

**CHEM 2124: Organic Chemistry I Laboratory for Chemistry non-Majors
(Lab for CHEM 2324)**

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Office PSCI 308; Office hours: Thursday 12:30 PM – 1:30 PM and by appointment

Textbook: Experimental Organic Chemistry - A Small-Scale Approach,
Wilcox & Wilcox. 2nd Edition, Prentice Hall, 1995, Upper Saddle River, NJ.

All students are expected to have read the information about scheduled lab activities in the Wilcox/Wilcox text book in advance, so that they are fully prepared for the laboratory activity of that day, see detailed curriculum above. Note that some assignments will use source material not in the textbook; this material will be provided to you. You should read any additional source material well in advance of any activity. You are also responsible for reading all posted material (e.g. on the course Moodle), and all material sent by email. Some of this material provides essential safety information which you cannot overlook. Students should also know the structures of the chemicals they are working with. The structures may be found in the students' organic chemistry textbook, or on the internet (Google, Wikipedia, etc.). Students should also prepare their lab notebook, in advance, before coming to lab; instructions are provided in the first lecture content.

Students work in teams of two in CHEM 2124. You will have the same team member throughout the course.

Teaching Assistants:

CRN#	TA	TA email address
31334	Yuejiao Xian	yxian@utep.edu
30985	Qian Wang	qwang@miners.utep.edu
36266	Olivia Fernandez	ofernandez2@utep.edu
36401	Laura Saucedo	lisaucedo@miners.utep.edu

Note that possibly not all sections listed on this draft syllabus will make sufficient enrollment, and some may be cancelled.

TA's office hours: TBA

Course times/Locations: depends on section (CRN #)

CRN#	lab room	DAY	Time
31334	1.0506	T, W, TH	10:30AM-1:20PM instructor: Dirk
30985	1.0508	T, W, TH	10:30AM-1:20PM instructor: Dirk
36266	1.0506	T, W, TH	1:30PM-4:20PM instructor: Dirk
36401	1.0508	T, W, TH	1:30PM-4:20PM instructor: Mortazavi

Please make sure you attend the correct section/day, and that you are in the correct room. If you are attending the wrong section, you will not be graded properly, and may be withdrawn from the course by the instructor. Each TA maintains separate grading for their section, though they all

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follow the grading scheme outlined in this syllabus. Note that there are course enrollment limits, we cannot overenroll a course, and, we cannot have students attend a section which is already at maximum enrollment.

Course Objective: Students learn a) to work safely in a laboratory environment; b) to carry out multiple-step syntheses; c) to apply organic synthetic laboratory techniques; d) to characterize organic compounds by various methods; e) to maintain a laboratory notebook, and f) to dispose of laboratory waste properly.

Curriculum: CHEM 2124 involves learning basic organic chemistry operations including measuring melting point, infrared and NMR spectra, recrystallization, distillation, extraction, sublimation, and some basic reaction chemistry and related operations

Some Essential dates:

(In the event of a discrepancy of these dates with the official university calendar, the university calendar prevails. Please check the university calendar to assure essential dates)

June 10 – Summer I 2018 semester begins

June 11 – This is the first day Summer CHEM 2124 meets. Do not miss the first day of class as there is an essential safety discussion, and should you miss, you will be required to write a safety report (see below).

June 28 – Course drop deadline. The last day to receive a W. Note that the College of Science policy is that no “W” grades may be issued after this date.

July 5 – Last Day of Summer I classes; this is usually also the last day for complete withdrawal from the University. Please consult with your advisor to verify this date.

GRADING:

The grades for the laboratory will consist of:

1/3 Attendance, comportment, preparation, and compliance with safety and cleanliness guidelines.

1/3 Lab Reports (completed on-line through organic.utep.edu)

1/3 Quizzes (completed on-line through organic.utep.edu)

Note below the 25% penalty on your attendance/comportment/compliance/etc. grade should you miss the safety lecture (first day of class). A 25% penalty on this grade might mean that the highest grade you can earn in the class is B.

