

CHEMISTRY 121 Introduction to General Chemistry

Instructor name: Morgan Stock

Instructor contact information:

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COURSE DESCRIPTION: General chemistry for non-science majors. Completion of CHEM& 121 and CHEM& 131 fulfills chemistry requirement for many health science majors (nursing). This course covers the fundamentals of chemistry which includes: structure of atom/molecules, thermodynamics, stoichiometry, equilibrium and acid base chemistry.

Prerequisite: . Prereq: MATH 098 or better or placement test above MATH 098 or by instructor permission. Lab fee. Transfer class.

I. RECOMMENDED TEXT AND MATERIALS:

- A. Gorzynski Smith (2013), General, Organic, and Biological Chemistry (2nd ed.), McGraw Hill
- B. Scientific calculator.

II. STUDENT LEARNING OUTCOMES:

Upon completion of the course, the student will be able to:

- A. Take mass, volume, length and temperature measurements with appropriate accuracy and precision.
- B. Perform mathematical conversions (particularly Metric conversions) and calculations, expressed with appropriate units and significant digits.
- C. Recognize and describe various forms of matter and the transformations (physical and chemical) thereof.
- D. Recognize and describe the key ideas of atomic structure, the periodic table, and chemical bonding.
- E. Recognize and identify specific ionic compounds, binary molecular compounds and inorganic acids by chemical formula and chemical name; derive the chemical formulas and names of these compounds.
- F. Balance chemical equations; recognize and describe various types of chemical reactions (such as addition, decomposition, replacement, precipitation, redox and neutralization).
- G. Perform chemical calculations involving moles, molar mass, molarity and concentration, stoichiometry, gas laws, and pH.

III. COURSE CONTENT:

- A. Matter:
 - a. Solids, liquids, gases.

- b. Homogeneous and heterogeneous mixtures.
 - c. Elements and compounds.
 - d. Properties and transformations of matter.
- B. Measurement:
- a. Significant digits.
 - b. Scientific notation.
 - c. Metric units and conversions.
 - d. English-Metric conversions.
 - e. Temperature scales.
 - f. Density.
- C. Atomic structure:
- a. Subatomic particles (location within the atom; properties); nucleus, shell, subshell, orbital.
 - b. Atomic mass, atomic number, mass number.
 - c. Electron energy levels; electronic configuration of the elements.
 - d. Valence shell, valence electrons, and Lewis symbols.
 - e. Isotopes; radioactivity; radioactive decay.
- D. The periodic table and periodic table trends:
- a. Various categorizations of the elements:
 - i. Groups and periods.
 - ii. Metals, nonmetals and metalloids.
 - iii. Orbital blocks.
 - iv. Representative, transition, and inner transition elements.
 - v. Alkali metals, alkaline earth metals, halogens, noble gases.
 - b. Ionization energy, electronegativity.
- E. Chemical bonding:
- a. Molecules and the covalent bond; Lewis structures.
 - b. Shapes of molecules; VSEPR theory; bond angles; polarity.
 - c. Ion formation and the ionic bond.
 - d. Naming of ionic and binary molecular compounds.
 - e. Derivation of chemical formulas.
- F. Chemical compounds and equations:
- a. Chemical reactions and equations; balancing chemical equations.
 - b. Types of chemical reactions (such as addition, decomposition, replacement, precipitation, redox and neutralization).
 - c. Chemistry of solutions.
 - d. The mole; Avogadro's Number.
 - e. Molar mass; molarity and concentration; and calculations thereof.
 - f. Chemical equilibrium.
 - g. Calculations involving:
 - i. Dilution.
 - ii. Reaction stoichiometry.
 - iii. Gas laws.
 - iv. Limiting reagent.
- G. Acids and bases:
- a. Names and chemical formulas of common acids.
 - b. Neutralization reactions; acid-base titration.
 - c. Predicting acid-base reactions.

- d. Acid and base strength; weak acid dissociation.
- e. pH and calculations thereof.
- f. Buffers.
- H. Laboratory and experimental science:
 - a. The scientific method; observation, hypothesis, theory, scientific law.
 - b. Laboratory safety and proper laboratory technique.
 - c. Laboratory exercises to complement lecture concepts.

IV. COLLEGE-WIDE ABILITIES:

- A. Communicate effectively.
- B. Think logically and critically.
- C. Evaluate and process quantitative and symbolic data.

V. EVALUATION:

Grades will be based on exams, written assignments, lab work and class participation. A maximum of around 555 points can be earned, tentatively to be distributed as follows:

- Exams (minimum 2) 60% Score
- Quizzes (minimum 5) 15% Score
- Lab Reports (7) 25% Score

Grade Scale for the Course			
95 - 100	4	70 - 72	2.2
93 - 95	3.8	68 - 70	2
90 - 93	3.6	66 - 68	1.8
87 - 90	3.4	64 - 66	1.6
84 - 87	3.2	62 - 64	1.4
81 - 84	3	60 - 62	1.2
78 - 81	2.8	58 - 60	1
75 - 78	2.6	<58%	0.0 (no credit)
72 - 75	2.4		

Course Features & Policies:

Lectures: You should attend all lectures, as there will be material presented in lecture that is not covered in the text, & portions of the text that we may skip. Homework assignments will be announced during lecture, & much of the exams will be based around the lectures. You should try to begin reading the material in the textbook before that material is presented in lecture, for maximum learning benefit.

Homework: No mandatory homework will be assigned, though suggested problems and material will be given and are **strongly** recommended. Failure to complete give assignments will be reflected in poor exam scores.

Exams: There will be at least exams. Exams will be announced at least 1 week in advance of the exam date. Make-up exams will not be provided.

- While each exam will focus on recent material, in order to succeed you MUST retain a working knowledge of all material covered since the beginning of the quarter.
- **Student Code of Rights and Responsibilities:**
http://inside.spscc.ctc.edu/Student_Services/enrollment/forms/code_of_rights.pdf
- **Students with Disabilities statement**
 - *Students who are eligible for learning accommodations must make arrangements with the Office of Disability Support Services. Students who have a letter of accommodation should meet with me as soon as possible, preferably during the first week of class.*
- **Financial Aid:** Students receiving financial aid should ALWAYS check with Financial Aid prior to withdrawing, signing an incomplete contract, changing to an audit, or receiving an F or V grade in a class.
- **Class Cancellation:** Cancellation of class will be announced as soon as possible either in class or via the class website (www.chem121.weebly.com)

Tentative Schedule

WEEK	LECTURE	Events
#1: Jun 30	Chp 1,2	Lab Check in F – Independence Day
#2: Jul 7	Chp 2, 3, 4	Lab: Accuracy and Density
#3: Jul 14	Chp 4, 5	Lab: VSEPR
#4: Jul 21	Chp 5	Lab: Alkaseltzer
#5: Jul 28	Chp 6, 7	Lab: Factors Affecting Rate
#6: Aug 4	Chp 7,8	Lab: Molar Mass of CO ₂
#7: Aug 11	Chp 8,9	Lab: Buffer
#8: Aug 18	Chp 9	Lab: Titration Th – Final Day of Classes (Final Exam)