

# ORGANIC CHEMISTRY LABORATORY 2 (CHEM 3220)

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Office Hours: Monday 11 -11:30 am; 2:30 – 3 pm CHEM 276

Lecture Time and Location: 3220.002 Monday 12:30-2:20 pm CHEM 109

## COURSE INFORMATION

### COURSE DESCRIPTION (FROM THE UNT COURSE CATALOG)

Separations and Synthesis. Organic preparations; techniques of recrystallization, solvent extraction, separation of mixtures, chromatography and spectroscopic methods.

### COURSE FORMAT AND DELIVERY

This course contains six two-day modules focusing on ten topics to achieve the learning objectives. Students attend the laboratory alternating days to perform and collect data from the planned procedure. The day between, students work with the instructor, teaching assistants, and peers to plan for the next procedure, report the results of the previous experiment, read the assigned preparatory material, and complete a pre-lab quiz successfully. All assignments are submitted electronically through LabFlow. An in-class Knowledge Transference Check will be held during class time during the Finals Day of the semester. (Friday, June 20)

Students are assigned to group A or B at the beginning of the semester and will follow the schedule for that group within their section for the semester. Students are assigned a work bench and fume hood on the first day they attend the laboratory. Students perform all experimental work in those assigned spaces so laboratory etiquette and safety can be tracked over the semester.

The instructor provides a weekly lecture covering the basics and safety of each procedure as well as feedback from teaching assistants and laboratory supervisors. Regular office hours and meeting by appointment will be available to students. Students are required to attend the weekly lecture hour in CHEM 109. Habitual absenteeism in this lecture will result in loss of access to the laboratory.

Teaching assistants will assist students in the laboratory to complete the planned procedure, but students are expected to have submitted all pre-lab assignments successfully prior to entering the lab. Due to the safety concerns in this laboratory course, students failing to complete pre-lab assignments may not enter the laboratory to perform the procedure for that module.

## REQUIRED AND RECOMMENDED MATERIALS

Access to the UNT Canvas LMS is required. A word processing program for writing pre-lab plans and lab reports for electronic submission is required unless the student keeps a *bound and dedicated* lab notebook. If this is the case, the student should contact the instructor and teaching assistant as soon as possible for approval.

Access to the LabFlow platform must be purchased and registered to the student using the correct lab section. No assignments will be accepted outside of LabFlow.

Footwear and clothing protecting the student from chemical splashes, spills, and accidental glass breakage is required. UNT Chemistry department provides clean lab coats for each session the student attends the laboratory. Use of personal lab coats is highly discouraged for chemical hygiene and safety reasons.

Safety glasses or goggles with ANSI Z87 or Z87+ impact rating are required at all times in the laboratory. Z87 or Z87+ will be usually stamped near the hinge of safety glasses or on the top of goggles. Prescription glasses will not be permitted as a substitute for proper eye protection.

Access to software designed to display organic and inorganic compounds as bond-line formulas such as ChemDraw or ChemSketch is recommended. It is available in the CCIL for students enrolled in chemistry courses at UNT.

## GRADING AND ASSESSMENT

### GRADING

Each module will contain three graded components

1. Pre-lab quiz due the day before (midnight) attending the laboratory for the experiment.
2. Pre-lab plan/procedure due one day (24 hours) before attending the laboratory for the experiment.
3. Lab Report due two days after attending the laboratory for the experiment.

Teaching assistants and the instructor will provide students with graded lab reports with feedback through LabFlow LMS as soon as possible after the due date of each assignment. Students are advised to read and understand the feedback to avoid further point deductions for the same errors. Pre-lab quiz grades will be available electronically after the quiz is completed. Pre-Lab plan grade will be available as soon as possible after the experimental procedure is completed.

