

III. Statement of Course Need

- A. This is the first course in a two-semester sequence (Organic Chemistry I and II) that is required in the following AS programs: Biology, Chemistry, Pre-Medical Professional, and Pre-Pharmacy. Although not required, it is recommended in the Environmental Science programs, and it may be required by some transfer institutions in that field.
- B. In the laboratory portion of the course, students will employ a scientific approach to understanding relevant chemical principles and reactions and solving problems. Students will develop important skills in the laboratory, such as recrystallization, liquid-liquid extraction, distillation, titration, thin-layer chromatography, gas chromatography, infrared spectroscopy, nuclear magnetic resonance, and melting point-determination.
- C. This course generally transfers as a program requirement and/or a free elective.

IV. Place of Course in College Curriculum

- A. Free Elective
- B. This course meets a program requirement for the following AS programs: Biology, Chemistry, Pre-Medical Professional, and Pre-Pharmacy.
- C. 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

- A. Introduction and Review of General Chemistry
- B. Structures and Properties of Organic Molecules
- C. Structure, Naming and Conformational Analysis of Alkanes and Cycloalkanes
- D. Stereochemistry
- E. Spectroscopic and spectrometric methods
 - a. Infrared Spectroscopy
 - b. Mass Spectrometry
 - c. Nuclear Magnetic Resonance
- F. The Study of Organic Reactions
- G. Structure, Naming, Synthesis, and Reactions for
 - a. Alkanes
 - b. Alkenes
 - c. Alkynes
 - d. Alkyl Halides
- H. Nucleophilic Substitution and Elimination Reactions of Alkyl Halides
- I. Organic Synthesis

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 organic chemistry. (GE-NJ 3)
2. Solve quantitative and conceptual problems appropriate to the course material. (GE-NJ 2, 3*)
3. Apply basic laboratory techniques to the performance of a variety of organic chemistry experiments. (GE-NJ 1, 3*)
4. Communicate the results of laboratory work in an appropriate professional writing style. (GE-NJ1)
*(*embedded critical thinking)*

B. Course Learning Outcomes:

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

1. Name organic compounds according to the IUPAC nomenclature system and draw molecular structures from the systematic IUPAC names.
2. Determine the geometric structure of organic compounds using knowledge of atomic structure, hybridization, covalent bonding, stereochemical and conformational analysis.
3. Use the knowledge of reactivity in functional groups to predict the products of organic reactions and to design rational syntheses of selected compounds.
4. Write detailed mechanisms of selected reactions.
5. Interpret infrared, nuclear resonance, and mass spectra to solve structure determination problems.
6. Employ content knowledge and proper laboratory techniques and instrumentation to carry out experiments and determine the identity of unknown compounds.

C. Assessment Instruments

- A. Semester assessments
- B. Cumulative final examination
- C. Quizzes
- D. Laboratory notebook and reports

VII. Grade Determinants

1. Semester examination
2. Cumulative final examination
3. Quizzes

4. 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

- Klein, David R, *Organic Chemistry*, latest edition (print or electronic), Wiley.
- Zubrick, James, W, *The Organic Chem Lab Survival Manual*, 10th ed. (print or electronic), Wiley.

B. Other suggested materials

- Laboratory notebook (carbon-copy capable)
- Safety glasses
- Molecular Visions Kit by Darling Models

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. Organic Chemistry Laboratory (currently SC253)
- B. Instrument Room (currently SC54)

X. Honors Options: None