

**Lecturer:** Dr. Eric J. Voss  
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**Lecture Times:** MWF, 10:00–11:15 am, SL 3114

**Office Hours:** MWF, 11:15–11:50 am; T, 8:00–8:50 am; or by appointment

**Course Description:**

University-level modern chemistry for science and engineering students, atomic structure, molecular bonding, structure, stoichiometry, chemical change, equilibrium, qualitative analysis. Four lecture hours per week.

**Prerequisites:** High school chemistry or CHEM 113, high school algebra.

**Note:** A grade of C or better is required in order to proceed to CHEM 121b.

**Attendance:**

Not required but highly recommended. You will receive no credit for quizzes that are given on days you are absent.

**Textbook:**

McMurry, J.; Fay, R. C. *Chemistry*; Prentice-Hall: Englewood Cliffs, NJ, 1995. ISBN 0-13-350281-3 Available at Textbook Rental.

**Optional Books:**

Fredeen, D. J. *Study Guide: Chemistry*; Prentice-Hall: Englewood Cliffs, NJ, 1995. ISBN 0-13-350489-1 Available at the University Center Bookstore.

Topich, J. *Solutions Manual: Chemistry*; Prentice-Hall: Englewood Cliffs, NJ, 1995. ISBN 0-13-350497-2 Available at the University Center Bookstore.

**Grading:** The overall course grade will be calculated as follows:

Problem Sets and Quizzes	20%
Hour Exams (Four)	60% (15% each)
Final Exam	20%

**Problem Sets:**

Assigned problems are intended to aid your study and help in taking exams. They will be collected and randomly graded. **Problem sets are due at the beginning of class, and will not be accepted after the due date.** After they are graded, solutions will be posted in the glass case outside of room SL 2230 and on the web page <http://www.siue.edu/~evoss/chem121a/problemsets>.

**Quizzes:**

A few unannounced quizzes will be given during the semester. You will not be allowed to make-up missed quizzes.

**Examinations:**

Exam 1	Friday, <u>September 19</u>	Chapters 1–3.8
Exam 2	Friday, <u>October 17</u>	Chapters 3.9–5
Exam 3	Monday, <u>November 10</u>	Chapters 6–7
Exam 4	Monday, <u>December 8</u>	Chapters 8–10
Final Exam	Monday, <u>December 15</u>	Chapters 1–10 (comprehensive)

Hour exams will be given during the lecture hours and will include conceptual questions from lecture and reading assignments and problems similar to those assigned. Make-up exams will be given **only** under the most serious circumstances. Documentation must be provided **in advance** to establish that the seriousness of the event precludes you from being present for an examination.

**Final Examination:**

The final examination will be a comprehensive exam over all lecture materials. Your final examination is scheduled for **Monday, December 15 from 10:00 to 11:40 am.**

**Tutorial Assistance:**

The Department of Chemistry offers tutors in room SL 1109. Check the schedule posted outside of the tutor room for more details.

**Laboratory Discussion:**

Every Friday a short preview lecture will be given to explain the laboratory experiment for the following week. When an exam is given on a Friday, the lab preview will be given on the following Monday.

**Review/Problem Solving Sessions:**

A few review/problem solving sessions will be given on Mondays, Wednesdays, or Fridays from 11:15 to 11:50 am in SL 3114. Details will be announced in class.

**Department of Chemistry  
Academic Misconduct by Students**

Faculty members retain their traditional authority to take disciplinary action in the event of academic misconduct such as cheating, plagiarism, or classroom disruption. In the event of academic misconduct, the instructor may request The Student Assessments and Standards Committee of the Department of Chemistry to impose on a student the sanction of a failing grade on an individual assignment or on a course as a whole. The Chair of the Department may recommend to the Dean of Students other sanctions such as dismissal from a major or from the University.

**Tentative Lecture Schedule:**

August	25	Chapter 1	October	22	Chapter 6
	27	Chemistry Skills Exam		24	Chapter 6 Lab Preview ANAL 350
	29	Chapter 1 Lab Preview PROP 393		27	Chapter 7
September	1	Labor Day - <b>no class</b>		29	Chapter 7
	3	Chapter 1		31	Chapter 7 Lab Preview REAC 456
	5	Chapter 2 Lab Preview PROP 353	November	3	Chapter 7
	8	Chapter 2		5	Chapter 7
	10	Chapter 2		7	Chapter 8 Lab Preview THER 428
	12	Chapter 3 Lab Preview STOI 420		10	<b>Exam 3</b>
	15	Chapter 3		12	Chapter 8
	17	Chapter 3		14	Chapter 8 Lab Preview PROP 331
	19	<b>Exam 1</b>		17	Chapter 8
	22	Chapter 3 Lab Preview STOI 423		19	Chapter 9
	24	Chapter 3		21	Chapter 9 Lab Challenge 2 Preview
	26	Chapter 4 Lab Preview REAC 390		24	Thanksgiving - <b>no class</b>
	29	Chapter 4		26	Thanksgiving - <b>no class</b>
October	1	Chapter 4		28	Thanksgiving - <b>no class</b>
	3	Chapter 4 Lab Preview ANAL 503	December	1	Chapter 9
	6	Chapter 5		3	Chapter 9
	8	Chapter 5		5	Chapter 10 Lab Final Preview
	10	Chapter 5 Lab Challenge 1 Preview		8	<b>Exam 4</b>
	13	Chapter 5		10	Chapter 10
	15	Chapter 5		12	Chapter 10, Review
	17	<b>Exam 2</b>		15	<b>Final Exam</b> 10:00-11:40 am
	20	Chapter 6 Lab Preview ANAL 395			

