

**University of Alaska Fairbanks**  
**Chemistry 103: Basic General Chemistry**  
**Course Syllabus**

**Course:** Basic General Chemistry (CHEM 103); 4 credits

**Prerequisites:** Placement in ENGL 111 **and** DEVM 105 or, alternatively, instructor permission

**Locations and meeting times:**

**Lecture:** REIC 201; TR 9:45 am-11:15 am

**Lab:** REIC 242

F01: T 11:30 am – 2:30 pm

F02: T 3:00 pm – 6:00 pm

F03: T 6:30 pm – 9:30 pm

F04: W 2:15 pm – 5:15 pm

F07: M 2:15 pm – 5:15 pm

**Blackboard link:** <http://classes.uaf.edu>

All course information, supporting documents and grades 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 to all students enrolled in the course, so it is important that you verify that the email address listed is correct.

**Instructor:** Dr. Brian Edmonds

**Office hours:** TR 11:15 am – 1:15 pm or by appointment

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

**Research:** REIC, Room 145

**Phone:** (907) 474-6527

**E-mail:** bwedmonds@alaska.edu

**Preferred contact method:** e-mail

**Required course material:**

Text:

Title: *Introduction to general, organic, and biochemistry*, 8<sup>th</sup> ed (2007)

Authors: Bettelheim, Brown, Campbell and Farrell

Publisher: Thompson Brooks/Cole

ISBN: 0-495-01197-5

Clicker:

A wireless TurningPoint clicker should be purchased from the bookstore or online. For more information on how to use the clicker, visit the following FAQ on the TurningPoint website:

<http://www.turningtechnologies.com/studentresponsesystems/studentresources/studentlounge/>

You must register the clicker by logging on to the Blackboard website and selecting this course (CHEM F103X...). Now click on "course tools" (in the gray "Tools" box) and then 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 (9/8/09).

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

OWL (On-line Web-based Learning system) registration:

You must 1) obtain an access code, and 2) register for OWL in order to complete the online homework assignments. Go to the following site: <http://www.cengage.com/owl>

Under "Choose Your Course", select "Allied Health Chemistry", "Buy an Access Code", and follow the instructions. Note: If you do not plan to take additional chemistry courses at UAF and you are confident that you will not have to retake this course, then you should only purchase a single semester of OWL access. Otherwise, a 4-semester option is available.

Once you have purchased OWL access, return to "Allied Health Chemistry", select "Register" from the drop-down menu and follow the instructions. You may see several instances of CHEM 103; therefore, it is important to make a note of the instructor's name (Edmonds, Brian) and select that particular course.

Homework assignments and due dates will be posted on Blackboard.

Scientific calculator:

You must have a calculator capable of scientific notation.

UAF custom laboratory manual:

*Experiments for basic general chemistry, fall 2009.*

### **Course Description:**

Fundamentals of chemistry including historical and descriptive aspects as well as basic mathematical concepts. Fulfills the laboratory part of the natural science requirement and prepares the student for CHEM F105X. Note: This course satisfies elective credit only.

**Specific Coverage:**

- I. Basic properties of matter and energy
- II. Structure of the atom and nuclear chemistry
- III. Chemical bonding and chemical reactions
- IV. 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 understand the basic structure of atoms and molecules, and how these (unique) structures influence the rearrangement of atoms/molecules to form new compounds, the products of a chemical reaction. Students will also understand the concept of the state (or phase) of matter and how specific types of intermolecular forces determine when and how phase changes (liquid to gas, e.g.) occur. The general properties of gases, solutions, and acids/bases will be appreciated in some quantitative detail. 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 that comprise an atom and how are these particles arranged?
3. What feature of the atom gives it its identity?
4. How does the “electronic structure” of an atom govern its tendency to react with other atoms?
5. What are the basic types and features of nuclear radiation?
6. What are the fundamental types of chemical bonds and how are they formed?
7. How are ionic and covalent compounds named?
8. 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?
9. What are states, or phases, of matter and how do intermolecular forces affect the phase?
10. What is the “ideal gas law” and how is it used to determine specific properties of gases?
11. What is a solvent, and what general feature of the solvent determines the types of solutes that will dissolve?
12. What is a “colligative property”?

