Required Syllabus Information – all must be included in the course syllabus

CHE 101
Course Title: Intro to Chemistry I/Lab: SC1
Course Credits: 5
Course Description: Includes the study of measurements, atomic theory, chemical bonding, nomenclature, stoichiometry, solutions, acid and base, gas laws, and condensed states. Laboratory experiments demonstrate the above concepts qualitatively and quantitatively. Designed for non-science majors, students in occupational and health programs, or students with no chemistry background.

GT Pathways Requirements:

Guaranteed Transfer (GT) Pathways Course Statement:
The Colorado Commission on Higher Education has approved CHE 101 for inclusion in the Guaranteed Transfer (GT) Pathways program in the GT- SC1 category. For transferring students, successful completion with a minimum C– grade guarantees transfer and application of credit in this GT Pathways category. For more information on the GT Pathways program, go to http://highered.colorado.gov/academics/transfers/gtpathways/curriculum.html.

NATURAL & PHYSICAL SCIENCES (N&PS) CONTENT CRITERIA – GT-SC1

1. The lecture content of a GT Pathways science course (GT-SC1)
    a. Develop foundational knowledge in specific field(s) of science.
    b. Develop an understanding of the nature and process of science.
    c. Demonstrate the ability to use scientific methodologies.
    d. Examine quantitative approaches to study natural phenomena.

2. The laboratory (either a combined lecture and laboratory, or a separate laboratory tied to a science lecture course) content of a GT Pathways science course (GT-SC1)
    a. Perform hands-on activities with demonstration and simulation components playing a secondary role.
    b. Engage in inquiry-based activities.
    c. Demonstrate the ability to use the scientific method.
    d. Obtain and interpret data, and communicate the results of inquiry.
    e. Demonstrate proper technique and safe practices.

COMPETENCIES & STUDENT LEARNING OUTCOMES FOR GT-SC1

Inquiry & Analysis:

4. **Select or Develop a Design Process**
    a. Select or develop elements of the methodology or theoretical framework to solve problems in a given discipline.
5. **Analyze and Interpret Evidence**

a. Examine evidence to identify patterns, differences, similarities, limitations, and/or implications related to the focus.
b. Utilize multiple representations to interpret the data.

6. **Draw Conclusions**
    a. State a conclusion based on findings.

Quantitative Literacy:

1. Interpret Information
    a. Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
2. Represent Information
    a. Convert information into and between various mathematical forms (e.g., equations, graphs, diagrams, tables, words).

SYSTEM REQUIREMENTS:

REQUIRED COURSE LEARNING OUTCOMES

1. Apply significant figures correctly in measurements and calculations.
2. Use dimensional analysis to solve a variety of problems.
3. Use the periodic table to assist in explaining chemical bonding, polarity, and physical and chemical properties of elements.
4. Write and/or give orally the corresponding formula and name of a compound when given only the formula or name.
5. Calculate the mathematical relationship between variables after graphing the experimental data.
6. Apply knowledge of chemistry principles to real world situations.
7. Apply knowledge to solve mathematical problems related to chemistry principles.
8. Read, analyze and apply written material to new situations.
9. Write and speak clearly and logically in scientific presentations and/or essays.
10. Apply appropriate forms of technology to solve problems or compile information.

REQUIRED TOPICAL OUTLINE

I. Introduction Terminology
    a. Classification of matter
    b. Physical and chemical properties and changes of matter
    c. Measurement including significant figures
    d. Introduction to dimensional analysis
    e. Atomic theories and periodic table

II. Atomic theories and structure of the atom
    a. Relative mass and the mole

- b. Electronic configuration and the periodic table
- c. Electron configuration
    - i. Orbital notation
    - ii. Classification of the elements
    - iii. Property trends

III. Chemical bonding and molecules
- a. Types of chemical bonding
- b. Noble gas configuration and chemical bonding
    - i. Ionic
    - ii. Covalent
    - iii. Polar covalent
- c. Lewis structures
- d. Polyatomic ions
- e. Valence Shell Electron Pair Repulsion Theory (VSEPR)
- f. Polarity

IV. Nomenclature and formulas of compounds
- a. Ionic compounds
- b. Covalent compounds

V. Chemical reactions
- a. Chemical equations and terminology
- b. Types of chemical reactions
- c. Energy and reactions
- d. Stoichiometry
    - i. Limiting reagent
    - ii. Percent yield

VI. States of matter
- a. Gas stat
    - i. Pressure
    - ii. Gas laws (Boyles`, Charles`, Ideal Gas, Dalton`s)
    - iii. Stoichiometry
- b. Condensed states
    - i. Liquid state
    - ii. Solid state
    - iii. Intermolecular forces
- c. Changes in states of matter

VII. Solutions
- a. Terminology
- b. Concentration units
- c. Preparation and dilution
- d. Colligative properties

VIII. Reaction rates and equilibrium
- a. Rates
- b. Factors that influence rate
- c. Chemical equilibrium
- d. Le Chatelier`s principle

IX. Acid/Base Chemistry
- a. Acid/base definitions
- b. Nomenclature

c. pH
d. Strengths of acids and bases
e. Titration and stoichiometry
f. Buffers

RECOMMENDED TOPICAL OUTLINE

I. Nuclear Chemistry
   a. Radioactivity
   b. Nuclear equations
   c. Detection
   d. Half-life
   e. Fission and fusion
   f. Applications

CCCOnline Course Policies: http://www.ccconline.org/ccconline-course-policies/

Effective Implementation date: Spring 2018, 201830