Your attendance grade encompasses many factors. Your TA or instructor can deduct from this grade if you appear poorly prepared, do not follow instructions, do not comport yourself well in class, fail to follow safety requirements (such as failing to wear safety goggles), or fail to clean up your work area and contribute to general cleanliness throughout the lab.

Grades will follow the following scheme:

89.5-100: A

79.5-<89.5: B

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69.5-<79.5: C
59.5-<69.5: D
<59.5: F

There are no final exams in this course.

Pre-lab QUIZZING

Quizzes will be administered on-line through a Moodle learning system, through the link: organic.utep.edu. You will be provided with a LOGIN to the system prior to the first quiz. A new quiz will be posted on the system at 4:30PM the day before any a lab activity. It will be due at 8AM the morning of the activity. There are no extensions of the quiz period. It is your responsibility to check for quiz open and due times/dates to assure you do not miss a quiz. The first quiz will be available online at 4:30PM on Tuesday, June 11, and is due on Wednesday 8AM of June 12, 2019. The intent of quizzing is to assure that you have prepared adequately for each lab session. Preparing for each new lab requires you to consult with your book, syllabus, material posted online, and the material presented by your TA. Note that all quizzes are normalized to 0-100 regardless of the number or value of individual questions.

Lab Report: Your lab report will also be completed on-line through organic.utep.edu. During the summer, the reports for all activities for the week become available at 5PM of Thursday of that week, and are due at Noon (12) of Saturday of that week. There are no extensions of the report period. Your first two reports will be available at 4:30PM on Thursday, June 13, and are due on Saturday, noon, of June 15, 2019. Typically, each week, you will have 2-4 reports to complete. Note that all reports are normalized to 0-100 regardless of the number or value of individual questions.

Attendance Policy:

Your TA can deduct credit if you are late. Missing too many lab meetings, or being late, will render you susceptible to involuntary instructor initiated withdrawal from the course.

Missing the first lab meeting, at which safety is discussed, will render you susceptible to instructor initiated withdrawal from the course. This is because safety is essential information in order to participate in the course.

During the Summer, with the accelerated daily schedule, there is no capability to make up a missed day. **If you believe you will miss any days that this course meets during the Summer, you should instead register for this course in a different semester.** If you are absent for a day, you will receive a 100% deduction in your attendance grade.

Consequence of missing the safety lecture – first day of class

The safety lecture takes place the first day of class. Your attendance of the safety lecture is essential to the safety of you, your classmates, and your TA. Previous safety lectures in other courses do not release you from the obligation to attend this lecture. You receive a grade for attending this lecture. Should you be absent for the safety lecture:

1. You will lose credit for the entire day's activities.
2. The instructor of record reserves the right to withdraw you from the course.

3. You will lose 10% of your Attendance, comportment, preparation, and compliance with safety and cleanliness grade for every class meeting throughout the course. You can remedy the 10% per class penalty by following the guidelines in step 4:
4. You are required to submit a five page single space report on safety in the organic laboratory, using the slides presented by your TA as primary source material. Figures do not count toward the five page specification. You have one week from your missed safety lecture to complete this requirement. Should you fail to adequately complete this assignment by the deadline, you will lose 10% of your attendance/compliance/comportment/safety grade for the entire course. Your Instructor of Record will assess whether your report is adequate. Note that a loss of 10% of this grade by failing to complete the report could likely mean at least one letter grade reduction for the course. This report will not earn back your missed attendance for the first day of class. It is meant to assure that you are properly prepared for course safety.

Unauthorized activities

Neither you or your TA are authorized to execute activities that are not part of the course curriculum. Consult with your instructor of record if you believe you must conduct a chemical or instrumental activity that is not part of the course curriculum.

Contribution to lab cleanliness:

Cleanliness is part of your grade. If you depart from a class meeting without properly contributing to cleaning your station and helping to maintain the lab tidiness, your TA will deduct from your grade. You will also be expected to contribute to maintaining the cleanliness of the balance room, chemical dispensing, and waste handling areas of the lab. If your TA finds your glassware or work area not properly cleaned, or, you have failed to help keep clean the balance, chemical dispensing, and waste handling areas of the lab, this will be deducted from your grade.