Point distribution for assignments:

Safety and lab equipment test	100
Laboratory etiquette and safety score	100
Six pre-lab quizzes (50 each)	300
Six pre-lab plan/procedures (50 each)	300
Six lab reports (100 each)	600
<u>Knowledge Transference Check</u>	<u>200</u>
<b>Total</b>	<b>1600</b>
Bonus for section safety crew	+40
Bonus for SPOT survey	+40

The course grade will be assigned by the following scheme:

100%-90% of total points	A
89%-80% of total points	B
79%-70% of total points	C
69%-60% of total points	D
<60% of total points	F

#### PRE-LAB QUIZ (50 POINTS)

A ten-question multiple choice quiz must be completed on LabFlow LMS successfully the day (before midnight) prior to attending the laboratory prepared for the experimental procedure. Students are expected to read and/or watch all materials within the module before attempting the quiz. Students are allowed multiple attempts to earn the highest grade. Students can use any reference materials available on Canvas or LabFlow, excluding the work of other students.

#### PRE-LAB PLAN/PROCEDURE (50 POINTS)

*Stepwise numbered* instructions the student plans to perform in the laboratory must be submitted through LabFlow LMS 24 hours prior to attending the laboratory to conduct the experimental procedure. These instructions should be a concise and understandable summary from the detailed procedures provided by the instructor on LabFlow or Canvas. Any preliminary calculations or information required by the instructions must appear in the submitted pre-lab plan. The instructor may enforce a maximum word count, if needed. Upon submission, the instructor and teaching assistants will approve your plan or send the student corrections to be made before attending the laboratory. Students are required to print this plan before their assigned lab starts to use as a guide. Students who do not submit an approved *stepwise and numbered* plan may not enter the lab to perform the experimental procedure.

Students will only be contacted if their submitted plan is not accepted. Students that submit this plan less than 24 hours before they arrive at the lab should understand the teaching assistant does not have enough time to accept the plan. This may result in not being notified before lab starts but still not permitted to enter the lab.

As reference source to be used in the laboratory, students must also include a table of chemicals used and/or synthesized during the procedure. This table must include appropriate physical constants, potential hazards, and disposal information. **Print this information out and bring it to lab with you.**

The general points distribution for the Pre-lab Plan/Procedure is in the table below.

Clarity and Completion	30
Stepwise	10
Submitted >24 hrs before lab	10

## LAB REPORT (100 POINTS)

The student's report of laboratory activities must be submitted two days after performing the experimental procedure. The lab report will be unique to this semester's work. Lab reports submitted in previous semesters will not be accepted. The lab report will include:

1. (INTRODUCTION) A brief introduction to the procedure which includes a short description of the procedure, the chemical and physical properties being exploited in the procedure, the information to be collected, and what should be hopefully concluded from this information. The chemical reference table from the pre-lab plan must also be included at the end of this section.
2. (OBSERVATIONS AND DETAILS) A succinct and objective description of what was actually done in the laboratory along with appropriate observations and details from each step in the procedure. This is not the same as the pre-lab plan. This is a paragraphically written description of what was observed as the procedure occurred. First or third person is acceptable. Past tense is required. Passive voice is preferred.
3. (RESULTS) A data table summarizing all numerical observations reported in the observation section.
4. (CONCLUSIONS AND DISCUSSION) Conclusions drawn from the student's *observations* (or additional data provided by the teaching assistants or instructor) which affirms or contradicts the statements or claims made by the student in the *introduction* section of the report.

Lab reports must be written in a manner understandable and legible. Grammar is not strictly graded, but complete sentences are required. The lab report (along with the pre-lab plan) ideally should allow the teaching assistant to reproduce the procedure as it was done. Points will be deducted for a lack of effort to communicate scientific details clearly.

Lab report submission in LabFlow requires each of the above sections be entered into a separate text box. Do not upload your entire report as one document or your teaching assistant may not grade some sections.

The results section is automatically graded by LabFlow but your written sections of Details and Observation and Conclusions and Discussion should mention the measured values even if they are listed in the Results area. If you make a change to your results after the due date, your lab report will be marked as late. Turn it in early and if you find out you need to make a correction, you still have time.

## SAFETY AND LABORATORY EQUIPMENT TEST (100 POINTS)

Students must pass a test covering chemical safety before working with chemicals. The safety test can be taken twice for the highest grade. The student must also agree to the Student Laboratory Safety Agreement (SLSA) to receive credit for the test and enter the lab. This test will be available on LabFlow and the SLSA on Canvas.

