

III. Statement of Course Need

- A. This is the second course in a two-course sequence providing an in depth study of modern chemistry at the college level. This course is laboratory science course designed for students majoring in science and/or science related disciplines. Lecture and laboratory will use an investigatory approach to topics. Students will be required to conduct a literature research that will lead to an individual research paper and in class presentation. 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. 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 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