13. What is the “activation energy” for a reaction, and how does this energy influence the rate of a reaction?
14. What is the definition of chemical “equilibrium”?
15. What is the definition of an acid (a base)?
16. 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:**

The lecture portion of the course will be taught using a traditional lecture-based format augmented with PowerPoint and periodic “learning check” (clicker) questions.

### **Course Policies:**

#### **Attendance:**

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

#### **Exams:**

Three exams will be given (two midterms and a final). Taken together, exams will count 50% toward the determination of a final grade for the course. 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. Exam format for makeup exams may be different from the original exam. An oral examination may also be utilized if deemed appropriate by the instructor. Exams dates and times are posted on the course calendar.

#### **Lab:**

A detailed outline of policies pertaining specifically to the lab portion of the course can be found in the Chem 103 lab manual. Know, however, that students must complete at least 8 of the 11 offered labs to pass the course. Questions concerning the lab should be addressed to the assigned TA or the laboratory coordinator, Emily Reiter (REIC, 194A; 474-6748; e.reiter@alaska.edu).

### **Grading:**

Exam, lab, clicker and OWL homework scores will be posted on Blackboard.

Final grades will be calculated as follows:

Exams I and II: 200 pts (100 points for each exam)

Final Exam: 100 pts (non-cumulative covering the last 1/3 of the course)

OWL homework: 100 pts

Lab write-ups/exercises: 200 pts

Clicker score: 50 pts

Letter grades will be assigned as follows:

<b>A:</b> 585 – 650 points	<b>D:</b> 390 – 454 points
<b>B:</b> 520 – 584 points	<b>F:</b> Less than 390 points
<b>C:</b> 455 – 519 points	<b>I:</b> Failure to complete course requirements

**Support Services:**

Support services will be provided by the University of Alaska Library system, online resources and the instructor. Additional services are available through Student Support Services (<http://www.uaf.edu/sssp/>) at UAF.

**Disabilities Services:**

We will work with the Office of Disabilities Services (203 WHIT, 474-7043) 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 are 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 are subject to student vote/approval.

# Chem 103 Lecture Schedule

## UAF Fall 2009

Week	Date	Topic/Chapter Sections	Reading
1	3-Sep	Introduction/Syllabus	none
2	8-Sep	Matter, Energy, and Measurement 1.1 - 1.7	1-19
	10-Sep	1.8 - 1.9; Atoms 2.1 - 2.4	19-24; 29-41
3	15-Sep	2.5 - 2.6	41-53
	17-Sep	2.7 - 2.8; Nuclear Chemistry 3.1 - 3.2	53-57; 63-66
4	22-Sep	3.3 - 3.7	66-84
	24-Sep	3.8 - 3.9; Chemical Bonds 4.1 - 4.4	84-87; 93-100
5	29-Sep	<b>Exam I</b>	
	1-Oct	4.5 - 4.7	100-111
6	6-Oct	4.8 - 4.10	111-120
	8-Oct	4.11; Chemical Reactions 5.1 - 5.3	120-121; 129-134
7	13-Oct	5.4 - 5.5	135-145
	15-Oct	5.6 - 5.8	145-154
8	20-Oct	Gases, Liquids & Solids 6.1 - 6.4	160-169
	22-Oct	6.5 - 6.8	169-180
9	27-Oct	6.9 - 6.10	180-186
	29-Oct	Solutions & Colloids 7.1 - 7.4	192-197
10	3-Nov	7.5 - 7.7	197-211
	5-Nov	7.8; Reaction Rates & Chemical Equilibrium 8.1	211-217; 223-225
8	10-Nov	<b>Exam II</b>	
	12-Nov	8.2 - 8.4	225-234
9	17-Nov	8.5 - 8.7	234-240
	19-Nov	8.8; Acids & Bases 9.1	240-245; 251-253
10	24-Nov	9.2 - 9.3	253-257
	26-Nov	Thanksgiving Holiday	
11	1-Dec	9.4 - 9.5	257-261
	3-Dec	9.6 - 9.7	261-267
12	8-Dec	9.8 - 9.9	267-272
	10-Dec	9.10 - 9.12	272-279
13	15-Dec	Review	
	17-Dec	<b>Final Exam (8 - 10 am)</b>	