and how is it used to determine specific properties of gases?
10. What is a solvent, and what general feature of the solvent determines the types of solutes that will dissolve?
11. What is the “activation energy” for a reaction, and how does this energy influence the rate of a reaction?
12. What is the definition of “chemical equilibrium”?
13. What is the definition of an acid (a base)?
14. What is pH? What is a buffer? How does a buffer affect the changes in pH that occur in response to addition of acid or base to a solution?

Instructional Methods:

A traditional lecture-based format will be used for the classroom component of the course. Lectures will be augmented with PowerPoint presentations and periodic “learning check” (clicker) questions.

Core Assessment:

Chemistry 103 is part of the UAF Core Curriculum. “The overall goal of the Natural Sciences component of the Core Curriculum is to prepare students for lifelong learning in the natural sciences…” [Faculty Senate Guidelines, 1990]. To partially fulfill this objective, students will, in addition to the specific course coverage outlined above, receive specific instruction on the scientific method, the set of practices that scientists must follow to obtain a meaningful interpretation of their results. Student understanding of the scientific method will be assessed toward the end of the course by answering questions about a hypothetical experiment (see “Exercise to assess understanding…”, below). In addition, students will be given examples of the interplay between scientific knowledge and public policy throughout the course. The purpose of these examples is to encourage students to think about and comment on the impact of scientific knowledge on public policy. For example, how does the scientific literature concerning health effects of fluoridated water affect decisions to alter the fluoride content of municipal water? Student understanding of the relationship between policy and science will be assessed via a 2-page essay to be completed toward the end of the course (see “Essay on the relationship…”, below). Details of the assignment will be communicated later.

Course Policies:

Attendance: Students are expected to attend class and actively participate. Attendance and participation will be assessed by clicker responses.

Cell phones/Computers: The use of cell phones during class is not permitted. Notebook computers may be used for taking notes. Any other use is prohibited.

Preparation: Students are expected to read the assigned sections of the textbook (see course calendar, below) prior to class.

Exams: Three exams will be given (two midterms and a final). Makeup exams will be allowed only with pre-approval of the instructor or with an acceptable reason. Acceptable reasons for makeup exams include severe illness, family emergencies or other unavoidable events including dangerous weather conditions and car accidents. The exam format for makeup exams may be different from the original exam. Exams dates and times are posted on the course calendar.
**Sapling Homework:** Homework assignments must be completed by the posted due date in order to receive credit. Your homework grade will be calculated from the top 9 (out of 10) homework assignments.

**Lab:** A detailed outline of policies pertaining specifically to the lab portion of the course can be found on Blackboard. Students must complete at least 8 of the 11 offered labs to pass the course; however, know that your overall lab grade will be calculated from the highest 10 lab scores (the lowest score will be dropped). Questions concerning the lab should be addressed to your lab TA, or to the laboratory coordinator, Emily Reiter (REIC, 194A; 474-6748; e.reiter@alaska.edu).

**Grading:**

Exam and lab scores will be posted on Blackboard. Sapling homework scores are available on the Sapling website.

Final grades will be calculated as follows:
- Midterms I and II: 200 pts (100 points for each exam)
- Final Exam: 100 pts (not cumulative)
- Sapling homework: 100 pts
- Lab write-ups/exercises: 155 pts
- Exercise to assess understanding of the scientific method: 10 pts
- Essay (2 pages) on the relationship between public policy and scientific knowledge: 10 pts
- Completion of Natural Science Core Questionnaire: 5 pts
- Clicker score: 20 pts

Letter grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>540 – 600 pts</td>
</tr>
<tr>
<td>B</td>
<td>480 – 539 pts</td>
</tr>
<tr>
<td>C</td>
<td>420 – 479 pts</td>
</tr>
<tr>
<td>D</td>
<td>360 – 419 pts</td>
</tr>
<tr>
<td>E</td>
<td>Less than 360 pts</td>
</tr>
</tbody>
</table>

**Support Services:**
Support can be obtained through the University of Alaska Library system, online resources, and the instructor. Additional services are available through Student Support Services (http://www.uaf.edu/sss/) at UAF.

**Disabilities Services:**
We will work with the Office of Disabilities Services (http://www.uaf.edu/disability/) to provide accommodations for students with disabilities. If you have a disability and require special assistance, please contact the instructor as soon as possible. Students with disabilities must provide a written statement indicating any special requirements that will be necessary as early in the semester as possible (preferably within the first week).

**Cheating/Academic Dishonesty:**
The Chemistry & Biochemistry Department Policy on Cheating is: “Any student caught cheating will be assigned a course grade of F. The student’s academic advisor will be notified of this failing grade and the student will not be allowed to drop the course.” The Department considers performing unauthorized “dry labs” as cheating. Partnering during the lab is acceptable, but lab reports must show your own calculations and ideas. Providing clicker responses for another student or asking another student to provide responses with your clicker is not permitted.

