RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

CHEM 104 – GENERAL CHEMISTRY II

I. Basic Course Information

A. Course Number and Title: CHEM 104 – General Chemistry II

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: General Chemistry I (CHEM- 103) and 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: CHEM-103 General Chemistry I and MATH-112 Precalculus I

This course is a continuation of General Chemistry I. Emphasis is placed on kinetics, equilibrium behavior, thermodynamics, acids and bases, solubility equilibria, and electrochemistry.

III. Statement of Course Need

This is the second 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. Properties of solutions
2. Solution stoichiometry
3. Rates of chemical reactions
4. Thermodynamics
5. Gaseous equilibria
6. Acids, bases, and buffers
7. Solubility equilibria
8. Electrochemistry

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. Connect molecular structures to intermolecular forces and evaluate the effect of these forces on the macroscopic physical and chemical properties of matter, such as solubility, melting point and boiling point.
2. Demonstrate working knowledge of basic thermodynamics, including the relationships between state functions and equilibrium behavior.
3. Demonstrate a working knowledge of Le Châtelier's principle as it applies to equilibria, such as acid-bases, buffers, and solubility.
4. Balance complex redox reaction and determine the potential associated with the reaction.
5. Use proper techniques and instrumentation to perform qualitative ion analyses, and collect data for kinetic, thermodynamic and advanced titrimetric experiments.
6. Communicate the results of laboratory work in a clear and efficient manner.

C. Assessment Instruments

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

VII. Grade Determinants

1. Semester exams
2. Cumulative Final exam
3. Quizzes and/or graded homework
4. 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

- 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]: No Honors option.