Your notebook:

Guidance for maintaining your notebook will be discussed in class at the first class meeting, or may be summarized on Moodle course postings at organic.utep.edu

Prior to coming to lab, you should come prepared with, for instance, calculations already worked out in your notebook for operations you will undertake in the lab. Your TA may periodically demand to see your notebook. If you are not maintaining an adequate notebook, your TA may deduct from your attendance/etc. grade.

Communication:

In order for students to be well prepared for the course and work safely, communication is essential. You are required to check your email daily, throughout the semester, for announcements dealing with various elements of the course. It is your responsibility to assure that the email address under which you are registered is correct and functioning. You should also check the course Moodle frequently for updates.

All emails to your TA should be simultaneously copied to your instructor of record.

Your TA & TA's pre-lab lecture:

Your main point of contact will be your Teaching Assistant (TA). By the day of check-in and the safety lecture, your TA should be determined and your TA will check you in, administer and teach the course.

Your TA will lecture on content for the present day's activities and may also comment on upcoming activities for future scheduled lab days. You will be provided online with a draft of anticipated slide content for the TA's presentations. Note that TAs often augment this draft content with additional or different content, and may have to make some last minute adjustments in procedures. You should pay close attention to the TA's presentations. Attendance to the pre-laboratory lecture is mandatory. If you miss the pre-lab lecture, your TA will deduct from your grade, and you will be subject to instructor initiated withdrawal from the course.

Your fume hood:

Note that hoods are labeled, and you will always work in the same hood. ALL chemical activities are done in the hood. The bench is for maintaining your notebook and supplies for your activity. Please make sure that labeled equipment remains in the hood or on the bench that matches that labeling.

If your course section needs to keep chemical intermediates from one day to the next, each section has been provided with a locker for storage. Please consult with you TA for storage of compounds and materials from one day to the next.

The Weighing Room, Dispensing hood and handling chemicals

- 1) Do not leave chemical bottles or loose chemicals in the weighing room
- 2) Clean up after yourself
 - a. Do not leave chemical spills you caused, Clean them up.
 - b. If you need help with a clean-up, ask your TA for advice
- 3) Many chemicals are hygroscopic, and will absorb moisture through from the air, ruining them for further use. For example MgSO_4 or CaCl_2 . Please tightly close containers that you opened.
- 4) Many chemicals are volatile and will evaporate away. Please tightly close containers that you opened.
- 5) How you handle chemicals and responsible clean-up will be part of your grade.

Students will work in teams of two. You will either be assigned or may be able to choose a lab partner. You will continue with the same lab partner for all activities throughout the semester

Academic Honesty: Materials submitted to fulfill academic requirements must represent the submitting student's own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Dean of Students Office for disciplinary action.

Students with Disabilities: If you have or suspect a disability and need accommodations, you should contact The Center for Accommodations and Support Services (CASS) at 747-5148 or at cass@utep.edu or room 106 Union East Building. The faculty member and TA cannot judge whether you need accommodation for a disability. This must be done by CASS, which will advise us how we should best accommodate specialized needs.

Safety: You are required to follow all the safety rules and procedures in the laboratory. Missing the first lab meeting at which safety is discussed places you and your classmates at risk, and, will render you susceptible to involuntary instructor initiated withdrawal from the course. If you miss the safety lecture, please check to make sure that you have not been withdrawn from the course.

Summary of some important safety rules:

- Always know the danger of the chemicals you are working with, e.g. sulfuric acid. You should research the safety and chemical reactivity of all reagents before coming to class and ask your TA if you have any further questions.

- Always wear goggles. This is a State law. You do not have the choice to not comply.

- Always wear lab coats

- Know where the eye wash, safety shower, and fire extinguisher are located. Your TA should brief you on how these work.

- Wear closed shoes. Your foot must be completely enclosed with no toes showing. This is because the floor may be commonly contaminated with chemicals and small shards of broken glass.

