



DEPARTMENT OF SCIENCE  
COURSE INFORMATION SHEET FOR  
**CHE101 – APPLIED CHEMISTRY**

*All members of the Science Department at Clinton Community College use the respective course templates as a basis for their course syllabi. Faculty may, at their discretion, change the order of the course content or add course content.*

**COURSE NUMBER AND TITLE:** CHE101 – Applied Chemistry

**COURSE SECTION:** *TBA*

**CONTACT HOURS:** 5      **CREDIT HOURS:** 4

**SEMESTER AND YEAR:** *TBA*

**INSTRUCTOR’S NAME, TELEPHONE NUMBER, EMAIL ADDRESS, OFFICE NUMBER, AND OFFICE HOURS:** *TBA*

**I. COURSE DESCRIPTION:**

This is a basic chemistry course appropriate for non-science majors, elementary majors, and students in pre-nursing. Students learn basic concepts and the vocabulary used in chemistry as well as how to apply concepts to quantitative problems. The topics covered include measurement, atoms, molecules, mass, energy, naming compounds, acids and bases, and basic organic chemistry concepts. There are three hours of lecture and one two-hour laboratory per week.

This course meets the SUNY General Education course requirements for natural sciences.

**II. PREREQUISITE:** ENG094 – Fundamentals of Composition and MAT100 – Introductory Algebra or their equivalents

Students receiving credit for CHE111 and/or CHE112 cannot receive credit for CHE101.

**COREQUISITE:** ENG101 – English Composition or equivalent

**III. COURSE OBJECTIVES, SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES AND ASSESSMENT:**

**COURSE OBJECTIVES:**

As the result of instructional activities, students will be able to:

1. Interpret and analyze scientific information.
2. Develop hypotheses based on the observation of natural phenomena.

3. Explain experimental design based on a testable hypothesis as a result of observation and prediction.
4. Record and organize data resulting from quantitative measurement using tables and graphs.
5. Interpret and analyze data and come to conclusions based on the evidence presented.
6. Calculate an initial unit of measurement to another unit using conversion factors from the unit of an equality.
  - a. Convert an initial unit of measurement to another unit.
  - b. Identify conversion factors from the units in an equality.
  - c. Calculate density of a substance.
  - d. Convert between mass and volume using density.
7. Describe the characteristics of an element using the periodic table and the relationship between electron arrangement, group number and periodic law.
  - a. Explain the relationship between electron arrangement, group number and periodic law
  - b. Identify an element and the characteristics of an element using the periodic table
  - c. Identify number of protons, neutrons, and electrons in an atom using the periodic table.
  - d. Identify an isotope and describe the atomic mass of an element.
8. Determine the correct formulas for ionic and covalent compounds and balance a chemical equation.
  - a. Identify elements and compounds in a chemical formula.
  - b. Write the correct formulas for ionic and covalent compounds.
  - c. Name ionic and covalent compounds.
  - d. Write a balanced equation for a chemical reaction.
9. Determine the mole/mass relationships in chemical equations using principles of stoichiometry.
  - a. Determine the molar mass of a compound from its formula.
  - b. Convert between grams of a substance and number of moles using molar mass.
  - c. Use mole conversion factors to determine number of moles for a reactant or product.
  - d. Calculate the mass of a reactant or product using a given mass of a substance in a reaction and appropriate mole factor and molar masses.
10. Describe physical properties of solids, liquids, and gases and the energy involved with changes of states in matter.
  - a. Identify the physical properties of three states of matter.
  - b. Describe the changes of state between solids, liquids, and gases.
  - c. Calculate the energy involved with changes of states in matter.
11. Calculate pressure, volume, temperature, or moles using the appropriate gas law.
  - a. Describe the kinetic molecular theory of gases.
  - b. Describe the units of measurement used for pressure, volume, temperature, or moles of a specific amount of gas.
  - c. Calculate pressure, volume, or temperature using the appropriate gas law
12. Identify the solute and solvent and calculate the concentration in a solution.
  - a. Identify solute and solvent in a solution.
  - b. Describe hydrogen bonding.

- c. Calculate concentration of a solution.
  - d. Describe hypotonic, isotonic, and hypertonic solutions.
13. Identify conjugate acid-base pairs for an acid base reaction and determine the strength of an acid or base using the pH scale.
- a. Identify an acid and base in a reaction.
  - b. Identify a solution as acidic, basic, or neutral using the pH scale.
  - c. Calculate concentration of hydronium and hydroxide ions using the ion product of water.
  - d. Calculate pH from the hydronium or hydroxide ions in solution.
  - e. Identify conjugate-acid-base pairs for an acid base reaction.
14. Describe the properties that are characteristics of organic compounds

#### **SUNY GENERAL EDUCATION KNOWLEDGE AREA LEARNING OUTCOMES:**

Students will demonstrate the ability to:

1. understand the methods scientists use to explore natural phenomena, including:
  - observation
  - hypothesis development
  - measurement and data collection
  - experimentation
  - evaluation of evidence
  - employment of mathematical analysis
2. apply scientific data, concepts and models in one of the natural sciences

#### **IV. REQUIRED TEXTBOOK AND MATERIALS:**

##### **REQUIRED TEXTBOOK:**

Chemistry: An Introduction to General, Organic, and Biological Chemistry, 9<sup>th</sup> edition;  
Timberlake. Benjamin Cummings  
ISBN # 0-805-33015-1

##### **REQUIRED MATERIALS:**

Safety glasses are required for all on-campus sections.

**V. METHODS OF INSTRUCTION/COURSE ORGANIZATION:** *To be determined by the respective instructor.*

**VI. ATTENDANCE PROCEDURE (INCLUDING MAKEUP POLICY):** *To be determined by the respective instructor.*

**VII. BIBLIOGRAPHY OF READINGS (IF APPLICABLE):** *To be determined by the respective instructor.*

**VIII. METHODS OF EVALUATION (INCLUDING THE CALCULATION OF COURSE GRADE):** *To be determined by the respective instructor. The methods of evaluation shall include tests (test types, length and weight of each), papers (weight of each), projects (weight of each), and other forms of evaluation (weight of each).*

**IX. GRADING SCALE:** *To be determined by the respective instructor. The grading scale shall indicate what numerical scores correspond to the following grades: A, A-, B+, B, B-, C+, C, C-, D+, D, and F.*

*Please Include:* If you have, or suspect you may have, any type of disability or learning problem that may require extra assistance or special accommodations, please speak to me privately after class or during my office hours as soon as possible so I can help you obtain any assistance you may need to successfully complete this course. You should also contact Laurie Bethka, Room 420M in the Academic Assistance Center, for further assistance.

**X. GENERAL TOPICS OUTLINE:**

1. Energy and Matter
2. Atoms and Elements
3. Compounds and Their Bonds
4. Chemical Reactions and Quantities
5. Gases
6. Solutions
7. Acids and Bases
8. Nuclear Radiation
9. Introduction to Organic Chemistry

**XI. ACADEMIC INTEGRITY:** Academic honesty is expected of all Clinton Community College students. It is academically dishonest, for example, to misrepresent another person's work as one's own, to take credit for someone else's work or ideas, to accept help on a test, to obtain advanced information on confidential test materials, or to intentionally harm another student's chances for academic success.

**XII. COURSE CONTINUITY PLAN:** In the case that the college officially closes because of an emergency which causes a short term disruption of this course, we will utilize e-mail to continue this course in the short term (1-3 weeks). All students need to utilize their campus e-mail to receive course related information.