Organic Chemistry I, Fall 2023
CHEM 2420-01, 4 credits
SM 208: MWF 9:00 to 9:50 a.m.

Uko Udodong Office: SM 221 Office Phone: 307-754-6230 E-mail: uko.udodong@nwc.edu
Office Hours: MWF 2:00 – 3:00 pm, T 9:00 – 9:50 am
Course Website: http://www.nwc.edu/ and go to MyNWC to access

Description
This course is set up with three (3) hours of lecture and three (3) hours of lab per week. This course is the first of a two-semester sequence that covers the chemistry of carbon and its compounds. Organic chemistry I studies the aliphatic compounds of carbon including nomenclature, structure, preparation, reactions, reaction mechanisms, and stereochemistry. The course introduces nuclear magnetic resonance, ultraviolet spectroscopy, infrared spectroscopy, and mass spectra as methods of analyzing organic compounds. This course is a core course for the Associate of Science degree with Specialization in Chemistry. *Prerequisite:* CHEM 1030 or equivalent. CHEM 2420 is the prerequisite for CHEM 2440.

***Outcomes*:** For the Specialization in Chemistry, students will demonstrate knowledge in organic chemistry including nomenclature, structure, reaction mechanisms, stereochemistry, and spectral analysis.

Student Action Steps for this Learning Outcome:
Students will

1. Understand and demonstrate the use of the terms, key concepts, and relationships that the author has listed as goals for each chapter.
2. Categorize organic molecules based on its functional groups.
3. Name simple organic molecules including stereoisomers.
4. Categorize organic reactions as to basic type of reaction.
5. Demonstrate an understanding of the basic reaction mechanisms of alkyl halide reactions.
6. Demonstrate an understanding of simple organic reactions involving alkanes, alkenes, alkynes, alkyl halides, alcohols, and ethers.
7. Identify simple organic molecule structure using various spectroscopic techniques.

These Outcomes are assessed using exams, laboratory reports, homework, quizzes, and the American Chemical Society standardized final exam.

Protocol
This is an interactive class. Students should read relevant sections in the textbook before coming to class. Students should come to class ready to participate in discussions and **in-class problem solving exercises**. The **in-class problem solving exercises** will be used in the determination of the final grade.

Working problems will be one of the best ways to study and prepare for exams. Your calculator will come in handy from time to time, although these courses will not deal with as many different quantitative aspects of chemistry as did CHEM 1020/1030. Both Organic Chemistry I and II are concerned primarily with the chemistry of carbon and its compounds which will involve only a few other elements. Most organic chemistry problems involve learning names, structures, preparations, and reactions of compounds. The two organic chemistry courses also cover reaction mechanisms, stereochemistry, and many of the spectroscopic techniques used to qualitatively identify organic compounds.

Problem assignments and Sapling homework: Homework assignment will be done and graded online using Achieve (https://macmillan.force.com/macmillanlearning/s/article/Students-Register-for-Achieve-courses-via-your-school-s-LMS). Weekly quizzes will be used to check your homework progress and your understanding of chapter materials. It is to your advantage to complete homework assignment and create a chapter summary before the quiz and the exam. No graded work (homework, quizzes, and laboratory reports) will be accepted after the last day of class, December 15, 2023. Any work not completed and turned in will be recorded as a zero in the computation of the final grade**. I do not assign nor do I accept any**

form of extra credit work.

Note well: See me as soon as possible if you have a legitimate excuse to request a make-up exam.

The **final exam is scheduled for 9:30 am - 11:20 am on Wednesday, December 13, 2023, in SM 208**

Academic Honesty: I expect you to read, be familiar with, and adhere to the **Academic Code of Conduct** found in the current *Northwest College Student Handbook* (https://www.nwc.edu/handbook/). The *Student Handbook* defines acceptable and unacceptable academic conduct along with the procedures for administration of the **Academic Code of Conduct**. For this course, you should maintain a level of academic integrity in line with Northwest College Policies and Procedures. It is the faculty's responsibility to affirm the importance of academic integrity and to try to educate students as to standards of academic behavior. Students, too, bear the responsibility for academic integrity. Northwest College expects each student to learn and comply with academic expectations, display appropriate conduct in classroom situations, accept Northwest College's "Student Academic Rights" and "Student Academic Responsibilities," and preserve academic integrity by upholding the spirit and letter of the Academic Code of Conduct. Violations of academic integrity include but are not limited to the following: plagiarism, cheating, trafficking, copyright infringement, and interfering with the learning of other students.