- Long hair must be tied back

- Wear long pants (no skirts or shorts)

- No hats

- No food/drink items are allowed in a chemistry laboratory

- Keep your work space clean!!!!

- If there is a chemical spill, inform the TA immediately.

- If you are injured (a cut, inhalation of toxic gases, acid burn on skin, etc.) inform your TA immediately. We are required to file reports of all injuries, no matter how minor, and also to offer you the option to seek medical aid.

- Do not wear your lab coat or gloves outside the lab in the area in the location of Starbucks.

- Do not enter the lab until your TA has arrived. Unsupervised students are not permitted in the lab.

More detailed safety information:

1) Eye Protection: Goggles: **GOGGLES MUST BE WORN IN THE LAB AT ALL TIMES.**

As soon as you enter the lab, you should have your safety goggles on, regardless of whether any laboratory activity is underway. You cannot remove your safety goggles until you leave the lab. Students who refuse to comply with safety goggle rules will be asked to leave the lab, and in the event they refuse to leave, will be escorted out by University police. At the end of this syllabus, we illustrate what kind of Safety Goggles you must use.

- a. For those who wear contact lenses, we want to advise that injuries can often be more severe in the event of a chemical splash into the eye. We recommend that, if possible, you choose to wear glasses under your goggles, instead of contact lenses.

- 2) Hot Glassware: Hot glassware looks the same as cold glassware. Use care when working with a reaction apparatus that is being heated or with the glassware that may be attached to or removed from the apparatus, as hot glass cannot be distinguished from cold glass
- 3) Hot Plates: A hot hot-plate looks the same as cold hot-plate. Use the same care as you use with glassware which may be hot. Note that some hot-plates possess a warning display light to indicate that the plate may be too hot to touch. This display light may fail (or won't operate if the hot-plate is unplugged, but still is hot), which means you should not rely on the display light to indicate the plate is hot. Note that some older models of hot-plates may not possess a hot display light, or, instead possess an on/off indicator light. This on/off light does not indicate if a hot-plate is hot or not, only if it is on or not. Even after a plate has been turned off or unplugged, it can remain hot enough to cause a serious burn.
- 4) Liquid hazards
 - a. Hot solutions – always use great care when adding anything to a hot solution. The material that you add can serve as a nucleation site for bubble formation, and the solution can foam or erupt, sometimes violently from the flask/beaker
 - b. Heat of mixing – many things, when they mix, generate heat, sometimes explosively. For example, use great care when mixing acids and water. To reduce the heat of mixing, always add acid to the water. Never add water to the acid.
 - c. Never look directly into a flask or beaker while working with it. Reactions, hot solution eruptions, heat of mixing effects can cause the material in the flask or beaker to erupt or eject toward you.
- 5) Broken glassware. If glassware breaks in the lab, use extreme care in handling it. If you need assistance, ask your TA. Broken glassware should be placed in the broken glassware container, NOT in trash containers.
 - a. Note that long narrow glass objects such as thermometers, glass pipettes, glass tubing and glass rods easily break and can easily then penetrate the skin causing serious cuts and penetrating wounds. Do not apply bending forces to these objects. For example do not try to force a tube or thermometer through a stopper (with a hole). This results in a common hand injury when the tube or thermometer breaks. The correct approach is to hold the thermometer close to the stopper opening and push through slowly in increments of fractions of an inch. Seek assistance from your TA on this.
 - b. Because small shards of broken glass can remain on the floor for long periods of time, you cannot wear open shoes such as sandals. The shoe should completely enclose your lower foot and toes.
- 6) Chemical waste disposal. Make sure you seek guidance from your TA in disposal of chemical waste. Some waste containers are only meant for certain kinds of waste. Mixing the wrong chemical waste can produce a violent chemical reaction and/or fire.
 - a. Solid waste and gloves should be placed into the bins/drums (usually blue in color)
 - b. Liquid waste should be placed in one of three labeled containers in the waste hood:
 - i. Organic non-halogenated: This would be all liquid or solution organic waste that does not contain a halogen (F, Cl, Br, I) atom.