## LABORATORY ETIQUETTE AND SAFETY SCORE [LESS] (100 POINTS)

Assessment for laboratory etiquette and safety is determined by the instructor, teaching assistant, and lab supervisor based on the written observations of the student's compliance to the safety agreement, lab cleanliness, recitation attendance, and proper waste disposal.

#### KNOWLEDGE TRANSFERENCE CHECK (200 POINTS)

In class assignment given 12:30 pm, Friday, June 20, 2025. The questions will be free responses based on topics covered this semester and pre-requisite courses. Students may use a calculator. Students with alternative testing recommendations from the ODA should schedule time in the ODA testing center.

#### SECTION SAFETY CREW (BONUS 40 POINTS)

To promote a culture of safety in the organic laboratory, a volunteer section safety crew will be assigned to each module on the first laboratory meeting for the semester. Students may volunteer for more than one module but will not receive more than 40 points for the semester. The safety crew must stay in the laboratory until the last student has completed the procedure and follow all safety rules while in the lab. The safety crew will work with the teaching assistant and lab staff to correct minor safety and etiquette issues left by other students.

#### SPOT SURVEY (BONUS 40 POINTS)

The instructor and teaching assistants value students' opinions and feedback on this course, the laboratory, and teaching methods. Anonymous online surveys of students' perception of the teaching provided by Dr. Browning and teaching assistant will be towards the end of the semester. If greater than 70% of students enrolled in CHEM 3210 participate in the SPOT survey, 40 points will be added to all students' cumulative points before averaging.

Students should not send "proof" that the SPOT survey was completed to the instructor or teaching assistants. Dr. Browning can see the number of students participating during the survey but can't see the results or responses until after the semester ends.

## MODULES AND SCHEDULE

Full laboratory schedule is available on Canvas. The file "Lab Schedule and Due Dates for Spring 2025" is located in the Syllabus module.

Module number	Module name	Learning Objectives (Students will understand...)
1	Oxidation of Alcohols	<ul style="list-style-type: none"><li>• Green chemistry and the selection of reagents in the lab</li><li>• Steam distillation and "salting out"</li><li>• Qualitative analysis of aldehydes and ketones using IR and NMR</li></ul>
2	Grignard Reduction of Carbon Dioxide	<ul style="list-style-type: none"><li>• Handling air and water sensitive reactions</li><li>• Safe handling of peroxide formers and strong reducing agents</li><li>• Purification of organic products with acid-base liquid extraction</li></ul>
3	Thermodynamics of the Diels-Alder reaction	<ul style="list-style-type: none"><li>• Reversible reactions and self-dimerization</li><li>• Stereospecificity of the Diels-Alder reaction</li><li>• Hydrolysis and dehydration of anhydrides</li><li>• Nuclear Magnetic Resonance (1-D NMR, 2-D NOESY, 2-D COSY)</li></ul>
4	Acylation by Electrophilic Aromatic Substitution (EAS)	<ul style="list-style-type: none"><li>• Substituent effects in reaction rates in EAS</li><li>• Aromaticity and catalysts in Freidel-Crafts acylation</li><li>• Purification of organic compounds by column chromatography</li><li>• UV/Vis spectroscopy</li><li>• Introduction to cyclic voltammetry</li></ul>
5	Saponification of Triglycerides	<ul style="list-style-type: none"><li>• Hydrolysis and Esterification</li><li>• Solubility of carboxylates and sulfonates in the presence of cations</li><li>• Environmental impacts of surfactants</li></ul>
6	Coupling of Diazotized Amines	<ul style="list-style-type: none"><li>• Visible absorption of conjugated systems in a pH indicator</li><li>• Acid-base properties of zwitterions</li><li>• Safe handling of amines</li></ul>

## CLASS POLICIES

### ATTENDANCE

Students enrolled in the CHEM 3210 course are responsible for punctual attendance and are expected to be attentive, respectful, and participate. Students that do not attend the preparatory lectures often struggle to complete the planned laboratory procedures safely during the three-hour lab session period. An unprepared student increases the risk of harm to all students working in the lab, puts an unfair responsibility on the teaching assistant, and detracts from other students' learning. Knowledge of safety precautions for specific hazards and proper waste disposal is an essential and necessary part of the organic chemistry laboratory courses.

