

## CHE 105, General Chemistry I

### I. Course Description

The course involves the study of the principles and laws concerning the structure and behavior of matter and their applications in qualitative and quantitative laboratory situations. This course is designed for all chemistry, engineering, pre-medical and science majors. Prerequisite: High school chemistry or CHE 103 or CHE 102. Students should also be able to perform algebraic manipulations.

### II. Meeting Times and Location

M, W; 11:00 am; Room 1K4

### III. Instructor and Office

David Edelbach

Office: 3H4

Office phone: (815)288-5511 ext. 364

email: edelbad@svcc.edu

Office hours: M 10-11, 12:30-1:30

Tu 1:30-2:30

W 10-11

Th 10:30-12:30

### IV. Grade Determination

#### 1. Exams

- four unit exams worth 100 points each
- comprehensive final worth 250 points
- Exam dates are announced in class.

#### 2. Missed Exams

- All make-up exams will be given during the last week of class.
- There is no penalty for missing one exam so long as it is taken during the last week of class.
- If a second or third exam is missed, 5 points will be deducted from each of those exams.
- If no exams are missed 10 points will be added to your total number of points.

#### 3. Quizzes

There will be daily quizzes. All quizzes combined are worth 125 points. The three lowest quiz scores will be dropped. No make up quizzes will be given. In the interest of time, short quizzes will be given and only 5 minutes will be allowed to complete the quiz. This should be enough time if you know the material. Quizzes will be given at the beginning of the class. Being late to class will reduce the amount of time you have for the quiz by the number of minutes you are late.

#### 4. Laboratory

Laboratory will contribute 25% to the overall course grade.

#### 5. Final grade will be based on percentage of total points obtained.

90-100% A, 80-89% B, 70-79% C, 60-69% D, < 60% F

### V. Attendance

No points will be given for attendance.

### VI. Studying

- Review class notes.
- Rework problems done in class.
- Work assigned problems.
- Be able to do the items listed on the objective sheets.

### VII. Materials

Textbook: *Principles and Reactions*, Masterton and Hurley, 6<sup>th</sup> Edition, ISBN 0-495-12671-3

Lab Manual: *Laboratory Studies for General Chemistry I*, David Edelbach

## VIII. Tentative Schedule

Week	Chapters
1-3	1, Matter and Measurements
	2, Atoms, Ions and Molecules
	Test, Chapters 1,2
4-6	3, Stoichiometry
	4, Reactions in Aqueous Solutions
	Test, Chapters 3,4
7-10	5, Gases
	6, Electronic Structure and Bonding
	Test, Chapters 5,6
11-14	7, Ionic and Covalent Bonding
	8, Thermochemistry
	Test, Chapters 7,8
15	9, Liquids and Solids
	Final, Comprehensive, Chapter 1-9

## IX. Outcomes

### A. Matter and Measurements

Students will define terms used to discuss matter and measurements; classify matter, properties and changes; indicate appropriate SI units; record answers with the correct number of significant figures; work problems involving percentage; perform conversions; will work problems involving density.

### B. Atoms, Ions, Molecules

Students will describe the experiments used to discover the structure of the atom; give the properties for subatomic particles; indicate the atomic number, mass number, and the number of proton, electrons, and neutrons given and elemental symbol in the form  ${}^A X^{\text{charge}}$ ; distinguish between structural, molecular, and empirical formulas; work quantitative problems involving the relative abundance of isotopes and the average atomic mass; name and provide formulas for ionic and molecular compounds and acids.

### C. Chemical Reactions and Stoichiometry

Students will determine the empirical and molecular formulas for compounds given various types of data; complete and balance precipitation and neutralization reactions; work stoichiometry problems; calculate the masses of individual atoms and molecules; work problems involving molarity and solution preparation; classify reactions as redox or non redox and balance redox reactions using the half reaction method.

### D. Gases

Students will describe the relationship between temperature, pressure, volume, and number of moles of a gas; work problems using the ideal gas law; work quantitative problems involving gas mixtures; work stoichiometry problems involving reactions occurring in the gas state including those involving collecting gas over water; explain the behavior of gases using the KMT; describe the difference between effusion and diffusion, those factors affecting effusion and diffusion rates, and work problems using Graham's law of effusion; describe the difference between a real and ideal gas and indicate those conditions under which real gases behave most ideally; describe our atmosphere in terms of composition, structure, and types of air pollutants and their sources and formation.

#### E. Electromagnetic Radiation and Electronic Structure

Students will calculate frequency, wavelength, and energy per photon; list the components of the electromagnetic spectrum in order of increasing wavelength, frequency, or energy per photon; describe emission, absorption, and continuous spectra, will indicate what conditions are required to produce each, and will explain their formation at the atomic and molecular level; work problems involving the Bohr model of the hydrogen atom; describe the quantum mechanical model of the atom; write electron configurations for atoms and ions and indicate the number of unpaired electrons; list atoms and ions in order of increasing size, ionization energy, and electronegativity.

#### G. Bonding

Students will classify bonds, write electron dot structures, assign formal charges, predict molecular shape and bond angles, give hybridization, and indicate the overall polarity of molecules or ions, describe the characteristics and formation of pi and sigma bonds.

#### H. Thermochemistry

Students will describe the source of energy changes in chemical reactions and draw energy diagrams for; calculate Enthalpy changes for reactions using Hess's law, heats of formation, bond energy, or experimental data; work quantitative problems involving heat capacity.

#### I. Condensed State

Students will describe the nature and relative strength of hydrogen bonding, dipole forces, and dispersion forces; predict the predominant intermolecular force present in a compound; predict physical properties based on structure; draw and label a cooling curve for a pure crystalline substance; describe the difference between ionic, molecular, metallic, and network covalent solids in terms of bonding and general properties; classify solids; describe phase changes and use phase diagrams.

Objective examinations, quizzes, and lab exercises will determine student comprehension of all outcomes

#### **X. Accommodation statement**

If you have a disability or suspect that you have one and want to request a classroom accommodation, it is your responsibility to inform your instructor. Reasonable accommodations will be made after verification from the Student Needs Coordinator's Office located in Room 1G4, or by calling extension 246.

#### **XI. Assessment Statement**

Sauk Valley Community College is an institution dedicated to continuous instructional improvement. As part of our assessment efforts, it is necessary for us to collect and analyze course-level data. Data drawn from students' work for the purposes of institutional assessment will be collected and posted in aggregate, and will not identify individual students. Your continued support in our on-going effort to provide quality instructional services at SVCC is appreciated.

#### **XII. Privacy**

The college policy on student records complies with the "Family Educational Rights and Privacy Act." This Act is designed to protect the privacy of education records, to establish the rights of students to inspect and review their education records, and to provide guidelines for correction of incorrect or misleading data through formal and informal hearings. A copy of the Act or questions concerning the Family Educational Rights and Privacy Act may be referred to the Dean of Student Services, Ext. 271