Banned Materials and Practices: Cell phones and all electronic devices capable of sending, receiving, recording, viewing, and playing audio and visual communications, photographs, and recorded audio and visual information are not to be used or accessed during exams. Accessing any of these devices or engaging in inappropriate communication during exam shall be interpreted as cheating and a zero will be recorded for that exam. Altering test materials and then requesting credit or requesting undue credit will also be interpreted as cheating that will lead to a zero being recorded for the assignment. I will give you a copy of a periodic table and other appropriate tables which I feel you need for exams. **Note cards are not permitted during quizzes and exams.**

Materials Required

- A calculator with log and exponential functions.
- **YOU!** I expect you to be familiar with and adhere to the **Attendance Policy** as described in the **Academic Procedures and Policies** (http://catalog.nwc.edu/). Excessive absences from class are the major cause of academic failure. Daily attendance is recorded. Excessive absences are reported to the Registrar's Office, the Financial Aid Office, and the Student Success Center. If there are circumstances which result in your excusable absence from class, it is in your best interest to work with me and keep me informed of these situations.

- ***Texts***: Organic Chemistry, 7th ed., Janice Gorzynski Smith, McGraw Hill, 2024. ISBN 978-1-264-14153-1 (bound) or 978-1-266-67876-9 (loose-leaf)
  Molecular Model Kit – Organic, Inorganic, Organomet, ISBN 978-09648837-1-0
  Student Study Guide/Solutions Manual to accompany Organic Chemistry, 7th ed., Janice Gorzynski Smith and Erin R. Smith, ISBN 978-1-266-68014-4

  Watch McGraw-Hill Connect: **http://video.mhhe.com/watch/Qr1EP1E4zjTSYWwsecjU2Z?**
  Click here for: McGraw Hill eBook and Readanywhere app
  McGraw-Hill Support: 800-331-5094

Grading: Scores for all graded work are recorded and stored on the Moodle course site. It is to your advantage to keep all of your graded work so as to check your records against my records.

Quizzes, in-class assignments, and classroom participation	8%
Achieve homework	7%
Laboratory	20%
Four (4) lecture exams	50%
Comprehensive final* (Standardized ACS Exam)	15%
TOTAL	100%

Grading Scale:

		92 and above	A	90 – 91	A-
87 – 89	B+	83 – 86	B	80 – 82	B-
77 – 79	C+	73 – 76	C	70 – 72	C-
67 – 69	D+	63 – 66	D	60 – 62	D-
Below 60	F				

A grade of “Incomplete”, "I", may be awarded when a student is unable to complete all required course work for reasons beyond the student's control. To be considered for a grade of "I" the student must be passing the course at the time preceding the extenuating circumstances. An incomplete will be considered only if the student missed one assignment, and the assignment requires less than a week to complete.

Universal Syllabus Information - for information on the topics below, refer to https://www.nwc.edu/academics/syllabi/universal-syllabus-information

I. General COVID Information

II. Institutional Health and Safety Guidelines

III. Daily Student Health Screening

IV. Personal Protective and Social Distancing Requirements

V. Adjustments to Academic Delivery

VI. Glossary of Terms

VII. Northwest College ADA Statement

VIII. Northwest College Title IX Policies

IX. Northwest College Nondiscrimination Notice

X. Northwest College Respect for Diversity Statement

XI. Northwest College Course Withdrawal Procedure and Schedule

XII. Northwest College Statement on Academic Dishonesty

XIII. Northwest College Final Exam Schedule

XIV. Northwest College Synchronous Distance Delivery (ZOOM)

XV. ZOOM Etiquette and Best Practices for Students

XVI. Northwest College Student Resources

IX. Northwest College Emergency Procedures Guide (including evacuation assembly areas)

https://nwc.edu/security/documents/Emergency%20Response%20Guide%202015.pdf

Organic Chemistry I – CHEM 2420
Tentative Lecture and Exam Schedule - Fall 2023
SM 208: MWF 9:00 – 9:50 a.m.

