

CHEM 241: Organic Chemistry I Laboratory

Instructor: Dr. Al Fischer, PhD

Office Hours: By appointment at calendly.com/dralfischer. You will be able to choose to meet on Zoom or at my office during scheduling. (No need to email or ask - just schedule!) (AP 342)

Email: dfischer@wcu.edu

Class meets Mondays from 15:25 - 18:15 in AP 214.

Rationale / Purpose

CHEM 241 Lab introduces students to basic techniques and procedures in isolation, purification, and characterization of organic compounds and simple reactions used in the organic chemistry laboratory. Students will also be trained in the proper way to write a scientific laboratory report. The catalog description reads as follows:

An introduction to organic chemistry, with an emphasis on structure and bonding, reaction mechanisms, and chemical reactivity. Lab MUST be taken concurrently with Chem 241 lecture.

Credits: 1 Prerequisite: A grade of C- or better in CHEM 140.

Safety

You will be required to wear appropriate attire to attend lab:

- Goggles or safety glasses rated for chemical protection (subject to approval by University/your instructor).
- Nitrile gloves
- Closed toed shoes
- Long pants

You must complete the safety training and survey before attending lab!

Turning in Assignments

All worksheets and lab reports will be submitted online. This will require that you scan your work prior to uploading it.

Assignments are due at 3:25 PM on the day of lab.

For lab assignments, late work is accepted up to exactly one week past the due date. This is enforced by Canvas – you will not be able to submit anything past one week!

Prelab assignments are NOT accepted late! They are due at 3:25 PM on the day of lab. This is enforced by Canvas!

I recommend using the PawPrint scanners in the hallway of the science building if you do not have your own scanner (scan your WCU ID to start a scan).

You can also use Apps on your phone.

Please upload multiple pages as a single pdf. If your scans are not legible or are not a single document your work may not be graded.

Course Objectives

By the end of this lab course, students should be able to:

- Apply knowledge obtained in CHEM 241 lecture to problem solving and critical thinking in the laboratory.
- Utilize mathematical knowledge gained from general chemistry to perform common calculations, including mass balance, limiting reagent, and percent yield.
- Engage in safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately, using general guidelines and basic knowledge about the common hazards associated with them in an organic chemistry laboratory.
- Maintain an appropriate scientific notebook using notational and descriptive content containing MSDS information on relevant chemical reagents, experimental procedure followed, data collected, and observations made during the experimental process.
- Assemble glassware and perform the following techniques as a part of synthetic procedures: aqueous workup, extraction, distillation, reflux, separation, isolation, and crystallization.
- Predict the outcome of several common organic reaction types through a basic understanding of starting materials, functional groups, mechanism, and typical reaction conditions.
- Characterize prepared substances by physical and spectroscopic means.
- Develop the skill set necessary to continue on to CHEM 242 lab.

Course Readings

All relevant reading background material and experimental procedures for each experiment can be found on the Blackboard site for this course. In addition, read the corresponding relevant sections in your textbook (*Organic Chemistry*, Janice G. Smith, 5th Ed., McGraw Hill). *BEFORE coming to lab, please be prepared to understand and perform the lab to execute any experiment.*

Course Materials

Required Materials

The following materials are **required** for all students:

- A lab use only face mask. *Face masks must be worn at all times per WCU policy.*
- A pair of safety goggles or chemical-rated safety glasses
- A bag of 30 (or box of 100) **nitrile** gloves
- A 50-page carbonless laboratory notebook (if you have extra room in your notebook from Gen Chem you can use that!)
- Appropriate clothing (i.e., no shorts, open-toed shoes, etc.)

Suggested Materials

The following materials are suggested for all students:

- A black felt-tip pen with permanent ink (Sharpie)
- A lab coat. (Students will be required to wear a lab coat, but shared lab coats will be provided in lab.)

Each of the above items is available at the WCU bookstore.

Faculty Expectations of Students/Course Policies

General Expectations.

- ***Come prepared!*** Read/view all prelab materials before attending lab. Bring goggles and a lab notebook. *Students needing to borrow goggles may have points deducted from their lab grade.*
- Wear appropriate attire.
- Observe all safety rules. *Students not following safety rules may have points deducted from their lab grade.*
- Be on time. On time means 5 minutes before the start of lab.
- Work independently. There will be NO working in groups.
- Work hard: analyze your data before handing it in. Do your own work.
- Demonstrate mastery of skills that you have learned in general chemistry lab.

Attendance Policy

You must attend lab EVERY week and carry out the assigned work. **Makeup labs are not possible!** Students must attend their **assigned** laboratory section *each and every meeting time*. All organic lab sections are completely full, the experiments are time consuming, and there is very little flexibility for completing missed assignments outside your assigned meeting time.

Guidelines for Classroom Behavior

Cell phones may be used in the case of an emergency or to complete laboratory activities (e.g. timing reactions with the stopwatch app). Calls must be taken outside the lab in the hallway. Do NOT place your cell phone in the fume hood. Writing in lab notebooks should also be done on tabletops outside the hood, not in the hood itself.

Personal safety (especially eye safety) and writing in the lab notebook are important themes in this course. Both of these issues will be discussed in more detail during the first lab meeting. *Once you enter the organic lab you will be expected to follow the safety guidelines at all times.*

Some experiments will require setup times with little time actually tending to the reaction; other reactions may require constant attention. The bottom line in each of the synthetic procedures is that you must obtain the product. However, despite our best efforts, the experiments do not always work the first time. In this case, it is your responsibility to inform the instructor and work out a plan. If the problem is caught soon enough, you can simply repeat the experiment on the same day with no loss of points other than more time spent in the lab. Otherwise, if no product is obtained, points will be deducted from your grade for that lab.