- ii. Organic halogenated: This would be all liquid or solution organic waste that does contain a halogen atom.
 - iii. Aqueous waste: This would be all waste that is in water.
 - c. Log waste into designated waste sheets. When you add waste to a bottle, there should be available a log-in sheet to account what and how much you have added to the bottle.
- 7) Trash: There is a trash bin the lab. Do not put gloves, chemicals or broken glassware in the trash bin. Do not put anything contaminated with chemicals into the trash bin. The custodial staff can be harmed by chemicals or broken glassware.
- 8) Injuries: All injuries must be reported to your TA.
- 9) Fire: Treat all organic compounds as being flammable. Note that open flames are rarely created in the lab as part of a lab procedure. However, vapors can be ignited by hot surfaces. In the event of a fire, alert your TA and classmates. None of you are fire-fighters. Your first consideration has to be your safety and that of others, which means evacuation to a safe location is the priority. When you and your TA are safe, the fire should be reported. Your TA/instructor may take some action to extinguish a fire based on their own judgment of whether this can be done safely.
 - a. There are nearby sources of water that can be used to extinguish clothing on fire. One source is the shower just outside the main door of the room. The other is the eye wash hose at each sink which can be drawn out some distance to douse someone.
 - i. Your TA should show the location and illustrate means of use for the shower and eyewashes. If your TA has not done this, please ask him/her to do so for the class.
 - b. A fire extinguisher should also be available to extinguish a fire. Always aim the extinguisher at the base of the flame.
 - c. Clothing that you wear to the lab should be under control, so that sleeves or bottoms of shirts cannot easily be contaminated with chemicals or are floppy enough to be ignited by a flame.
 - i. Choose carefully what to wear to the lab. Your clothing may also be damaged by chemicals, so you should choose clothing that you might be willing to discard.
 - d. Hair can easily catch fire and burn. Also, uncontrolled hair can be more easily contaminated by chemicals. Keep loose hair under control and tied back.
 - e. When heating anything, keep your face away from the opening of the glassware, as a sudden flash or explosion could more likely propel material toward you.
- 10) Chemical exposure: Most, if not all organic compounds can pass through the skin. The substances we use, or which you might encounter, could have varying toxicity and danger. Many are skin irritants. Some are respiratory irritants; avoid inhalation; do not attempt to smell the odor of substances as this could cause nasal or respiratory distress. You will also be working with organic and inorganic acids and bases, and other inorganic substances. The hazards of these substances are spelled out in the Materials Safety Data Sheet for each substance.
 - a. Avoid getting anything on the skin, and wash your hands and arms when you complete the lab. You must wear protective gloves when working in the lab. While your TA/instructor or the faculty can answer some questions about the

safety of the chemicals you encounter, we are not fully expert on all of the toxic and pharmacological properties. Additional questions may be referred to UTEP Environmental Health & Safety.

- b. Treat all surfaces in the lab as contaminated. Do not sit or lean on benches or hoods.
- 11) Gloves: You will be supplied with gloves to use to protect your hands. Do not take these gloves home to try to clean and reuse them, as they can be contaminated with chemicals. The gloves we provide do not offer absolute protection. Many organic chemicals can slowly pass through rubber gloves. Wash your gloved hands periodically to reduce chemical contamination remaining on the glove. You are permitted to use more than one pair of gloves in a laboratory session. Replace the gloves if you suspect that they have become heavily contaminated. Replace the gloves if they develop a hole or tear. The gloves do not protect against thermal burns; you can be burned through the gloves by a flame or hot object. The gloves do not offer penetration protection; sharp objects can penetrate through the glove material. Discard the gloves in the designated waste container when you finish with a pair.

