

# CHEMISTRY 121 AB Fall 2012

## Course Syllabus

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Office 3624, Office hour Wednesday 11:00 AM-12:00 PM

### GENERAL COURSE INFORMATION

**Required Material:** Introductory Chemistry Forth Edition by Nivaldo J. Tro.

ISBN: 978-0-321-72599-8.

In this course we will use an online homework and quiz from mastering chemistry web site more information will be given in class.

Information regarding Lab Manual will be given in the class.

Calculator (**you may not use your cell phone as calculator in this class**)

**Catalog Description:** **Chem. 121-** Principle of general inorganic chemistry, including properties of matter, dimensional analysis fundamentals of stoichiometry, interpretation of the periodic table, nomenclature and introduction to solution chemistry and commonly used concentration units.

**Evaluation:**

Your grade will be based on your performance in the following:

10 Quizzes (15 pts each, drop lowest)	135 Points
10 Labs (15 pts each, drop lowest)	135
3 Midterms Exams (100 pts each)	300
1 Final Exam (200 pts)	200
1 Exit Exam (90 pts)	90
Homework	<u>40</u>
Total	900 points

No quiz or lab score will be dropped in the calculation of your midterm grade

Letter grades will be assigned according to the scale:

A	90%
B	80%
C	70%
D	60%
F	<60%

- Final Grade:** Grades will be submitted to the registrar on the last day of classes, but your grade may not be available online or on a transcript for some time after that.
- Attendance:** Your attendance is required at all classes. Unexcused exam, quiz and lab absences score 0. It is the responsibility of the student to contact the instructor regarding missed work. If an absence is anticipated, the student should make arrangements to complete the missed assignments prior the absence. In an emergency, it is the student's responsibility to contact the instructor within one class period of an exam. There are no laboratory make up days. Written documentation may be requested to make up an exam.
- Quizzes:** Quizzes will be given at the beginning of class, and will have time limit, usually 20 minutes. Answer keys will be available after the quiz. If you miss a quiz, you will not have a chance to make it up. The lowest quiz and lab score will be dropped to determine your final grade.
- Exams:** There will be three midterm exams and one final exam. You must bring your own calculator, pencil and eraser for exams. Cell phones may not be used at any time during the exam, even as calculators. Once the exam begins you may not leave the room unless you turn in the exam. **Unlike labs and quizzes, exam scores will not be dropped to determine your midterm or final grade.**
- Exit Exam:** In order to insure uniform expectations across all sections of Chem. 121 at Truman College the department has instituted an exit exam.
- Labs:** The procedure for each experiment is fully described in the laboratory manual. All lab manuals will be downloaded from the blackboard web site. You are expected to read the experiment before coming to lab. **Students who come to lab with only a copy of the post lab questions or data sheet will not be permitted to perform the experiment.** When assigned by the instructor, pre-lab questions will be due before the lab begins and must be turned in before you will be permitted to start the lab. When post lab questions or reports are assigned, they will be due at the beginning of the next class period, unless otherwise announced. Late lab reports score 0 for that portion of the lab grade. There are no make up laboratory experiments. No pre-lab, post-lab, or data sheets will be accepted from students who miss the lab period.

**Chemistry 121: Lecture, Lab & Exam Schedule- Rahel Bokretzion,  
Fall 2012**

Date	Monday	Wednesday
08/20	Introduction, Chapter 1	Chapter 2 Check in & Lab Safety
08/27	Chapter 2	Chapter 3, Lab 1
09/03	Labor Day Holiday	Quiz 1 Chapter 3, Lab 2
09/10	Chapter 3	Chapter 4, Lab 3
09/17	Quiz 2, Exam Review, Chapter 4	Exam 1 (Chapter 1-3) Chapter 4
09/24	Chapter 4 & 9	Chapter 9, Lab 4
10/01	Chapter 9	Quiz 3, Chapter 10 Lab 5
10/08	Quiz 4, Chapter 10	Chapter 10, Lab 6
10/15	Quiz 5, Exam Review, Chapter 5	Exam 2 (4,9 & 10) Chapter 5
10/22	Chapter 5	Chapter 7, Lab 7
10/29	Quiz 6, Chapter 7& 6	Chapter 6, Lab 8
11/05	Quiz 7, Chapter 6 & 8	Chapter 8 ,Lab 9
11/12	Quiz 8, Chapter 11	Quiz 9, Chapter 11 ,Lab 10
11/19	Quiz 10, Exam Review	Exam 3 (5,6,7,8 &11)Chapter 12
11/26	Chapter 13	Final Exam Review
12/03	Final Exam	Exit Exam

