OWENS
COMMUNITY COLLEGE

SEMESTER
Life and Natural Sciences Department
School of Science, Technology, Engineering, and Mathematics

Program Name: **Chemistry**
Course Name: **Organic Chemistry 1 – Laboratory**
Course Number: **CHM201** **Section: BXX**
Meeting Day(s) & Time(s):
Credits: 5 (combined lecture and lab)
Contact Hours: 4
Text: *A Microscale Approach to Organic Laboratory Techniques,* Pavia, D., Lampman, G., Kriz G., and Engel, R., Cengage Learning, 2018.
Instructor Name:
Office Location:
Office Hours:
Owens CC Email:**
Phone:
Additional Contact:
**Please use only Owens email for course communications

CATALOG DESCRIPTION: The first semester of a two-semester sequence. The advanced course with emphasis on the relationship between structure and reactivity. Topics include bonding in carbon compounds, functional groups, organic acid-base reactions, nomenclature, physical properties, structure, synthesis, and reaction mechanisms for alkanes, alkyl halides, alkenes, alkynes, stereochemistry, structure determination, and radical reactions. Laboratory work covers the separation techniques, instrumental analysis and microscale manipulations. (Can fulfill Sciences requirement in Associate of Science Degree programs. Students retaking this course must repeat both the lab and lecture

COREQUISITES: None

PREREQUISITES: CHM121 with a C grade or better

TEXTBOOKS and MATERIALS:

- *Organic Chemistry, 12th Edition;* Solomons, T.W.G. and C.B. Fryhle., J.C. Wiley and Sons Publishers, 2016.
- Scientific calculator
- Molecular model set (optional)
- *A Microscale Approach to Organic Laboratory Techniques,* Pavia, D., Lampman, G., Kriz G., and Engel, R., Cengage Learning, 2018.
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*Your **print book, e-book, or access code** required for class can be accessed through the Owens Community College e-Campus Bookstore by accessing the online link, called "Find Books" on the course schedule for each course section.*

GENERAL INFORMATION

Course Objectives

1. Describe the structure of carbon compounds and chemical bonding using Lewis structures, resonance theory, hybridization, and molecular orbital theory.
2. Identify the representative carbon compounds, functional groups and the instrumental methods for detecting the functional groups.
3. Discuss reaction mechanisms through acid-base reactions with emphasis on equilibrium constants and energy changes.
4. Utilize curved arrows to designate electron flow within a reaction.
5. Describe and sketch the structure and shapes of alkanes and cycloalkanes and discuss their nomenclature, isomerism, synthesis and reactions.
6. Recognize and explain chirality, enantiomerism, and diastereomerism and relate the stereochemistry to the addition, oxidation, and reduction reactions.
7. Determine stereochemistry of reaction products through an analysis of the mechanistic pathway of the reaction.
8. Compare and contrast the relationship between structure and chemical reactivity through SN1, SN2, E1, and E2 mechanisms.
9. Identify and sketch the structure of alkenes and alkynes and name using IUPAC nomenclature. Use the reactivity of carbon-carbon pi bonds and curved arrow reaction mechanisms to describe addition reactions to alkenes. 10. Examine and employ proton NMR, carbon-13 NMR, and mass spectrometry techniques for structural determination.
11. Recognize and describe the importance of radical reactions: substitution, addition, and polymerization.
12. Design multi-step synthetic strategies using addition, substitution, elimination, and other reaction types.

Laboratory Objectives

This laboratory is associated with the lecture portion of CHM201. Student should be able to demonstrate comprehension of:

- Organic compounds, basic synthesis reactions, separation techniques, product analysis, distillation techniques, qualitative and quantitative ionic analysis and more.

***Please refer to lecture syllabus for all learning outcomes and competencies**

COURSE RULES

Attendance

Attendance is taken at each laboratory session. If you are more than 30 minutes late for a laboratory you will not be permitted to attend that session. During the first 30 minutes your instructor covers the basic information necessary to successfully complete the laboratory, mandatory safety issues, precautions, and location of needed materials. After the session has begun, for safety purposes, your instructor needs to be working with all students, not covering the information for those students who are late. Therefore, if you are more than 30 minutes late, you will not be permitted to attend the laboratory and will be counted absent. You are encouraged to obtain missed information from other students in the laboratory. You will not be permitted to submit laboratory assignments for sessions in which you have been counted absent.

To achieve success in this course, laboratory attendance is critically important. It is necessary to be present in order to get direct attention from the instructor on course material. Students cannot learn the laboratory material without this practical experience, and the practical experience will be a large portion of the laboratory exams. Student attendance in the laboratory is also vital for accreditation and registry exams for all the technologies.

- You must be registered for the laboratory section that you are attending. Non-registered persons are not permitted in the laboratory.
- There are no make-up laboratory sessions.
- You will not receive any points for any of the work from a missed laboratory session.

