

Chemistry F105X: General Chemistry I Course Syllabus – Spring 2016

Course: General Chemistry I (CRN: 33471); 4 credits

Prerequisites: Placement in ENGL F111X or higher AND placement in MATH F151X or higher (or B- or better in CHEM-103). Instructor may override prerequisites.

Locations and meeting times:

Lecture: REIC 201; MWF 11:45 AM – 12:45 PM

Lab: Various times. To receive credit for F105X, students must be enrolled in a lab section.

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

Course information and exam scores will be maintained on the UAF Blackboard website. Check the site regularly for updates. Time-sensitive information will occasionally be sent to students by email, so verify that your email address (on the Blackboard site) is correct.

Instructor: Dr. Brian Edmonds

Office hours: W 1:00 – 2:30 PM, or by appointment

Office: Murie Building, 113E

Research Lab: Murie Building, Rm 110

Phone: (907) 474-6527

Email: bwedmonds@alaska.edu (preferred contact method)

Supplementary Instruction (SI)

Instructor: Jimmy Maynard

Email: jhmaynard@alaska.edu

Required materials:

Text:

Title: *Chemistry*, 12th Edition (2016)

Authors: Raymond Chang & Kenneth Goldsby

Publisher: McGraw-Hill Education

ISBN: 978-0-07-802151-0

McGraw-Hill Connect account for homework:

Instructions needed to set up your Connect account and access the course will be provided on Blackboard. A document describing purchasing options for both the text and Connect will also be available on Blackboard.

Scientific calculator:

You must have a scientific, nonprogrammable calculator.

Preferred models for ease of calculation are the following 4-line calculators:

TI-30 XS Multiview

TI-34 Multiview

The following 2-line calculators are also acceptable:

TI-30Xa

TI-30X IIs (solar)

TI-36X

Note: The TI-30XS-PRO and the TI-36X-PRO are NOT allowed.

Laboratory manual:

Lab documents will be made available on Blackboard.

Recommended:

American Chemical Society (ACS) General Chemistry Exam Guide by Eubanks & Eubanks (available for purchase in the bookstore; ISBN 0-9708042-0-2)

Optional:

Student Solutions Manual by Cruickshank to accompany *Chemistry* (11th ed of Chang & Goldsby)

Student Study Guide for Chemistry (11th ed of Chang & Goldsby)

Essential Algebra for Chemistry Students (2nd ed by David Ball)

Important Dates:

January 14 (R)	1 st day of class
January 18 (M)	Alaska Civil Rights Day (no class)
January 28 (R)	1 st day of lab
January 28 (R)	Homework/LearnSmart assignments for Chapter 1 are due. Know that 70% of questions must be attempted to avoid faculty-initiated drop.
January 29 (F)	Last day for student- or faculty-initiated drops (full refund of tuition and fees)
February 14 (S)	Freshman progress reports due
March 14 – 18	Spring break (no classes)
March 25 (F)	Last day for student- or faculty-initiated withdrawals (“W” on transcript)
April 22 (F)	SpringFest (no class)
May 2 (M)	Last day of instruction
May 5 (R)	Final exam: 10:15 AM – 12:15 PM

Course Description:

This is the first of a two-semester sequence in general chemistry that partially fulfills requirements for majors in engineering and chemistry. Major subjects include measurements, calculations, atomic and molecular structure, gas laws, stoichiometry, chemical reactions, and an introduction to organic chemistry.

Specific Coverage:

- I. Properties of matter
- II. Structure of the atom
- III. Mass relationships and chemical reactions
- IV. Reactions in aqueous solutions including redox and acid/base reactions
- V. Gas laws
- VI. Thermochemistry
- VII. Electronic structure of atoms
- VIII. Periodic relationships among the elements
- IX. Ionic and covalent bond models
- X. Molecular geometry

Course Goals:

Students who complete this course will have an understanding of fundamentals of general chemistry, including familiarity with the language of chemistry and the microscopic underpinnings of macroscopic phenomena. We cover the first 10 chapters of the Chang & Goldsby text as indicated in the course calendar (see below). Most of the remaining chapters are covered in General Chemistry II (Chem-F106X). The course has a quantitative emphasis, which provides students with problem solving skills in chemical sciences. The laboratory component of the course is designed to give students hands on exposure to the scientific method and reinforce concepts discussed in lecture.

Learning Outcomes:

By the end of the course, students should have a good understanding of the topics below.

1. Measurement: How are measurements and associated units used to solve problems in chemistry?
2. Language of chemistry: How are reactions classified and compounds named? What is Boyle's Law, oxidation number, solubility, enthalpy, and the photoelectric effect, etc.?
3. Structure of the atom: What are protons, neutrons, and electrons? How do electron configurations influence chemical reactivity and molecular structure?
4. Chemical reactions: How are chemical equations balanced to yield information about stoichiometry and reaction yield?
5. Chemical bonds: What are the fundamental types of chemical bonds, and how are they formed?
6. Gas laws: What is the ideal gas law, e.g., and how is it used to determine specific properties of gases?
7. Thermochemistry: How is energy held in the bonds of molecules and released or absorbed in chemical reactions?
8. Periodic trends: How do similarities in electron configurations support similarities in chemical properties of elements?
9. Molecular geometry: How can we explain the shapes of molecules through an understanding of electron pair repulsion, orbital hybridization, and molecular orbital theory?

Instructional Methods:

A traditional lecture-based format will be used for the classroom component of the course.

Course Policies:

Attendance: Students are expected to attend class, pay attention, and take notes.

