

**SEWARD COUNTY COMMUNITY COLLEGE  
COURSE SYLLABUS**

**I. TITLE OF COURSE:** CH2605- Organic Chemistry I

**II. COURSE DESCRIPTION: 5 credit hours**  
**3 credit hours of lecture and 2 credit hours of lab per week.**

First semester of a two-semester course designed to meet the requirements of students needing either General Organic Chemistry or Organic Chemistry I. Course content will include a study of the basic principles of nomenclature, and the reactions pertaining to aliphatic and arene compounds, study of carbohydrates, fats, and proteins.

For each unit of credit, a minimum of three hours per week with one of the hours for class and two hours for studying/preparation outside of class is expected.

Pre-requisite: Student must have reading level of English Composition I

**III. PROGRAM AND/OR DEPARTMENT MISSION STATEMENT:**

The Science Program at Seward County Community College provides opportunities to improve and enhance each student's understanding and comprehension of the natural world through a variety of courses and experience to develop a scientifically literate citizen.

**IV. TEXTBOOK AND MATERIALS:**

1. Wade, L.G. & Simek, J.W. (2017). Organic Chemistry (9th ed.). Glenview, IL: Pearson.
2. Wade, Jr. L.G., Organic Chemistry Solutions Manual
3. Schoffstall, A. M., Gaddis, B. A., & Druelinger, M. L. (2004). Microscale and Miniscale Organic Chemistry Lab Experiments (2nd ed.). New York, NY: McGraw Hill.

**V. SCCC OUTCOMES**

Students who successfully complete this course will demonstrate the ability to do the following SCCC Outcomes.

- 1: Read with comprehension, be critical of what they read, and apply knowledge gained to real life
- 2: Communicate ideas clearly and proficiently in writing, appropriately adjusting content and arrangement for varying audiences, purposes, and situations.
- 3: Communicate their ideas clearly and proficiently in speaking, appropriately adjusting content and arrangement for varying audiences, purposes, and situations.
- 5: Demonstrate the ability to think critically by gathering facts, generating insights, analyzing data, and evaluating information
- 7: Understand each other, moving beyond simple acceptance to embracing and celebrating the rich dimensions of diversity by working as a team to learn, engaging with community, exhibiting cultural awareness, and creating equity.
- 8: Show the ability to contribute to political, civic, and community responsibilities as an informed member of society
- 9: Exhibit workplace skills that include respect for others, teamwork competence, attendance/punctuality, decision making, conflict resolution, truthfulness/honesty, positive attitude, judgment, and responsibility

**VI. COURSE OUTCOMES:**

1. Review selected topics from freshman chemistry to make sure of a firm foundation for organic chemistry.
2. Overview the structure and nomenclature of selected carbon compounds that are found in the first 13 chapters at the beginning of the course.
3. Learn the IUPAC and common systems of nomenclature for writing and naming organic compounds.
4. Study the first 13 chapters of our textbook which includes the following organic groups: alkanes, alkenes, alkynes, dienes, alicyclic hydrocarbons, arenes, alkyl halides and alcohols.
5. Develop concepts of the reactions through examinations of known mechanistic processes.
6. Solve problems using the four types of reactions: substitution, addition, elimination and rearrangement.
7. Appreciate the importance of stereochemistry and chiral molecules and their importance to enzyme catalyzed reactions.
8. Examine some of the kinetics of organic reactions.
9. Practice techniques of synthesizing, isolating, separating and purifying organic compounds in the laboratory.