**Lab Topic**

<b>Lab 1: Measurements: Mass, Temperature, Density</b>
<b>Lab 2: Separation of Salt and Sand</b>
<b>Lab 3: Observing Chemical and Physical Changes</b>
<b>Lab 4: Identification of unknown metal</b>
<b>Lab 5: Analysis of Alum</b>
<b>Lab 6: Molecular Geometry and Shape</b>
<b>Lab 7: Ionic Reactions: Precipitates, Solubility, and Metal Activity</b>
<b>Lab 8: Empirical Formulas of Compounds (optional)</b>
<b>Lab 9: Stoichiometric Determination of the Formation of Copper(II) Oxide</b>
<b>Lab 10: Gas Laws: Boyle's and Charles'</b>

## General Education Goals Established by Truman College

- The student exhibits social and ethical responsibility and is aware of her or his place in the global community.
- The student performs effectively in the workplace and has the ability to work and make effective use of a wide variety of current technologies.
- The student communicates effectively in both written and oral formats.
- The student demonstrates the ability to think critically, abstractly and logically.
- The student gathers, interprets and analyzes data

## Teaching and Learning Goals Established by Truman College

Taking a course in Chemistry helps a student achieve all of the following general education goals. How this occurs is explained below.

- Communicate effectively in both written and oral forms  
  
Students will keep a laboratory notebook and learn to record careful observations, draw appropriate conclusions and reflect on what they have learned.
- Gather, interpret and analyze data  
  
Students will learn to collect data in the laboratory, create graphs, compare quantitative data and draw conclusions about the data obtained.
- Demonstrate the ability to think critically, abstractly and logically  
  
The Scientific Method is predicated upon deductive and inductive logical reasoning. Students will study applications of the scientific method to information gathered by the scientific community. Students will read articles about chemical discoveries. Abstract thinking is developed in many ways in chemistry from the use of symbols and models to the use of mathematics to solve a variety of problems.

- Work with a variety of technologies

Students use computers, data acquisition equipment, microscopes, digital imaging devices, media, the Internet, podcasts, digital balances, all in the pursuit of scientific knowledge.

- Exhibit social and ethical responsibility

This very serious goal is addressed on many levels in the chemistry course, from the discussion of the importance of careful and precise measurements that could affect the life of a patient to the discussion of what happened when the space ship Challenger exploded or a grain elevator explodes - we examine the role of responsible use of chemical knowledge.

- Perform productively in the workforce

Because Chemistry education is comprehensive in utilizing the body (kinesiology), the mind (both spatial and analytical reasoning) and the heart (looking at the connection of chemistry to the world) it is an excellent course to prepare individuals for the workforce.

- Demonstrate the ability to learn independently

Students are given independent projects to complete in the course. They are also given questions to research independently. Reporting these results to the class develops their ability to speak confidently to their peers.

- Gain awareness of their role in the global community

By discussing the way that chemistry is connected to other occupations and careers we develop student awareness about their career choice and its dependencies on a basic understanding of chemistry.

## **Physical Science and Engineering Departmental Learning Outcomes**

Upon graduation with an Associate degree from Truman College a student should be able to:

- Organize, analyze and interpret information and use the scientific method to make inferences.
- Exhibit knowledge of scientific concepts through written and oral communication.
- Demonstrate excellent laboratory skills and techniques including the proper use of relevant instruments and related technologies.
- Relate concepts learned in Physical Science and Engineering Department classes to real world situations.