**Amending this Syllabus:**
The instructor may initiate changes to this syllabus subject to unanimous approval by the students. Any changes will be clearly communicated via email and posted on Blackboard.

The instructor reserves the right to make minor changes to the lecture schedule (attached), and also to make changes to the grading policy that are of benefit to ALL students enrolled in the course. Neither of these two types of changes is subject to student vote/approval.

**Important Dates:**
- Late registration deadline (last day to add classes) – Friday, Sept. 9
- Last day for 100% refund of tuition and fees – Friday, Sept. 9
Last day for faculty- and student-initiated drops
(course does not appear on academic record)  
Friday, Sept. 16

Last day for 50% refund of tuition  
Friday, Sept. 16

Freshman progress reports due  
Friday, Oct. 7

Last day to apply for fall 2011 graduation  
Saturday, Oct. 15

Last day for faculty- and student-initiated withdrawals  
(W appears on transcript)  
Friday, Oct. 28

Thanksgiving Holiday  
Thursday, Nov. 24 – Sunday, Nov. 27

Last day of instruction  
Monday, Dec. 12

Finals  
Wednesday, Dec. 14 – Saturday, Dec. 17

---

**Chem 103 Lecture Schedule**

**UAF Fall 2011**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic/Reading Assignment</th>
<th>Lab Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-Sep</td>
<td>Introduction/Syllabus</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6-Sep</td>
<td>Matter 1.1 - 1.10</td>
<td>No Labs</td>
</tr>
<tr>
<td>3</td>
<td>8-Sep</td>
<td>Measurements 2.1 - 2.5</td>
<td>Safety Lab</td>
</tr>
<tr>
<td>4</td>
<td>13-Sep</td>
<td>2.6 - 2.11</td>
<td>Measurements</td>
</tr>
<tr>
<td>5</td>
<td>15-Sep</td>
<td>Atomic Structure 3.1 - 3.4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>20-Sep</td>
<td>3.5 - 3.8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>22-Sep</td>
<td>3.9; Ionic Bonds 4.1 - 4.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>27-Sep</td>
<td>4.6 - 4.9</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>29-Sep</td>
<td>Midterm I (Chapters 1 - 3)</td>
<td>No Labs</td>
</tr>
<tr>
<td>10</td>
<td>4-Oct</td>
<td>4.10 - 4.11; Covalent Bonds 5.1 - 5.3</td>
<td>Thermochemistry</td>
</tr>
<tr>
<td>11</td>
<td>6-Oct</td>
<td>5.4 - 5.7</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>7-Oct</td>
<td>5.8 - 5.10</td>
<td>Spectroscopy</td>
</tr>
<tr>
<td>13</td>
<td>13-Oct</td>
<td>5.6 - 5.9</td>
<td>Lewis Structures</td>
</tr>
<tr>
<td>14</td>
<td>18-Oct</td>
<td>5.10 - 5.12</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>20-Oct</td>
<td>Chemical Calculations 6.1 - 6.4</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>25-Oct</td>
<td>6.5 - 6.8</td>
<td>Empirical Formulas</td>
</tr>
<tr>
<td>18</td>
<td>1-Nov</td>
<td>7.7 - 7.12</td>
<td>Formula of a Hydrated Metal Salt</td>
</tr>
<tr>
<td>19</td>
<td>3-Nov</td>
<td>7.13; Solutions 8.1 - 8.4</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>8-Nov</td>
<td>Midterm II</td>
<td>Airbag</td>
</tr>
<tr>
<td>21</td>
<td>10-Nov</td>
<td>8.5 - 8.8</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>15-Nov</td>
<td>8.9; Chemical Reactions 9.1 - 9.3</td>
<td>Double Replacement/Solubility</td>
</tr>
<tr>
<td>23</td>
<td>17-Nov</td>
<td>9.4 - 9.7</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>22-Nov</td>
<td>9.8 - 9.9</td>
<td>No Labs</td>
</tr>
<tr>
<td>25</td>
<td>24-Nov</td>
<td>Thanksgiving Holiday</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>29-Nov</td>
<td>Acids, Bases, and Salts 10.1 - 10.4</td>
<td>Colligative Properties</td>
</tr>
<tr>
<td>27</td>
<td>1-Dec</td>
<td>10.5 - 10.8</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>6-Dec</td>
<td>10.9 - 10.10; 10.12 (skip 10.11)</td>
<td>pH and Buffers</td>
</tr>
<tr>
<td>29</td>
<td>8-Dec</td>
<td>10.14 - 10.16</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>13-Dec</td>
<td>No Class</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>15-Dec</td>
<td>Final Exam (8 - 10 am)</td>
<td></td>
</tr>
</tbody>
</table>