

NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course Title: General Chemistry II Lecture and Lab

Course #: CHE*122

Course Description: 4 credits (3 hours lecture, 3 hours lab)

Continuation of expansion of foundations learned in General Chemistry I. Topics include solution properties, chemical kinetics, chemical equilibrium, acids and bases, equilibrium and solubility, thermodynamics electrochemistry, transition metal chemistry and coordination chemistry, and organic and biochemistry.

Goals: The student should develop some understanding at the chemical level of the physical and biological processes in the surrounding world.

Outcomes: Upon successful completion of this course, the student should be able to:

- Classify and understand the differences between various types of reactions including acid-base reactions, precipitation reactions, oxidation-reduction
- Identify acid base-reactions by incorporating the Arrhenius, Brønsted-Lowry, and Lewis definitions of acids and bases
- Describe the properties and function of electrolytic and galvanic cells, use Faraday's law and the Nernst equation
- Use Le Chatelier's principle to describe shifts in equilibrium for chemical and physical reactions and calculate equilibrium constants
- Calculate K_p and K_c for reactions involving gases
- Calculate and use equilibrium constants for acids and bases to determine pH and acid/base concentrations
- Calculate and use solubility product constants for slightly soluble compounds to determine concentrations
- Define and give examples of uses for the common ion effect, buffers and hydrolysis
- Understand that all reactions occur at a specific rate and describe the factors that govern those rates
- Determine the order of reaction and calculate the rate constant of a reaction from experimental data using differential rate laws
- Define activation energy and describe how a catalyst affects the activation energy
- Differentiate between a rate determining step and a mechanism
- Explain how the interactions between various energy forms and matter can produce physical, chemical and nuclear transformations
- Observe, measure and represent mathematically the changes in the various energy forms taking place during the physical and chemical transformation of substances
- Define and recognize a state function
- Define the Laws of Thermodynamics and describe how they apply to chemical reactions
- Define, differentiate, calculate and apply the concepts of change in enthalpy, heat of formation, heat of reaction, Hess's law and heats of vaporization and fusion as they relate to chemical reactions

- Define, differentiate and apply the concepts of entropy, free energy of formation and free energy of reaction as they relate to chemical reactions
- Explain molarity, molality, and calculate molar mass from freezing point depression.
- To understand how the Laws of Thermodynamics can be applied to predict reaction spontaneity
- To understand basic transition metal chemistry and its application to coordination compounds
- Have basic understanding of organic chemistry including structure of major groups of biochemical molecules.
- Understand the chemistry of selected groups of elements in the Periodic Table

College Policies

Plagiarism: Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanction. Please refer to your “Student Handbook” under “Policy on Student Rights,” the Section entitled “Student Discipline,” or the College catalog for additional information.

Americans with Disabilities Act (ADA): The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Roseann Dennerlein, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6307 (V/TTY) and her email is rdennerlein@nwcc.commnet.edu.

School Cancellations: If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio stations. Students may also call the College directly at (860) 738-6464 to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.