### **General Student Learning Outcomes for Chemistry 121**

At the completion of this course, the successful student will be able to:

- Compare and contrast the chemical behavior and reactions of common substances.
- Convert quantities of mass, volume, temperature and length.
- Classify matter by its state and bonding behavior using the Periodic Table as a reference.
- Solve stoichiometry problems.
- Perform laboratory experiments using standard chemistry glassware and equipment.
- Record, graph, chart and interpret data obtained from experimentation.

### **Specific Course Objectives for Chemistry 121**

At the completion of this course, the successful student will be able to:

- Describe processes and procedures used in the scientific method.
- Differentiate terms such as observation, hypothesis, data, conclusion, theory.
- Explain how the use of the scientific method furthers scientific knowledge.
- Convert numbers in decimal notation to scientific notation and vice versa.
- Convert temperature data to values in three scales: Celsius, Fahrenheit and Kelvin.
- Explain why the Kelvin scale does not use negative numbers.
- Convert quantities using common metric units: liters/milliliters, grams/milligrams and meters/centimeters/millimeters.

- Demonstrate the use of significant figures
- Differentiate between precision and accuracy.
- Calculate one of the three quantities: mass, volume, density given the values for the other two.
- Measure the density of a sample of a solid or a liquid using available laboratory equipment.
- List the names and chemical symbols of at least 44 elements.
- List the names and formulas of common polyatomic ions.
- Given a positive and a negative ion - construct the formula of the ionic compound formed.
- Compare and contrast the difference between covalent and ionic compounds
- Classify bonds in common compounds along the continuum of purely covalent to purely ionic.
- Differentiate between pure substances (elements and compounds) and mixtures (homogeneous and heterogeneous).
- Classify common elements as metals, non-metals and semi-metals and describe the properties of each class.
- Explain how the arrangement of electrons in an atom affects its bonding and chemical properties.
- Explain how the periodic table is arranged and what is indicated by rows, columns and various sections of the table.
- List electronic configurations for the first thirty- six elements.
- List the number of valence electrons for the first twenty-six elements
- Construct simple Lewis Dot structures, water, methane, ammonia boron tri chloride, carbon dioxide and diatomic molecules.
- Identify the alkali metals, alkaline earth metals, transition elements, calcogens, halogens and noble gases on the periodic table.
- Convert between mass and moles.
- Convert between moles and molecules or atoms.
- Solve empirical formula problems.
- Classify chemical reactions into types: combination (synthesis), decomposition, single displacement (replacement) and double displacement (replacement)
- Perform the balancing of simple chemical reactions.
- Paraphrase the chemical properties of common ionic compounds and common covalent molecules.
- Recognize the formation of a precipitate or the evolution of a gas or heat during a chemical reaction performed in the laboratory.
- Construct chemical formulas for common compounds given the compound's name.
- Identify the name of compounds from its formula.
- Perform basic stoichiometric calculations to determine the quantity of products given various quantities of reactants.
- Solve limiting reactant problems.

- Solve percent yield problems.
- Compare and contrast the properties of the three basic states of matter: gas, liquid and solid.
- Explain the Kinetic Molecular Theory of Gases and list the assumptions of this theory.
- Calculate volume, temperature or pressure of a gas sample that undergoes changes in its initial conditions using the combined gas law.
- Use the ideal gas law in stoichiometric calculations.
- Compare the solubility of various common compounds.
- Define the terms: solution, solute and solvent.
- Calculate the molarity of solutions.
- Perform laboratory experiments that illustrate basic chemical principles.
- Demonstrate the careful recording of observations and data in the laboratory.
- Demonstrate knowledge of laboratory safety.
- Demonstrate effective laboratory procedures such as transfer of solids, weighing of solids, pouring of liquids, measurement of liquid volume.
- Organize and graph experimental data.
- Interpret experimental data and draw inferences from the data.
- Summarize the results of experimental observations and data.