Students who are absent from more than two lab lectures will be prohibited from entering the laboratory and completing procedures for the remainder of the semester. Failure to complete the procedure will result in a grade of zero for the lab report assignment in that module.

There is no distinction between "excused" and "unexcused" absences, except for religious Holy Days and other absences as required by state law and university-sponsored absences (see UNT Policy 06.039). Students are responsible for requesting UNT policy approved absences from Dr. Browning by email no less than seven days before the expected absence. Requests must include satisfactory evidence to substantiate the reason for the excused absence.

A portion of the Laboratory Etiquette and Safety Score is determined by student attendance. Students that are absent from less than five lab lectures may still incur a point deduction for multiple absences.

### MAKE-UP LABS

Students are expected to attend lab sections at the scheduled time. Missed labs can be attended at another time while the module is still active in the laboratory if space is available. It is the student's responsibility to contact Dr. Browning and the teaching assistant as soon as possible if an absence is inevitable.

Only the due dates for lab reports will be adjusted for make-up labs. Pre-lab assignments must be completed according to their regular due dates to be eligible to request a make-up lab. Students who did not submit a pre-lab plan will not receive an extension on that assignment. Lab reports for rescheduled labs will be given two days to be submitted but will not be accepted late for a grade.

Under most circumstances, students are limited to one rescheduled lab.

There are no online labs. Students are prohibited from using another student's or fabricated data to submit a lab report if they did not attend the lab and attempt the procedures (see Fraud). Don't ask.

## LATE SUBMISSION OF ASSIGNMENTS

Pre-lab plans, quizzes, and lab reports all have due dates.

1. Pre-lab plans must be submitted 24 hours before your scheduled time to attend lab to earn full credit. The pre-lab plan can be turned in up to 24 hours late for 50% credit. The pre-lab plan must be printed to attend lab even if it has not been submitted on LabFlow.
2. Pre-lab quizzes close at midnight the evening before you are scheduled to attend lab. Late submission for pre-lab quizzes can only be granted by Dr. Browning.
3. Lab Reports are due two days after the experiment is performed in the laboratory. Lab reports submitted *more than two days beyond the due date* will not be accepted under normal circumstances. Lab reports submitted within the grace period will receive 75% credit on the late submission. Lab reports for make-up labs will not be accepted late.

## REDOING ASSIGNMENTS

After a grade has been assigned, students should read the feedback given and follow that feedback on future assignments. The TA team will not re-grade any assignments.

## GRADE DISPUTES

Grade disputes will only be handled during office hours. Disputing a grade does not mean a student will receive the outcome they desire.

## FRAUD

Students submitting lab reports for modules for which they did not attend will lose all bonus points awarded for the semester, lose all points for the module, lose 50% of the Laboratory Etiquette and Safety Score, and be reported to the Office of Academic Integrity.



## REQUIRED STATEMENTS

### ACADEMIC INTEGRITY STANDARDS AND CONSEQUENCES

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

### ADA ACCOMMODATION STATEMENT

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website at <https://studentaffairs.unt.edu/office-disability-access>. You may also contact ODA by phone at (940) 565-4323.

### COURSE SAFETY PROCEDURES

Students enrolled in CHEM 3210 are required to use proper safety procedures and guidelines as outlined in UNT Policy 06.038 Safety in Instructional Activities. While working in laboratory sessions, students are expected and required to identify and use proper safety guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that the UNT is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider obtaining Student Health Insurance. Brochures for student insurance are available in the UNT Student Health and Wellness Center. Students who are injured during class activities may seek medical attention at the Student Health and Wellness Center at rates that are reduced compared to other medical facilities. If students have an insurance plan other than Student Health Insurance at UNT, they should be sure that the plan covers treatment at this facility. If students choose not to go to the UNT Student Health and Wellness Center, they may be transported to an emergency room at a local hospital. Students are responsible for expenses incurred there.

### EMERGENCY NOTIFICATION & PROCEDURES

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas LMS for contingency plans for covering course materials