I. Basic Course Information

A. Course Number and Title: CHEM 103 – General Chemistry I

B. New or Modified Course: Modified Course

C. Date of Proposal: Semester: Fall  Year: 2018

D. Effective Term: Fall 2019

E. Sponsoring Department: Science and Engineering

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 6
   Lecture: 3
   Laboratory: 3
   Out of class student work per week: 7.5

H. Prerequisites/Corequisites:
   Prerequisite: Two years of college preparatory laboratory science or equivalent.
   Corequisite: Precalculus I (MATH-112).

I. Laboratory Fees: Yes

J. Name and Telephone Number or E-Mail Address of Department Chair and Divisional
   Dean at time of approval: Marianne Baricevic, Marianne.Baricevic@raritanval.edu;
   Sarah Imbriglio: Sarah.Imbriglio@raritanval.edu

II. Catalog Description

Prerequisites: Two years of college preparatory laboratory science or equivalent.
Corequisite: Precalculus I (MATH-112)

This is the first course in a two-course sequence providing an introductory survey of
modern chemistry. Emphasis is placed on electronic structure and its relationship to
bonding and the periodic table, the physical states of matter, stoichiometry, molecular
geometry, gas laws, solutions, and their chemistry.

III. Statement of Course Need
This is the first course in a two-course sequence providing an introductory survey of modern chemistry on the college level. It is required in the Biology, Chemistry, Environmental Science, Pre-Medical Professional, Pre-Pharmacy options of the Science and Mathematics Associate of Science degree program, and the Engineering Science Program.

The course has a lab component to provide students with additional learning opportunities by using hands-on experimentation.

IV. Place of Course in College Curriculum

A. Free Elective
B. This course serves as a General Education course in Science with Lab.
C. This course meets a program requirement in the following AS programs: Biology, Chemistry, Environmental Science, Physics, Pre-Medical Professional, Pre-Pharmacy options of the Science and Mathematics Associate of Science degree program, and the Engineering Science Program.
D. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, www.njtransfer.org; b) for all other colleges and universities, go to the individual websites.

V. Outline of Course Content

1. Introduction to Basic Terms
2. Atomic Structure
3. Chemical Bonding
4. Molecular Geometry and Polarity
5. The Mole Concept and Stoichiometric Calculations
6. Chemical Reactions and Solution Stoichiometry
7. Nomenclature
8. Thermochemistry
9. Physical States of Matter
10. Gases

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes:

At the completion of the course, students will be able to:

1. Demonstrate a knowledge of and the ability to critically analyze the principles of chemistry. (GE- NJ3*)
2. Solve quantitative chemistry problems. (GE-NJ2*, GE-NJ3*)
3. Apply laboratory techniques to perform chemistry experiments. (GE-NJ3*)
4. Use proper instrumentation and technology to collect and analyze data (GE-NJ4)
5. Communicate the results of laboratory work in a clear and efficient manner. (GE-NJ1)
   (* embedded critical thinking)

B. Course Learning Outcomes:

At the completion of the course, students will be able to:

1. Use stoichiometric calculations in conjunction with chemical equations and gas laws to predict yields, limiting reactants, theoretical yields and percent yields.
2. Understand atomic structure and the evolution of the atomic model through history, both at the nuclear and electronic level. This includes understanding isotopes and being able to write electronic configurations.
3. Demonstrate an understanding of periodic trends in atomic properties and their origins.
4. Draw Lewis Structures, resonance forms, calculate formal charges, and determine the geometry of covalent compounds.
5. Write IUPAC names for acids, as well as ionic and simple molecular compounds.
6. Write balanced chemicals equations (both molecular and ionic) and correctly predict the products of reactions such as double displacement reactions, simple decompositions and syntheses, and simple redox reactions.
7. Perform qualitative analyses of reactions and fundamental chemistry experiments such as, gravimetric, simple titrimetric and calorimetric analyses, and qualitative spectroscopy.

C. Assessment Instruments

1. Semester examinations
2. Cumulative final examination
3. Quizzes
4. Laboratory notebooks and reports

VII. Grade Determinants

A. Semester exams
B. Cumulative Final exam
C. Quizzes and/or graded homework
D. Laboratory experiments, including a laboratory notebook

Primary format, modes, and methods for teaching and learning that may be used in the course:

A. Lecture/discussion
B. Laboratory
C. Student collaboration
D. Small group work
VIII. Texts and Materials

A. Suggested textbooks
   • OWLv2 Subscription

B. Other suggested materials
   • Carbon-Copy Laboratory Notebook
   • Safety Glasses
   • Scientific Calculator

(Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.)

IX. Resources

   A. General Chemistry Laboratory

X. Honors Options [if relevant]: No Honors option.