Date		Textbook Chapter
Aug 23, 25, 28		1 (Structure and Bonding)
Sept 4	**Labor Day – no class**	
Aug 30, Sept 1, 6		2 (Acids and Bases)
Sept 8, 11, 13, 15		3 (Organic Molecules/Functional Groups)
Sept 18	**Exam #1**	
Sept 20, 22, 25, 27		4 (Alkanes)
Sept 29, Oct 2, 4		5 (Stereochemistry)
Oct 6, 9		6 (Understanding Organic Reactions)
Oct 11	**Exam #2**	
Oct 13 - 16	**Fall Recess – no classes**	
Oct 18		Spectroscopy A (Mass Spec)
Oct 20		Spectroscopy B (IR Spec)
Oct 23, 25, 27, 30		Spectroscopy C (NMR Spec)
Nov 1	**Exams #3**	
Nov 3, 6, 8		7 (Alkyl Halides and Nucleophilic Subst)
Nov 7	**Advising Day – no day classes**	
Nov 10, 13, 15		8 (Alkyl Halides and Elimination Rxns)
Nov 22 – 26	**Thanksgiving Break – no classes**	
Nov 17, 20, 27, 29		9 (Alcohols, Ethers, and Epoxides)
Dec 1	**Exam #4**	
Dec 4, 6, 8		10 (Alkenes)
Dec 11		(Review)
9:30 am - 11:20 am on Wednesday, December 13, 2023, in SM 208	**----**	**Comprehensive ACS Final Exam**

Additional practice problems – Janice Smith 7th Edition

Chapter 1
1.60, 1.61, 1.63, 1.65, 1.66, 1.67,, 1.72, 1.74, 1.77, 1.85

Chapter 2
2.41, 2.42, 2.45, 2.46, 2.48, 2.49, 2.51, 2.53, 2.55, 2.56, 2.57, 2.59, 2.60, 2.64, 2.66, 2.67, 2.69, 2.70, 2.71, 2.72, 2.74, 2.76, 2.80, 2.81, 2.83

Chapter 3
3.36, 3.39, 3.40, 3.44, 3.45, 3.37, 3.51, 3.55, 3.56, 3.59, 3.61, 3.63, 3.67

Chapter 4
4.40, 4.41, 4.42, 4.43, 4.45, 4.46, 4..47, 4.48, 4.50, 4.51, 4.53, 4.55, 4.56, 4.58, 4.60, 4.61, 4.62

Chapter 5
5.38, 5.39, 5.40, 5.41, 5.44, 5.45, 5.48, 5.49, 5.52, 5.54, 5.55, 5.57, 5.58, 5.59, 5.60, 5.61, 5.62, 5.66

Chapter 6
6.27, 6.28, 6.29, 6.31 6.32, 6.34, 6.35, 6.36, 6.37, 6.38, 6.40, 6.42, 6.43, 6.44, 6.45, 6.46,, 6.47, 6.49, 6.51, 6.52

Chapter 7
7.37, 7.39, 7.42, 7.43,7.46, 7.47, 7.48, 7.49, 7.52, 7.53,7.54, 7.58, 7.59, 7.60, 7.63, 7.66.7.69, 7.71, 7.72, 7.73, 7.76, 7.79

Chapter 8
Activity: sample problem 8.4 (p 328), sample problem 8.5, sample problem 8.6 (p 329); 8.22 (p 330), 8.51, 8.52, 8.54; 8.25, 8.27, 8.29, 8.30, 8.32, 9.33, 8.34, 8.35, 8.36, 8.37, 8.39, 8.42, 8.43, 8.45, 8.46, 8.48, 8.50, 8.51, 8.56

Chapter 9

Chapter 10
Activity: sample 10.9 (p 426); 10.31 (p 427); 10.60, 10.61; 10.34, 10.38, 10.39, 10.42, 10.45, 10.46, 10.47, 10.50, 10.52, 10.53, 10.54, 10.55, 10.57, 10.59, 10.60, 10.61, 10.62, 10.6610.68

Chapter 11
11.29, 11.30, 11.31, 11.32, 11.35, 11.37, 11.39, 11.41, 11.42, 11.43, 11.45, 11.46, 11.48, 11.49, 11.50, 11.51, 11.52, 11.55, 11.56,, 11.57, 11.59, 11.60, 11.61, 11.62, 11.63

Spectroscopy A – Mass Spectroscopy

Spectroscopy B **– Infrared Spectroscopy**

Spectroscopy C **– NMR Spectroscopy**

Organic Chemistry I Laboratory
CHEML 2420-01, 4 credits
SM 208: Tuesdays 1:30 to 4:00 p.m.
Fall 2023

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Required Materials: * a pen * a calculator * lab record notebook

Text: Operational Organic Chemistry: A Problem-Solving Approach to the Laboratory Course, 4th ed., John W. Lehman, Pearson/Prentice Hall, 2009, ISBN-13: 978-0-13-600092-1

***Outcomes*:** For the Specialization in Chemistry students will demonstrate knowledge in organic chemistry including nomenclature, structure, reaction mechanisms, stereochemistry, and spectral analysis.