Inclement weather policy

In case of inclement weather please consult the WCU webpage if there is any modified class schedule. Use greatest caution when traveling to and from campus. Please keep in mind that WCU and your instructor emphasize your personal safety as the highest priority.

Accommodations for students with disabilities

Western Carolina University is committed to providing equal educational opportunities for students with *documented* disabilities. Students who require services related to disability or reasonable accommodations must identify themselves as having a disability and/or medical condition, and provide current diagnostic documentation to the Office of Accessibility Resources (OAR). *All information is confidential.* Please contact OAR for more information at: (828) 227-3886, 135 Killian Annex, or accessibility.wcu.edu.

Pregnancy

Any student who is pregnant or might have become pregnant should notify her TA or instructor before conducting any laboratory work so that proper safety precautions can be taken. Certain chemicals can have severe harmful effects on unborn children. Pregnancy is a time when toxin avoidance is absolutely imperative since the developing fetus is highly susceptible to the effects of many common chemicals.

Academic Honesty & Integrity Policy

Western Carolina University, a community of scholarship is also a community of honor. Faculty, staff, administrators, and students work together to achieve the highest standards of honesty and integrity. Academic dishonesty is a serious offense at Western Carolina University because it threatens the quality of scholarship and defrauds those who depend on knowledge and integrity. Academic dishonesty includes:

- **Cheating:** intentionally using or attempting to use unauthorized materials, information, or study aids in any academic tests.
- **Fabrication:** intentional falsification of information or citation in an academic test.
- **Plagiarism:** intentionally or knowingly representing the words or ideas of someone else as one's own in an academic test.
- **Facilitation of Academic Dishonesty:** Intentionally or knowingly helping or attempting to help someone else to commit an act of academic dishonesty, such as knowingly allowing another to copy information during an examination or other academic exercise.

Instructors have the right to determine the appropriate sanction or sanctions for academic dishonesty within their courses up to and including a final grade of "F" in the course. Within 5 calendar days of the event the instructor will inform his or her department head (and the Associate Dean of the Graduate School if the student is a graduate student) in writing of the academic dishonesty charge and sanction.

Please refer to the Student Handbook for procedures that will be followed in the event that academic dishonesty has been committed. See also: <http://catalog.wcu.edu/content.php?catoid=20&navoid=346#honestypolicy>

Tutoring

Tutors are available at no cost through the Writing and Learning Commons (WaLC). The WaLC, located in Belk 207, provides free small-group course tutoring, academic skills consultations, workshops, one-on-one writing tutoring, online writing and learning resources, and faculty consultations for all students. You can find more information about all of our services at <http://tutoring.wcu.edu>. Tutors are generally upper class students who did well in their earlier chemistry courses. All tutoring sessions take place in the WaLC (207 Belk), or in designated classrooms on campus. More information can be obtained from:

- Chesney Reich, WaLC Director, reich@wcu.edu, 227-2273 (course-specific tutoring in all disciplines except math)
- Ben Kearns, MTC Director, btkearns@wcu.edu, 227-3830 (math tutoring)
- Mattie Davenport, WaLC Associate Director, mrdavenport@wcu.edu, 227-3426 (writing tutoring and writing fellows)

Use of Blackboard or other software

All material and information about the experiments, resources, and policies for the CHEM 242 lab course are available on Canvas. Students will turn in all work electronically on Canvas.

Students will need word processing software (e.g. Microsoft Word) to complete a lab report. Microsoft Office is available to students through WCU.

Students will need to use chemistry drawing software to draw reaction schemes and molecules. The most popular freeware chemistry drawing package is **ChemSketch**, although it only works for Windows. You instructor uses **ChemAxon Marvin Sketch**, which runs on Mac, Linux, and Windows.

Grading Procedures

There will be no exams in this course. A total points system will be used to determine your grade. *To calculate your grade, simply add up all of your graded material and divide by the total points and multiply by 100. For example, if you received a sum total of 600 pts at the end of the semester, your grade would be 100 x (600/700) = 85%, which would be a B.*

Assignment	Points Available
Stoichiometry Worksheet	50
Lab 1. Indigo/filtration	50
Lab 2. Ethanol/distillation	150
Lab 3. Extraction/TLC/mp/IR	100
Lab 4. Reduction of Fluorenone (write-up)	100
Lab 5. Acetaminophen/Synthesis	100
Lab 6. Chromatography	100
Safety Survey	13
ChemSketch Assignment	25
Library Exercise	25
Prelab Quizzes (online)	~150
Total	~663

Grades

The grade scheme for the course is as follows; **A+** = 100-97, **A** = 96.9-93, **A-** = 92.9-90, **B+** = 89.9-87, **B** = 86.9- 83, **B-** = 82.9-80, **C+** = 79.9-77, **C** = 76.9-73, **C-** = 72.9-70, **D+** = 69.9-67, **D** = 66.9-63, **D-** = 62.9-60, **F** = 59.9 and below. The grades of A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D- and F indicate gradations in quality from Excellent to Failure; the Quality Points/Semester Hour for each letter grade are explained in detail in the current WCU undergraduate catalog. Please note that a C- grade is less than satisfactory and may not meet particular program and/or course requirements.

Composition-Condition Marks

Writing of lab reports is a significant component of your grade. A student whose written work in any course fails to meet acceptable standards will be assigned a composition-condition (CC) mark by the instructor on the final grade report. All undergraduates who receive two CC grades prior to the semester in which they complete 110 hours at Western Carolina University are so notified by the registrar and are required to pass English 300 or English 401 before they will be eligible for graduation. This course must be taken within two semesters of receiving the second CC and must be passed with a grade of C (2.0) or better. Students must be familiar with the class attendance, withdrawal, and drop-add policies and procedures.

Tentative Course Schedule

Please consult the Canvas page for the schedule of labs and due dates.