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

Preparation: Students are expected to read the assigned sections of the textbook prior to class (see course calendar, below, for the lecture schedule). As motivation, LearnSmart activities (part of the Connect homework system) will be assigned with due time/date of 11:59 PM of the evening prior to lecture. The information needed to complete the assignment is in the text. Students should set aside 30 min to an hour to complete the assignment.

Exams: Four exams will be given (three 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, e.g. dangerous weather conditions and car accidents. The exam format for makeup exams may be different from the original exam. Exams dates are posted on the course calendar.

Connect Homework: Homework assignments must be completed by the posted due date (visible in Connect) in order to receive credit. There are no exceptions, so get started early. There will be 10 homework assignments (one for each chapter). The homework sets will be assigned on or before the day we begin the relevant chapter and due 2 to 5 days after completion.

Lab: Policies pertaining specifically to the lab portion of the course can be found on Blackboard. The first lab is a health and safety lab that students **MUST** attend and pass in order to continue with subsequent labs. Students must complete at least 8 of the 10 offered labs to pass the course; however, know that your overall lab grade will be calculated from the highest 9 lab scores (the lowest score will be dropped). Questions concerning the lab should be addressed to your TA or the laboratory coordinator, Emily Reiter (careiter@alaska.edu).

Grading:

Exam, lab, homework, and LearnSmart scores will be posted on Blackboard. There are 700 total points possible for the course.

Final grades will be calculated as follows:

Midterms I - III: 300 pts (100 points for each exam)

Final Exam: 150 pts (cumulative)

Connect homework: 100 pts

Connect LearnSmart: 50 pts

Lab write-ups/exercises: 100 pts

Letter grades will be assigned as follows:

A: 630 – 700 points	D: 420 – 489 points
B: 560 – 629 points	F: Less than 420 points
C: 490 – 559 points	I: Failure to complete course requirements

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/sssp/>) 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 few days).

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 beneficial to ALL students in the course. Neither of these two types of changes is subject to student vote/approval.

Chem 105: General Chemistry I
 Calendar - Spring 2016

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Lab</i>
1	15-Jan	Introduction (1.1 - 1.3)	
2	18-Jan	Civil Rights Day - No Class	
	20-Jan	States of matter & measurement (1.4 - 1.7)	
	22-Jan	Numbers and dimensional analysis (1.8 - 1.10)	No lab
3	25-Jan	Structure of the atom (2.1 - 2.3)	
	27-Jan	Periodic table, molecules, & ions (2.4 - 2.5)	
	29-Jan	Chemical formulas & naming compounds (2.6 - 2.7)	Safety lab
4	1-Feb	Atomic mass & molecular mass (3.1 - 3.3)	
	3-Feb	Percent composition (3.4 - 3.5)	
	5-Feb	Empirical formulas & chemical equations (3.6 - 3.7)	Intro to lab techniques/ analysis
5	8-Feb	Stoichiometry and calculations (3.8 - 3.10)	
	10-Feb	Review	
	12-Feb	Midterm I (Chapters 1 - 3)	Identification of unknowns
6	15-Feb	Precipitation & acid-base reactions (4.1 - 4.3)	
	17-Feb	Redox reactions (4.4)	
	19-Feb	Concentration & titrations (4.5 - 4.8)	Rxn's in aqueous solutions
7	22-Feb	Gas laws (5.1 - 5.3)	
	24-Feb	Ideal gas equation (5.4 - 5.5)	
	26-Feb	Dalton's law & KMT (5.6 - 5.8)	Gas laws
8	29-Feb	Energy changes & thermodynamics (6.1 - 6.3)	
	2-Mar	Enthalpy & calorimetry (6.4 - 6.5)	
	4-Mar	Standard enthalpy of formation (6.6 - 6.7)	Enthalpy of neutralization
9	7-Mar	Quantum theory & Bohr's theory of H atom (7.1 - 7.3)	
	9-Mar	Quantum mechanics (7.4 - 7.5)	
	11-Mar	Quantum numbers (7.6)	Spectroscopy
10	14-Mar	----	
	16-Mar	----	
	18-Mar	----	
11	21-Mar	Atomic orbitals & electron configurations (7.7 - 7.8)	
	23-Mar	Review	
	25-Mar	Midterm II (Chapters 4 - 7)	Stoichiometry
12	28-Mar	Periodic table & physical properties (8.1 - 8.3)	
	30-Mar	Ionization energy & electron affinity (8.4 - 8.6)	
	1-Apr	Ionic bonds (9.1 - 9.3)	Applied spectroscopy
13	4-Apr	Covalent bonds & electronegativity (9.4 - 9.5)	
	6-Apr	Lewis structures (9.6 - 9.7)	
	8-Apr	Resonance (9.8 - 9.9)	Copper cycle & redox
14	11-Apr	Bond enthalpy (9.10)	
	13-Apr	Molecular geometry (10.1 - 10.2)	
	15-Apr	Valence bond theory & hybridization (10.3 - 10.4)	Synthesis of aspirin
15	18-Apr	Molecular orbital theory (10.5 - 10.6)	
	20-Apr	Molecular orbital configurations (10.7 - 10.8)	
	22-Apr	No class	Review during lab time
16	25-Apr	Review	
	27-Apr	Midterm III (Chapters 8 - 10)	
	29-Apr	Review	Cumulative review sessions
17	2-May	Review	
	5-May	Final Exam: 10:15 AM - 12:15 PM (NOTE EARLIER START TIME!)	