GROSSMONT COLLEGE

# COURSE OUTLINE OF RECORD

Curriculum Committee Approval: 04/26/2022

GCCCD Governing Board Approval: 06/14/2022

## CHEMISTRY 120 – PREPARATION FOR GENERAL CHEMISTRY

1. Course Number Course Title Semester Units

CHEM 120 Preparation for General Chemistry 4

Semester Hours

3 hours lecture: 48-54 hours 96-108 outside-of-class hours 3 hours laboratory: 48-54 hours 192-216 total hours

1. Course Prerequisites

A “C” grade or higher or “Pass” in Mathematics 110 or equivalent or appropriate placement beyond intermediate algebra.

Corequisite

None

Recommended Preparation

None

1. Catalog Description

A beginning general chemistry course for students with little or no background in chemistry. This course will prepare students for a full-year general chemistry course. This course will be an intensive study in the areas of problem solving, basic atomic theory, chemical nomenclature, stoichiometry, gas laws, solutions, acid-base chemistry, and redox. The laboratory will be an introduction to quantitative techniques, descriptive chemistry, gas laws, and data treatment. Students will not receive credit toward graduation for more than one of the following courses: Chemistry 113, Chemistry 115 and Chemistry 120.

1. Course Objectives

The student will:

1. Solve a wide variety of problems using dimensional analysis.
2. Use proper conventions with regard to significant figures.
3. Apply the basic terms of science and chemistry.
4. Write the correct chemical formula from a name and correct IUPAC name from a formula for simple inorganic compounds.
5. Relate the position of an element on the periodic table to the electronic structure of that atom or its ion.
6. Diagram Lewis Dot structures for atoms, simple inorganic ions, and simple compounds.
7. Prepare three-dimensional drawings showing polarity of molecules by applying VSEPR theory.
8. Solve a wide range of stoichiometry problems that involve percent yield, limiting reagents, and impure reactants.
9. Use both the Arrhenius and Bronsted concepts in describing acid-base behavior.
10. Compute pH or pOH of a solution from its hydrogen or hydroxide ion molarity.
11. Write conventional, total, and net ionic equations for reactions in aqueous solutions.
12. Inventory ion and molecular concentrations in aqueous solutions.
13. Use standard laboratory equipment such as milligram balances, volumetric glassware, pipets and burets.
14. Observe a change and determine if it involves a physical change, a chemical change, or both.
15. Make a good quality graph from data and from a linear plot determine the equation for the line.
16. Instructional Facilities
    1. Standard lecture classroom.
    2. Wall mounted Periodic Chart.
    3. Facilities for lecture demonstrations, including a lecture table with gas, air, water, vacuum, and sink.
    4. Individual student drawers containing standard laboratory equipment including but not limited to beakers, Erlenmeyer flasks, graduated cylinders, filter flasks, Buchner funnels, glass funnels, pipets, test tubes, test tube racks, glass sample vials, drying tubes, and assorted scoopulas, stir rods and spatulas.
    5. Laboratory classroom including but not limited to drying ovens, fume hoods, hot plates, magnetic stir plates, triple beam balances analytical balances, Bunsen burners and microburners.
17. Special Materials Required of Student
    1. Laboratory apron or jacket.
    2. Scientific calculator with exponential and logarithmic functionality.
    3. Approved safety glasses or goggles.
18. Course Content
19. Matter and measurement.
20. Atoms molecules and ions.
21. Electronic structure of atoms.
22. Chemical nomenclature.
23. Problem solving using dimensional analysis.
24. Unit conversions.
25. Formulas equations, moles and stoichiometry.
26. pH, pOH, strong acids and bases.
27. Reactions in aqueous solution, net ionic equations, redox reactions.
28. Lewis Electron Dot diagrams and VSEPR.
29. Gas laws, PV=nRT, and gas stoichiometry.
30. Solutions and solubility.
31. Experimentation, data gathering and interpretation in the chemical laboratory.
32. Method of Instruction
    1. Lecture with an emphasis on quantitative and qualitative problem solving.
    2. Integration of appropriate web-based and computer audiovisual materials such as animations, PowerPoints, videos, and other multimedia, silent and non-silent polls, group work, exit tickets, etc.
    3. Computer assisted instruction.
    4. Inquiry based laboratory experience.
33. Methods of Evaluating Student Performance

a. Written quizzes, midterms and final examswhich may include fill-in-the-blank, short answer, multiple choice, and essay questions.

b. Laboratory reports such as descriptions and analysis of chemical reactions or analytical determinations.

c. Laboratory techniques to include proper safety procedures, use of laboratory equipment, and complete documentation of data.

d. Essays/presentations on topics such as experimental results, descriptive chemistry or current issues in chemistry.

e. Homework and various assignments are used to teach and emphasize content including, but not limited to reading texts, watching videos**,** solving problems out of the textbook or computer aided instructional exercises, surveys, peer review, discussions, etc.

1. Outside Class assignments
   1. Homework, both text and computer based.
   2. Laboratory reports such as descriptions and analysis of chemical reactions or analytical determinations.
   3. Essays/presentations on topics such as experimental results, descriptive chemistry or current issues in chemistry.
2. Representative Texts
   1. Representative Text(s):
      1. Cracolice, Mark S. And Edward I. Peters. *Introductory Chemistry*. *An Active Learning Approach.* 7thedition. Cengage Learning, 2020.
      2. J. George, and D. Vance. *Chemistry 120 Lab Manual*, 7th edition, El Cajon, California: Grossmont College, 2019.
   2. Supplemental texts and workbooks:

None

Addendum: Student Learning Outcomes

Upon completion of this course, our students will be able to do the following:

* 1. Demonstrate a working knowledge of the language of chemistry.
  2. Apply quantitative reasoning to chemical problems.
  3. Apply laws and theories to explain and predict the properties of atoms and molecules.
  4. Employ laboratory equipment and techniques to collect, organize, and evaluate experimental data.