**Assigned Problems:****Due Date**

Ch. 1 – 47, 55, 57, 58, 61, 63, 71, 77, 79, 85	September 5
Ch. 2 – 25, 27, 39, 41, 43, 45, 57, 59, 65, 67, 69, 73, 77, 83	September 12
Ch. 3 (set 1) – 31, 33, 37, 39, 43, 49, 51, 55, 57, 59, 63, 65	September 17
Ch. 3 (set 2) – 67, 71, 73, 77, 79, 81, 83, 89	September 26
Ch. 4 (set 1) – 19, 21, 23, 25, 31, 37, 41, 43	<u>October 3</u>
Ch. 4 (set 2) – 49, 51, 53, 55, 65, 67, 69, 73, 77, 83	<u>October 6</u>
Ch. 5 – 25, 29, 31, 41, 49, 51, 53, 61, 65, 67, 73, 79, 81, 85	October 15
Ch. 6 – 23, 29, 35, 39, 41, 47, 61, 63, 67, 79	<u>October 27</u>
Ch. 7 (set 1) – 27, 29, 33, 37, 43, 45, 49	October 31
Ch. 7 (set 2) – 51, 55, 57, 63, 69, 71, 75	November 7
Ch. 8 – 23, 25, 33, 35, 41, 47, 51, 53, 57, 65, 67, 69, 71, 77	November 19
Ch. 9 – 23, 25, 31, 33, 37, 41, 45, 49, 53, 57, 59, 69	<u>December 5</u>
Ch. 10 – 25, 27, 37, 41, 43, 45, 55, 63, 71, 77	December 10

From Sciences & Mathematics Handbook, 1996-1997:

**Guidelines for Students**

- 1. Students are expected to be in attendance (on time) for all class meetings and laboratories.** Entering or leaving a room at times other than the announced beginning and ending of the class is disruptive.
- 2. Students are expected to take examinations at the scheduled times except for an excused absence.** Make-up examination availability is subject to the policy of the specific instructor.
3. Students should make good use of learning opportunities provided, such as, conferences with the instructor during office hours, tutorials, and/or help sessions.
4. Assigned work should be submitted in neat form and on time.
5. Students should preserve the academic atmosphere of the classroom and not engage in any disruptive or distracting activity such as whispering, talking, walking around, eating, and drinking, etc.
- 6. Students are expected to devote sufficient study time to accomplish the stated goals and objectives of the course (customary recommendation is two hours of study outside class for every hour in class).**
7. Prerequisites for all College of Arts and Sciences courses are listed in the Catalog. A student should earn a grade of C or better in each course that is a prerequisite for a given course.

Students have the right to learning experiences that are free of favoritism, prejudice, discrimination, or harassment.

## **CHEMISTRY 121a**

### **GENERAL CHEMISTRY**

A natural science is a body of knowledge about things that are observable in nature, in the material world, and in the universe. Each branch of science organizes a multitude of facts and answers to “How...?” and “Why...?” questions. In the biological sciences (such as botany and zoology) questions are asked mainly about living things. In the physical sciences (such as geology and meteorology) the questions pertain mainly to things that are not alive. **Chemistry is in a central position.** It applies mathematics and the laws of physics, and is thought of most often as a physical science. However, the chemical elements are the building blocks for everything in the universe, living or not. Chemistry, therefore, legitimately asks questions about life itself.

Today, we have come to realize that no branch of science can be entirely independent of the others. The science of chemistry touches practically every aspect of our lives. It is also important in the successful pursuit of many careers.

Chemistry is the branch of science that deals with matter, with the changes that matter can undergo, and with the laws that describe these changes. As this definition implies, chemistry is both a theoretical and an applied science. The **principles of chemistry** are the explanations of chemical facts; this is where hypotheses, laws, and theories are encountered. **Descriptive chemistry** is the description of the elements and their compounds, their physical states, and how they behave. Accordingly, Chemistry 121a deals with the following general topics:

**Quantitative Aspects of Chemistry (Chapters 1, 2, 3, 4, 8)** : These chapters develop the basic groundwork for quantitative measurements of mass and energy and their applications to stoichiometric relationships. This includes the stoichiometry of compounds and chemical reactions as well as thermochemistry.

**Atomic Structure, and Periodic Properties of Elements (Chapter 5):**

The many physical and chemical properties that we observe for the elements and their compounds may seem, at first glance, to make understanding them hopelessly complex. To understand these properties, we must look at the structure of the atom. The knowledge of atomic structure will help us to simplify some of the complexities in chemistry by organizing the elements into the periodic table.

**Properties of Important Elements (Chapter 6):** This chapter includes processes used to obtain elements from natural sources (air, ocean, or minerals), methods used to purify these extracted elements, and chemical reactions of selected elements.

**Chemical Bonding and Molecular Structure (Chapters 6, 7):** Ordinarily, isolated atoms are not chemically stable. Instead they tend to combine chemically with other atoms. In this section we study the nature of chemical bonding (forces that hold atoms or ions together) and molecular geometry. Again, knowledge of chemical bonding and molecular geometry is helpful in predicting the properties of substances.

**Properties of Gases (Chapter 9):** With this chapter we start a systematic study of the states of matter—solids, liquids, and gases. We will take up gases first, partly because their physical properties are the easiest to understand and partly because important features about gases illuminate some of the behavior of liquids and solids.

**Liquids, Solids, and Changes of State (Chapter 10):** This chapter discusses the forces of attraction between particles. The nature of forces that are responsible for the properties of liquids and solids are investigated. We also look at what happens during transitions between solid, liquid, and gaseous states.