American Public University System

The Ultimate Advantage is an Educated Mind

School of Science, Technology, Engineering & Math

Course Number: CHEM233

Course Name: Organic Chemistry I with Lab

Credit Hours: 4

Length of Course: 8 or 16 weeks

Prerequisite: CHEM134 General Chemistry II with Lab, with a grade of a C- or higher

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Course Description

This is the first course of a two-course organic chemistry sequence that introduces students to the fundamentals of bonding, structure, and reactions of organic compounds, including nomenclature, molecular geometry, polarity, conformation, isomerism, functional groups, stereochemistry, reactions and reaction mechanisms, and spectroscopy. The laboratory component of this course is hands-on and designed for science students to learn how to make qualitative and quantitative observations about physical and chemical phenomena, make calculations, and test their own reasoning. Students will acquire skills in laboratory techniques designed to help reinforce and build upon the concepts presented in the lecture portion of the class. Students must have a safe work area available to perform laboratory activities, including working with an open flame. Students must be able to document their laboratory work using digital pictures and/or video. Students must also have room temperature storage available in order to maintain laboratory materials. Lab material for this course will only be provided once. If you need replacement lab equipment for any reason or need to retake the course later, you will need to purchase your own lab refills. This is a time and resource-intensive course. Students intending to use this course to satisfy prerequisites for pre-professional programs should verify that the Organic Chemistry with Lab course sequence meets the requirements of their intended program prior to enrollment. In order to be successful in this course, students must have successfully completed CHEM134 General Chemistry II with Lab or equivalent. **NOTE**: This course requires the student to purchase additional materials at substantial cost that are not covered by the book grant.

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Course Scope

This course is designed to teach the principles of organic chemistry and its laboratory to students who are science majors. It builds upon the content from CHEM 134 General Chemistry II with Lab, and it will introduce general organic chemical theory, including the fundamentals of bonding, structure, and reactions of organic compounds, nomenclature, molecular geometry, polarity, conformation, isomerism, functional groups, stereochemistry, reactions and reaction mechanisms, and spectroscopy, and provide a solid foundation of organic chemistry for subsequent science courses.

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Course Objectives

CO1 - Predict structure and reactivity of the following types of organic molecules: alkenes, alkynes, aromatic hydrocarbons, alcohols, ethers, epoxides, and alkylhalides based on such factors as carbon atom hybridization, bond length, bond strength, and bond polarity.

CO2 - Recognize chiral molecules and distinguish between R and S configurations, enantiomers, diastereomers, meso compounds, and conformational isomers.

CO3 - Provide curved arrow mechanisms for the following types of organic reactions: additions, substitutions, and eliminations.

CO4 - Predict the relative energies of the following types of chemical species: radicals,

carbocations, carbanions, straight-chain and branched alkanes, and substituted cycloalkanes based on structural considerations such as orbital hybridization, hyperconjugation, resonance stabilization, and energetically preferred conformation.

CO5 - Interpret ^{1}H NMR, ^{13}C NMR, IR, UV, and mass spectra and use these data to determine the structure of organic molecules.

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Course Delivery Method

This course delivered via distance learning will enable students to complete academic work in a flexible manner, completely online. Course materials and access to an online learning management system will be made available to each student. Online assignments are due by Sunday evening of the week as noted and include Discussion questions (accomplished in groups through a threaded discussion), examination, Labs, and individual assignments submitted for review by the Faculty Member). Assigned faculty will support the students throughout this course.

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Course Resources

Textbook (OER): McMurry, J. (2019). Organic chemistry. Libretexts.
Lab Materials: Hands-On Labs (2020) Organic Chemistry, eScience.

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Evaluation Procedures

Reading Assignments: Syllabus, Academic Honor Pledge, LibreTexts Text: Chapters 1 - 13

Quizzes: Quizzes 1 - 6

Introduction Discussion Assignment: Introduction Discussion

Discussion Assignments: Discussions 1 - 8

Exams: Midterm Exam; Final Exam

Laboratory Assignments: Labs 1 - 6

Late Work: Minus 15% per day late

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8 – Week Course Outline and Grading

The table below shows the points for each assignment.

Week 1 (or Weeks 1 & 2)

Course Objectives: CO-1

Reading/Viewing: Syllabus, Academic Honor Pledge, LibreTexts Text: Chapters 1 & 2

Discussion 1: Introduction Discussion 2.5 %

Lab: Lab 1 5 %

Assessment: Quiz 1 4.167 %

Week 2 (or Weeks 3 & 4)

Course Objectives: CO-1; CO-4

Reading/Viewing: Syllabus, LibreTexts Text: Chapters 3 & 4

Discussion: Discussion 2 2.5 %

Lab: Lab 2 5 %

Assessment: Quiz 2 4.167 %

Week 3 (or Weeks 5 & 6)

