RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE

CHEM 211 – ORGANIC CHEMISTRY I

I. Basic Course Information

A. Course Number and Title: CHEM 211 – Organic Chemistry I

B. New or Modified Course: Modified

C. Date of Proposal: Semester: Fall Year: 2024

D. Effective Term: Fall 2025

E. Sponsoring Department: Science & Engineering

F. Semester Credit Hours: 5

G. Weekly Contact Hours: 8
Lecture: 4
Laboratory: 4
Out of class student work per week: 10

H. ☒ Prerequisites: CHEM 104 – General Chemistry II
☐ Corequisites: N/A

I. Additional Fees: None

II. Catalog Description

Prerequisite: CHEM 104 – General Chemistry II

This course is the first semester of a two-semester intensive survey of the chemistry of carbon-based compounds. Emphasis is placed on the role of structure, functional groups, stereochemistry, reaction mechanisms, spectroscopy, synthetic methods, and laboratory applications of these principles. Topics include the chemistry of alkanes, alkenes, alkynes, alcohols, and alkyl halides, as well as nucleophilic substitution, elimination, and addition reaction mechanisms.

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 liquid-liquid extraction, recrystallization, distillation, titration, melting point determination, thin-layer chromatography, gas chromatography, infrared spectroscopy, and nuclear magnetic resonance.

C. This course generally transfers as a program requirement and/or a free elective dependent on the transfer institution.

IV. Place of Course in College Curriculum

A. Free Elective

B. This course meets a program requirement for the Chemistry AS program, the Biology and Pre-Medicine and Pre-Pharmacy tracks in the Biological Sciences AS program, and the Chemistry track in the Engineering AS program. It serves as a program option in the Environmental Science AS program.

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. Course 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- 3)
2. Apply basic laboratory techniques to the performance of a variety of organic chemistry experiments. (GE-1, 3*)
3. Communicate the results of laboratory work in an appropriate professional writing style. (GE-1)
4. Use the knowledge of reactivity of functional groups to predict the products of organic reactions and design rational syntheses of selected compounds.
5. Draw detailed arrow-pushing mechanisms for organic chemical reactions.
   *(*embedded critical thinking)*

C. Assessment Instruments

1. Exams (required)
2. Quizzes
3. Laboratory notebook and reports (required)

VII. Grade Determinants

A. Exams (required)
B. Quizzes
C. Laboratory notebook and reports (required)

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

A. Lecture/discussion
B. Laboratory
C. Group work

VIII. Texts and Materials

A. Klein, David R*, Organic Chemistry*, latest edition (print or electronic), Wiley.
B. WileyPLUS online subscription
C. Molecular model kit
D. Laboratory manual shared with students online
E. Carbon-copy laboratory notebook
F. Safety glasses
G. Other web sources designated by the instructor

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 (SC-253)
B. Instrument Room (SC-254)
C. Software licenses for spectroscopy instruments

X. Check One: ☐Honors Course ☐Honors Options ☒ N/A