## VII. COURSE OUTLINE:

1. Classify aliphatic compounds into alkanes, alkenes, alkynes.
2. Examine naming rules of the cyclic and substituted hydrocarbons.
3. Learn the basic nomenclature rules of the ten functional groups which include the following:
4. Become introduced to the natural products that include carbohydrates, peptides, proteins, and fats.
5. Learn the most basic rules associated with heterocyclic compounds.
6. Review the valences and oxidation numbers of selected ions.
7. Review bonding including ionic, covalent (polar and nonpolar), coordinate covalent, molecular orbital, and hybridized bonds.
8. Review concentration of solution.
9. Review equilibrium reactions.
10. Review principles of redox reactions.
11. Write structural formulas and name of organic compounds.
12. Study the polarity of molecules.
13. Examine intermolecular forces.
14. Compare structural formulas to their relation of chemical and physical properties.
15. Determine isomers of alkanes.
16. Understand mechanisms.
17. Compare sigma and pi bonds.
18. Understand cis and trans isomerism.
19. Solve elimination reactions.
20. Study addition, oxidation, elimination and substitution reactions.
21. Examine stereochemistry.
22. Write reactions of alkynes and dienes.
23. Compare the mechanism of 1,2 and 1,4 addition.
24. Study electrophillic addition and compare the mechanism with nucleophillic addition.
25. Study resonance bonding.
26. Learn Huckel rules of aromaticity.
27. Learn index of hydrogen deficiency.
28. Write electrophillic aromatic substitution reactions.
29. Look at various types of electronic effects such as field effects, inductimetric, mesomeric, and electromeric.
30. Study the chemistry of phenols.
31. Examine bond cleavage, dehydration, and oxidation reactions of alcohols.
32. Write synthesis reactions.
33. Analyze phenolic reactions.

34. Study the properties and write the reactions of cyclic ether oxides.
35. Study Grignard, Friedel-Crafts, and Wurtz reactions.
36. Write reactions involving acyl halides.
37. Know the Williamson synthesis for ethers.
38. Learn safety rules.
39. Practice all safety regulations.
40. Maintain carefully kept notebook of laboratory work.
41. Submit lab reports for each experiment.
42. Determine melting point of crystalline solid.
43. Purification of solid by recrystallization.
44. Distillation.
45. Fractional and steam distillation.
46. Extraction of acids, bases and the isolation of caffeine.
47. Extraction of cholesterol from gallstones.
48. Separation of chlorophyll from green leaves.
49. Use of column chromatography.
50. Nucleophilic substitution reactions of alkyl halides.
51. Synthesis of aspirin.
52. Grignard synthesis of triphenyl methanol and benzoic acid.
53. Writing and presenting a comprehensive research report.

#### **VIII. INSTRUCTIONAL METHODS:**

1. Chemistry is a laboratory science course and thus labs are an important part of the course. We will have approximately 22 laboratory experiments and recitations.
2. Lectures
3. Discussions
4. Programmed material
5. Demonstrations
6. Films & videos
7. Computer programs
8. Internet use

#### **IX. INSTRUCTIONAL AND RESOURCE MATERIALS:**

1. Chemicals
2. Laboratory equipment
3. Overhead projections
4. Audio & video cassettes
5. Films
6. Available instrumentation
7. Internet

#### **X. METHODS OF ASSESSMENT:**

Methods of assessing the general course outcomes and the specific course competencies include one-hour examinations, laboratory reports, students' laboratory notebook, homework

SCCC Outcome #1 will be assessed and measured by comprehension of text reading assignments, a semester research project, and participation in class discussion and through Calibrated Peer Review (CPR) assignments.

SCCC Outcome #2 will be assessed through the student's written CPR essays and semester research papers.

SCCC Outcome #3 will be assessed by the student's expression of ideas through class discussion and oral presentation of a semester research project.

SCCC Outcome #5 will be assessed and measured by lab experiments, a semester research project, CPR assignments, and writing of a laboratory procedure.

SCCC Outcome #6 will be assessed through the use of technology in laboratory experimentation and use of Internet in class work.

SCCC Outcome #7 will be assessed through class discussion, written reports on short research topics throughout the semester, and CPR assignments.

SCCC Outcome #8 will be assessed through class discussion and written reports on the effect of chemicals on ecological systems and how individuals affect the international, federal, state, and local government controls and regulations.

SCCC Outcome #9 will be assessed through class attendance, group participation, and individual ethics used in data collection and research reporting.

**XI. ADA STATEMENT:**

Under the Americans with Disabilities Act, Seward County Community College will make reasonable accommodations for students with documented disabilities. If you need support or assistance because of a disability, you may be eligible for academic accommodations. Students should identify themselves to the Dean of Students at 620-417-1106 or going to the Student Success Center in the Hobbie Academic building, room 149 A.

Syllabus Reviewed: 5/18/2021