Summary of anticipated schedule follows. The content below represents the intended plan for the semester. Adjustments in content and scheduling often have to be made depending on availability of equipment and supplies. You will be kept informed of changes in as timely a manner as possible. Make sure you check online for pre-lab quiz and report due dates for all activities.

day (Activity #)	Day	Activity (Chapter*)	Page
1 (0)	June 11	Laboratory Safety & course introduction Check in	
2 (1)	June 12	Melting Point (8.4B)	98
3 (2)	June 13	Recrystallization (8.4B)	98
4 (3)	June 18	Distillation (5.4B)	66
5 (4)	June 19	Extraction (9.7D) and sublimation	118
6 (5)	June 20	Thin Layer Chromatography (10C)	144
7 (6)	June 25	SN1 preparation of <i>tert</i> -butyl chloride (18.3C)	315
8 (7)	June 26	SN1 chemical kinetics (20.4)	325
9 (8)	June 27	Aspirin (49.2A)	486
10 (9)	July 2	E1 Cyclohexanol conversion to cyclohexene (21.5A)	331
11 (10)	July 3	Isopentyl acetate (Fischer esterification) (modification of 30.2A)	378
	July 4	holiday	

* Many activities involve either supplementary information or modifications which are discussed in online Moodle posts or posted course slides. Examine all provided content in your book and on line in order to be properly prepared

There are pre-lab quizzes and reporting associated with each of these activities. There are two additional reports for IR and NMR activities 11 and 12, respectively which take place

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throughout the Summer. There are no prelab quizzes for activities 11 and 12 as these occur throughout the Summer as you acquire knowledge about these two spectroscopies.

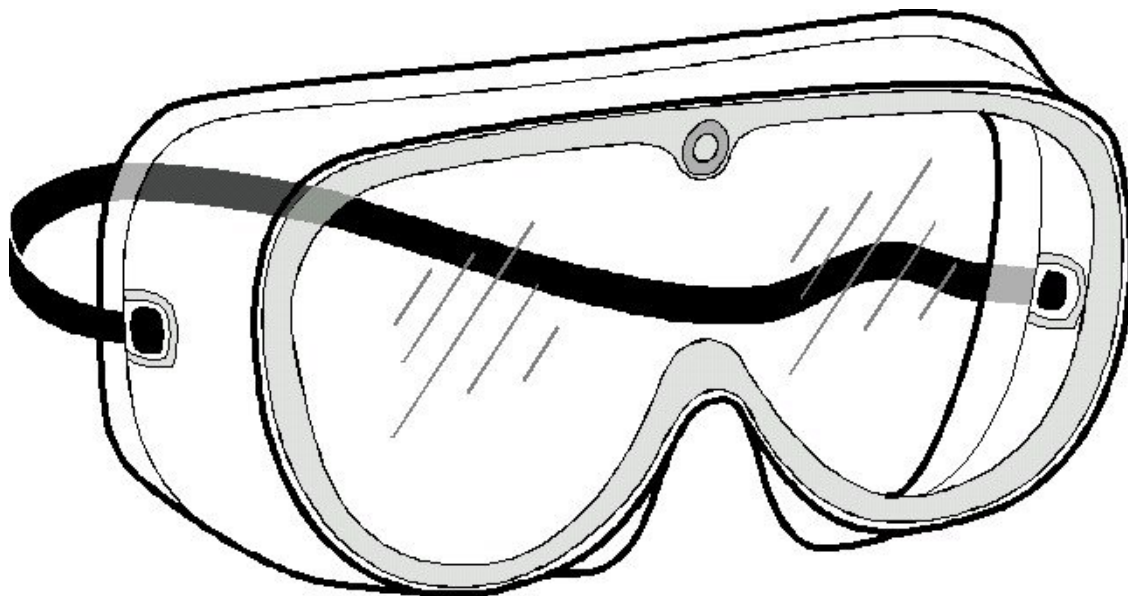
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Safety GOGGLES are required to work in ANY lab in UTEP Chemistry. The GOGGLES should fit firm to the face. This will best protect against splashes which could otherwise easily run around safety glasses and get into the eyes. We illustrate below what you should use and what you should (must) not use. The GOGGLES should possess the ANSI Z87.1 specification.

An example of the
kind of safety
glasses you should
NOT use



An example of the kind of safety
GOGGLES you MUST use:



• *The syllabus can be subject to change at the discretion of the instructor and the TA. You are solely responsible for obtaining the most updated information regarding this course. Check email, and the course Moodle frequently for updates and announcements.*