Safety

- **Eating, drinking and smoking are not permitted in the laboratory.**
- You must be registered for the laboratory section which you are attending. Non-registered persons are not permitted in the laboratory.
- Appropriate apparel is required in the laboratory at all times, including; cotton shirts, jeans, proper foot covering, proper shoes, etc.
- Loose clothing, shorts, sandals, open-toed shoes are not permitted.
- Full covering laboratory aprons are available as needed.
- More about apparel will be discussed at the first laboratory meeting.
- **Safety goggles MUST BE WORN while experiments are being conducted. The laboratory instructor will announce when goggles may be removed. The appropriate eyewear must be splash goggles, which are provided to each student. NO impact glasses are to be worn at any time.**

Student Responsibilities

- Read the laboratory assignment and appropriate lecture material prior to each laboratory session. It is recommended that a laboratory notebook be kept to record observations, experimental results, and instructor notes.

- Be on time and use the full laboratory period.
- Turn in all work as assigned, ask questions, and participate in each activity.
- CLEAN UP: Be certain that your area of the laboratory table is properly cleaned after use. Wash and return all glassware and other instruments to the proper areas. Check the sink to be sure that it is clear of all glassware and trash.

GRADING

The laboratory grade will be based on laboratory assignments and laboratory exams.

12 Laboratory assignments (25 points each)	300 points
Exam 1	100 points
Exam 2	100 points
Total	500 points

IMPORTANT: You must earn no less than 300 points (60%) out of the 500 total possible laboratory points to pass the entire course. If you do not earn at least 300 laboratory points, you will receive an (F) letter grade for the entire course.

There is NO provision for EXTRA CREDIT to be given beyond the designated points for each laboratory exam and activity.

Assignments

A laboratory assignment will consist of laboratory notebooks, student prepared samples and assigned questions from the laboratory manual. See the attached schedule for experiments.

Laboratory reports/notebooks will be graded on a 25-point. 20-points may be earned for student samples. The grade for samples will be based on the purity of the sample. Samples for experiments will be announced and collected by your instructor.

There are NO make-up laboratory sessions.

You will not receive any points for any of the work from a missed laboratory session unless arrangements are made with the instructor in advance.

Assignments are due when indicated by the instructor. Late assignments will receive a 10% grade deduction for each day late. Any assignment over 1 week late will receive a zero (0%) grade. Late assignments **MUST** be submitted to the Copy Center in Administration Hall (Toledo Campus) and the Mail/Copy Center (Findlay Campus). Be sure to include your name, instructor's name and course/section number on the assignment. No laboratory work will be accepted at the Toledo Campus Math/Science Department office.

You will not be permitted to submit or to receive credit for a laboratory assignment in a session in which you have been counted absent.

Exams

Exams 1 and 2 will each consist of approximately 20 questions. Each question will be worth 5 points each for a total of 100 points per exam.

The exam questions will be comprised from material covered in the laboratory manual, experiments, and laboratory lectures. Exams will include the following types of questions: multiple-choice, practical application, fill-in the blank, calculations, and short essay.

- Exam 1 will cover laboratories 1 to 6 or 7.
- Exam 2 will include material from the remaining laboratories.
- Exam 2 is NOT comprehensive.
- There will be NO open book or open notes allowed for the exams.

All exams are administered by the instructor in the classroom.

Open book and open notes are not permitted for an exam.

During exams, unauthorized use of a phone, tablet, e-watch or any other electronic device is prohibited. Use of these devices during an exam, could result in forfeiture of exam points.

Each exam can only be taken once.

Contact your instructor immediately if you miss a scheduled exam.

A student missing an exam chooses one of the following options:

- Take a **DIFFERENTLY FORMATTED** makeup exam on date assigned by instructor.
- Not take the exam and receive 0 points.

A student missing Exam 1 has one week from date of the missed exam to make up the exam.
A student missing Exam 2 has two days from date of the missed exam to make up the exam.

No assignments will be accepted at the Toledo Campus Life and Natural Sciences Department office

- There are NO make-up laboratory sessions.
- You cannot receive points for any work from a missed laboratory session.
- All work must be each student's own effort.
- No photocopied reproductions will be accepted.

Laboratory sections do not award letter grades, only point totals. The laboratory points earned are totaled and forwarded to your lecture instructor. This point total is scaled and added to the lecture point total. The final grade for the course is determined from points earned in both lecture and laboratory. See your lecture syllabus for the course grading summary and letter grade scale.

