RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

CHEM 103H – GENERAL CHEMISTRY I HONORS

I. Basic Course Information

A. Course Number and Title: CHEM 103H - General Chemistry I Honors

B. New or Modified Course: Modified

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

D. Effective Term: Fall 2019

E. Sponsoring Department: Science & Engineering

F. Semester Credit Hours: 4

G. Weekly Contact Hours: 6
Lecture: 3
Laboratory: 3
Out of class student work per week: 12

H. Prerequisites/Corequisites:
- Prerequisites: Minimum GPA of 3.5 or permission of instructor, and two years of college preparatory laboratory science or equivalent
- Corequisites: MATH 112 - Precalculus I or MATH 114H - Precalculus Honors

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: Minimum GPA of 3.5 or permission of instructor, and two years of college preparatory laboratory science or equivalent
Corequisites: MATH 112 - Precalculus I or MATH 114H - Precalculus Honors

This course is an in-depth study of the fundamental theories and laws 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. Lecture and laboratory will use an investigatory approach to topics. Students will be

required to conduct a literature research project that will lead to an individual research paper and in-class presentation.

III. Statement of Course Need

A. This is the first course in a two-course sequence providing an introductory survey of modern chemistry on the college level. This laboratory science course is designed for students majoring in science and/or science related disciplines. The honors course will fulfill a requirement for the students enrolled in the Honors College Program.

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

C. This course generally transfers as a program requirement, elective, and/or a lab science general education course.

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, Computer Science, Environmental Science, Engineering Science, Information Systems and Technology, Mathematics, Physics, General Science/Pre- Health Professional, Pre-Medical Profession, and Pre-Pharmacy.

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 notebook and reports
5. End of semester project

VII. Grade Determinants

A. Semester exams
B. Cumulative final exam
C. Quizzes and/or graded homework
D. Laboratory experiments, including a laboratory notebook
E. End-of-semester project

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
   - ZUMDAHL, S.S.; Zumdahl, S.A., Chemistry: An Atoms First Approach. 2nd ed. Cengage, 2010.
   - 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]: N/A