Student Action Steps for this Learning Outcome:
Students will
1. Work safely in the chemistry laboratory
2. Demonstrate the use of the basic techniques chemists use in experimentation
3. Select experimental techniques and instruments for organic chemistry experiment
4. Collect and correctly interpret experimental data using sound scientific principles

Protocol/Grading: Laboratory report will be collected every Friday for grading. A significant portion of your grade is based upon your ability to keep an accurate record of your work in the laboratory, as outlined in the Laboratory Notebook Guidelines. All laboratory work and laboratory reports must be entered into the laboratory record book and turned in for grading by the Thursday of the week in which the work was done. Any lab work which is not recorded, completed, and turned in will be recorded as a zero in the computation of the final grade. Each completed laboratory exercise is worth 100 points. Late lab reports lose 30% the first week and 100% by the end of the second week. All laboratory exercises must be completed and turned in by the last lecture class on Dec 15, 2021. There is no mid-term lab exam, and there is no final lab exam. At the end of the semester, the final lab grade will be used to determine the grade you will receive for the course.

If you miss a lab:
You may choose to do the scheduled make-up lab. The scheduled make-up lab can be used to replace one missed lab. You will not be able to make up more than one lab with the scheduled make-up lab. **November 21, 2023** will be the scheduled make-up lab.

Laboratory Safety and Safety Rules will be discussed at length during the first laboratory session. You are expected to comply with all safety regulations as they are for your safety and the safety of all who enter the laboratory classroom. If you fail to comply with laboratory safety regulations, you will be given one warning. There will be no second warning, as you will be asked to leave the laboratory classroom and given a zero on that laboratory exercise. If you receive three zeroes because of safety, you should drop the course as you will not be allowed back into the laboratory classroom. Failure to wear safety glasses is the most common laboratory safety violation.

Attendance: Obviously, if you are not in lab, you are not performing experiments, learning new techniques and new ways to think, observing and working with chemicals and the laws of chemistry. If you do not turn in reports, there is no way to evaluate your progress in the class. In essence, your progress is then zero, and so then is your grade. There are some times when you must be gone--understood. Three unexcused absences from lab will result in a failing grade for the course. The schedule has been made to allow you time to make up work toward the end of the semester at a specified time. If circumstances force you to miss one or more labs, please talk with me! Let me know your situation before it's too late to really help.

Organic Chemistry I – CHEML 2420
Tentative Laboratory Schedule
SM 208: Tuesdays 1:30 to 4:00 p.m.
Fall 2023

Date	**Laboratory Exercise**
Aug 29	Check in, Safety, Laboratory Record Book: pp 837 – 846 Lab 1: Experiment 1, pp 40 – 47 Effect of pH on Food Preservatives
Sept 5	Lab 2: Thin Layer Chromatography
Sept 12	Lab 3: Column Chromatography
Sept 19	Lab 4: Experiments 2, pp 48 – 54 Separating the Components of Panacetin
Sept 26	Lab 5: Experiments 3, pp 55 – 60 Identifying a Component of Panacetin
Oct 3	Lab 6: Experiments 4, pp 61 – 68 Synthesis of Salicylic Acid
Oct 10	Lab 7: Experiments 5, pp 70 – 77 GC; Preparation of Banana Oil
Oct 17	Lab 8: Spectroscopy and Experiment 13, pp 126 – 132 Investigation of a Chemical Bond by IR spectroscopy
Oct 24	Lab 9: NMR workshop
Oct 31	Lab 10: Experiments 8, p 91 – 97 BP, Refractive Index, UV-VIS: Identification of Hydrocarbons
Nov 7	**Advising Day**
Nov 14	Lab 11: Synthesis of Cyclohexene by dehydration of Cyclohexanol
Nov 21	Lab: Make-up, Catch-up
Nov 28	Lab 12: Bromination of Stilbene
Dec 5	Lab 13: Clean lab, Check out