

CHEM 121 - General Chemistry 2 Course Outline

General Education Information:

SECTION C

Course Description

Repeatability May be repeated 0 times

Catalog Description A continuation of CHEM 120. Topics include solutions, acid-base and redox equilibria, thermodynamics, kinetics, pH, buffers, solubility product, complex ions, thermodynamics, electrochemistry, biochemistry and nuclear chemistry.

Schedule Description

SECTION D

Condition on Enrollment

1a. Prerequisite(s)

CHEM 120

1b. Corequisite(s): *None*

1c. Recommended: *None*

1d. Limitation on Enrollment: *None*

SECTION E

Course Outline Information

1. Student Learning Outcomes:

- A. Communicate chemical and physical processes at the molecular level and how they relate to the macroscopic environment.

- c. Mechanisms
 - d. Catalysis
- B. Chemical Equilibrium
 - a. LeChatlier's Principle
 - b. Homogenous Systems
 - c. Heterogeneous Systems
- C. Acids & Bases
 - a. Strong and Weak acids
 - b. pH
 - c. Buffers
 - d. Titration Curves
- D. Applications of Aqueous Equilibria
 - a. Solubility
 - b. pH controlled Solubility
 - c. Complex Ions
 - d. Amphoterism
- E. Spontaneity, Entropy and Free Energy
 - a. Effect of Temperature
 - b. Work and Efficiency
- F. Electrochemistry
 - a. Balancing Oxidation-Reduction Reactions
 - b. Nernst Equation
 - c. Standard State Potentials
- G. Nuclear Chemistry
 - a. Radioactive Decay
 - b. Carbon Dating
 - c. Half Life
 - d. Nuclear Transformations
- H. Organic Chemistry
 - a. Nomenclature
 - b. Functional Groups
 - c. Free-Radical Halogenation
 - d. Substitution and Elimination Reactions
- I. Topics in Biochemistry May Include
 - a. Enzyme Kinetics
 - b. Michaelis-Menton Equation
 - c. Lineweaver Burke Plot
 - d. Biological Buffers
 - e. Action Potential
 - f. Amino Acids and Zwitterions
 - g. Ionic Strength and Osmotic Pressure
 - h.

4. Methods of Instruction:

Lecture:

Other (Specify):

Other: Lectures. Chemical demonstrations. Video presentations. Individual and group problem solving in the classroom. Individual and group laboratory experiments. Peer oriented guided instruction where the students help one another under the guidance of an instructor.

5. Methods of Evaluation: Describe the general types of evaluations for this course and provide at least two, specific examples.

Additional assessment information:

Four exams will be given, including the final exam. Exams will be fill in, multiple choice, true/false, and short answer, and will be graded on a point scale. A sample question may be, "What is the pH of a 0.1M acetic acid solution?" or "How many steps are required for a fourth order reaction?" or perhaps, "Please draw a working electrochemical cell indicating the composition of the electrodes, cell concentrations, and direction of electron flow."

Regular attendance in the laboratory. All labs will be checked off by the instructor prior to the student leaving the lab.

Letter Grade or P/NP

6. Assignments: State the general types of assignments for this course under the following categories and provide at least two specific examples for each section.

A. Reading Assignments

Daily reading of text; weekly reading of lab manual (ex: Read Chapter 15, "Chemical Thermodynamics," Sections 15.1 through 15.9 in your text and read the first lab, "The Kinetics of the Acid Decomposition of a Compound.")

B. Writing Assignments

Problem sets are provided for homework.

Laboratory write-ups are assigned weekly.

Sample tests/study sheets are provided for each of the four exams.

C. Other Assignments

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7. Required Materials

A. EXAMPLES of typical college-level textbooks (for degree-applicable courses) or other print materials.

Book #1:

Author: McMurry & Fay

Title: Chemistry

Publisher: Prentice Hall

Date of Publication: 2011

Edition:

Author: Atkins & Jones
Title: Chemical Principles
Publisher: W.H. Freeman
Date of Publication: 2012
Edition: 6th

Manual #1:

Author: Brown , LeMay, Bursten, Murphy, Woodward, Nelson & Kemp
Title: Laboratory Experiments for Chemistry: The Central Science
Publisher: Prentice Hall
Date of Publication: 05-18-2008

Manual #2:

Author: Brown , LeMay, Bursten, Murphy, Woodward, Nelson & Kemp
Title: Laboratory Experiments for Chemistry: The Central Science
Publisher: Prentice Hall
Date of Publication: 05-18-2008

Manual #3:

Author: Postma, Roberts & Holenberg
Title: Chemistry in the Laboratory
Publisher: W.H. Freeman
Date of Publication: 03-12-2004

Manual #4:

Author: Fawl
Title: Laboratory, General Chemistry
Publisher: NVC Reproduction Services
Date of Publication: 08-22-2012

B. Other required materials/supplies.