Course Objectives: CO-2; CO-3

Reading/Viewing: Syllabus, LibreTexts Text: Chapters 5 & 6

Discussion: Discussion 3 2.5 %

Lab: Lab 3 5 %

Assessment: Quiz 3 4.167 %

Week 4 (or Weeks 7 & 8)

Course Objectives: CO-1; CO-2; CO-3; CO-4

Reading/Viewing: Syllabus, LibreTexts Text: Chapter 7

Discussion: Discussion 4 2.5 %

Lab: None

Assessment: Midterm Exam 12. 5%

Week 5 (or Weeks 9 & 10)

Course Objectives: CO-1; CO-3

Reading/Viewing: Syllabus, LibreTexts Text: Chapters 8 & 9

Discussion: Discussion 5 2.5 %

Lab: Lab 4 5 %

Assessment: Quiz 4 4.167 %

Week 6 (or Weeks 11 & 12)

Course Objectives: CO-1; CO-3

Reading/Viewing: Syllabus, LibreTexts Text: Chapters 10 & 11

Discussion: Discussion 6 2.5 %

Lab: Lab 5 5 %

Assessment: Quiz 5 4.167 %

Week 7 (or Weeks 13 & 14)

Course Objectives: CO-4; CO-5

Reading/Viewing: Syllabus, LibreTexts Text: Chapters 12 & 13

Discussion: Discussion 7 2.5 %

Lab: Lab 6 5 %

Assessment: Quiz 6 4.167 %

Week 8 (or Weeks 15 & 16)

Course Objectives: CO-1; CO-2; CO-3; CO-4; CO-5

Reading/Viewing: Syllabus, LibreTexts Text: Chapters Review 1-13

Discussion: Discussion 8 2.5 %

Lab: None

Assessment: Final Exam 12.5 %

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Please see the Student Handbook to reference the University's grading scale.

Policies

Please see the Student Handbook to reference all University policies. Quick links to frequently asked question about policies are listed below.

Drop/Withdrawal Policy
Plagiarism Policy
Extension Process and Policy
Disability Accommodations

Writing Expectations

All written submissions should be submitted in a font and page set-up that is readable and neat. It is recommended that students try to adhere to a consistent format, such as that described below.

- Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).
- 11 or 12-point font in a style such as Arial, Helvetica or Times New Roman.

Citation and Reference Style

Assignments completed in a narrative essay or composition format must follow a widely accepted citation style, such as APA, Turabian or MLA. Please refer to the APUS Online Library for further examples, or contact the instructor with questions.

Late Assignments

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals, I understand you must manage competing demands on your time. Should you need additional time to complete an assignment, please contact me **before the due date** so we can discuss the situation and determine an acceptable resolution. Routine submission of late assignments is unacceptable and may result in points deducted from your final course grade.

Netiquette

Online universities promote the advancement of knowledge through positive and constructive debate – both inside and outside the classroom. Discussions on the Internet, however, can occasionally degenerate into needless insults and "flaming." Such activity and the loss of good manners are not acceptable in a university setting – basic academic rules of good behavior and proper "Netiquette" must persist. Remember that you are in a place for the rewards and excitement of learning which does not include descent to personal attacks or student attempts to stifle the Discussion of others.

- **Humor Note:** Despite the best of intentions, jokes and especially satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add "emoticons" to help alert your readers: ;-), :),

Disclaimer Statement

Course content may vary from the outline to meet the needs of this particular group.

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Online Library

The Online Library is available to enrolled students and faculty from inside the electronic campus. This is your starting point for access to online books, subscription periodicals, and Web resources that are designed to support your classes and generally not available through search engines on the open Web. In addition, the Online Library provides access to special learning resources, which the University has contracted to assist with your studies. Questions can be directed to **librarian@apus.edu**.

- **Charles Town Library and Inter Library Loan:** The University maintains a special library with a limited number of supporting volumes, collection of our professors'

publication, and services to search and borrow research books and articles from other libraries.

- **Electronic Books:** You can use the online library to uncover and download over 50,000 titles, which have been scanned and made available in electronic format.
- **Electronic Journals:** The University provides access to over 12,000 journals, which are available in electronic form and only through limited subscription services.
- **Tutor.com**: AMU and APU Civilian & Coast Guard students are eligible for 10 free hours of tutoring provided by APUS. Tutor.com connects you with a professional tutor online 24/7 to provide help with assignments, studying, test prep, resume writing, and more. Tutor.com is tutoring the way it was meant to be. You get expert tutoring whenever you need help, and you work one-to-one with your tutor in your online classroom on your specific problem until it is done.

Library Guide (http://apus.campusguides.com/SCIN134)
The AMU/APU Library Guides provide access to collections of trusted sites on the Open Web and licensed resources on the Deep Web. This course guide provides links to a number of sources relevant to this course, including journals, books, and web sites. Also, you can directly contact the librarian assigned to this course for assistance in locating information.

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