ACTIVITIES

M = Laboratory Manual, T = "Techniques of Organic Chemistry"

Activity 1 Introduction, Safety Video
Readings for this week: M: pgs. 1-14, 15-26; T: pgs. 1-40
Experiment 1 (Laboratory Exercise 1): Pipette Utilization
Assignments for next week:
Readings: M: pgs. 27-34; T: pgs. 40-48, 96-105
Prepare laboratory notebook for Experiment 2

Activity 2 Experiment 2: Solubility (Parts A-D)
Assignments for next week:
Readings: M: pgs. 35-38, 39-50; T: pgs. 75-86, 86-96, 106-127
Prepare laboratory notebook for Experiment 3

Activity 3 Experiment 3: Crystallization (Parts A, C and D)
Assignments for next week:
Readings: M: pgs. 51-54, 55-64; T: pgs. 128-152
Prepare laboratory notebook for Experiment 4

Activity 4 Experiment 4: Extraction (Parts A, C and D)
Assignments for next week:
Readings: M: pgs. 65-73; T: pgs. 215-236, 236-251
Prepare laboratory notebook for Experiment 6

Activity 5 Experiment 6: Chromatography (Parts A, C and D)
Assignments for next week:
Readings: M: pgs. 74-81; T: pgs. 162-174, 174-191, 256-277
Prepare laboratory notebook for Experiment 7

Activity 6 Experiment 7: Simple and Fractional Distillation (Part B)
Assignments for next week:
Readings: M: pgs.83-91, 92-96, 98-101; T: pgs. 153-162, 292-326
Prepare laboratory notebook for Experiments 26 and 8

Activity 7 **Exam 1**
Experiment 26: Gas Chromatographic Analysis of Gasoline
Experiment 8: Infrared Spectroscopy and Boiling Point Determination
Assignments for next week:
Readings: M: pgs. 102-104
Prepare laboratory notebook for Experiment 5

Activity 8 Experiment 5: Separation and Purification Scheme
Assignments for next week:
Readings: M: pgs. 105-109, 111-118

Prepare laboratory notebook for Experiment 16

Activity 9 Experiment 16: Spearmint and Caraway Oil (Part A)
Spartan Introduction
Assignments for next week:
Readings: M: pgs. 119-121, 123-126
Prepare laboratory notebook for Experiment 9

Activity 10 Experiment 9: Synthesis of Acetylsalicylic Acid
Assignments for next week:
Readings: M: pgs. 127-135
Prepare laboratory notebook for Experiment 23

Activity 11 Experiment 23: S_N1 and S_N2 Reactions (Parts A and C)
Assignments for next week:
Readings: M: pgs. 137-142
Prepare laboratory notebook for Experiment 24

Activity 12 Experiment 24: 4-Methylcyclohexene (Part A)

Activity 13 **Exam 2**

Various laboratory activities may utilize electronic digital devices that require software for operation. You may be requested to temporally download this software to your personal smartphone or tablet.

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit https://www.owens.edu/disability/, or stop by College Hall 124.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: https://www.owens.edu/successcenters/.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact them at counselingservices@owens.edu. More information is at https://www.owens.edu/counseling/.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 151) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: https://www.owens.edu/connection/ or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online resources. For more information visit https://www.owens.edu/library/.

Students can find more information on campus resources, student support, student life, and security at this link.

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's Student Code of Conduct, which includes academic honesty, encompassing plagiarism. See the Board Policy for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's Anti-Discrimination and Harassment Policy and the College's Title IX Policy/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu The policy may be found on the Owens website: 3358:11-2-63 Accommodation for a Student Absence for the Observance of Religious Beliefs and Practices Policy

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See FERPA regulations for more information.

Use of AI Tools: This course requires you to complete various assignments that assess your understanding and application of the course content. You are expected to do your own work and cite any sources you use properly. You are not allowed to use any artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to complete any part of your assignments. Any attempt to use these tools will be considered academic misconduct and will be dealt with according to the university's academic integrity policy. Students are expected to complete all work independently and without the assistance of AI-generated content.

If you have any questions about what constitutes acceptable use of AI tools, please consult with the instructor *before* submitting your work.

The instructor reserves the right to amend this syllabus as necessary and will communicate amendments to students in the course. It is the responsibility of the student to regularly check emails and announcements for changes.

SEMESTER Master Laboratory Schedule

Laboratory Schedule

Laboratory Section DAY	Laboratory Section DAY	Laboratory Section DAY
Activity 1 - DATE	Activity 1 - DATE	Activity 1 - DATE
Activity 2- DATE	Activity 2- DATE	Activity 2- DATE
Activity 3- DATE	Activity 3- DATE	Activity 3- DATE
Activity 4- DATE	Activity 4- DATE	Activity 4- DATE
Activity 5- DATE	Activity 5- DATE	Activity 5- DATE
Activity 6- DATE	Activity 6- DATE	Activity 6- DATE
Activity 7- DATE	Activity 7- DATE	Activity 7- DATE
Activity 8- DATE	Activity 8- DATE	Activity 8- DATE
Activity 9- DATE	Activity 9- DATE	Activity 9- DATE
Activity 10- DATE	Activity 10- DATE	Activity 10- DATE
Activity 11- DATE	Activity 11- DATE	Activity 11- DATE
Activity 12- DATE	Activity 12- DATE	Activity 12- DATE
Activity 13- DATE	Activity 13- DATE	Activity 13- DATE