ORGANIC CHEMISTRY LABORATORY I (CHEM 3210)

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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-week modules focusing on ten topics to achieve the learning objectives. Students attend the laboratory alternating weeks to perform and collect data from the planned procedure. The week between, students work with the instructor, teaching assistants, and peers to plan for the next weeks procedure, report the results of the previous week, read the assigned preparatory material, and complete a quiz successfully. All assignments are submitted electronically through Canvas.

Students are assigned to group A or B on the first day 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 spaces so laboratory etiquette and safety can be tracked over the semester.

The instructor provides a weekly pre-recorded 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.

Teaching assistants will assist students in the laboratory to complete the planned procedure but students are expected to have completed all pre-lab assignments successfully the day prior to entering the lab. Due to the safety concerns in this laboratory course, students failing to complete all 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.

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 Z78+ 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.

The book *Macroscale and Microscale Organic Experiments* by Kenneth L. Williamson and Katherine M. Masters is highly recommended.

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

Teaching assistants and the instructor will provide students with graded lab reports with feedback through Canvas LMS one week after the due date for the lab report. 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/procedure grade will be available as soon as possible after the experimental procedure is completed.

Point distribution for assignments:

Safety 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
Total	1400
Bonus for section safety crew	+50
Bonus for SPOT evaluations	+50

Students not permitted in the laboratory because an acceptable pre-lab plan/procedure was not submitted will receive zero points for the lab report in that module.

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

Each module will contain three graded components

1. Pre-lab quiz due one day before 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 one week after attending laboratory for the experiment.

Exact due dates will be on syllabi for individual sections.

PRE-LAB QUIZ (50 POINTS)

A ten-question multiple choice quiz must be completed on Canvas LMS successfully one day 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 one attempt to complete the quiz. The time limit for the quiz will be based on three minutes per question. Students can use any reference materials available on Canvas, excluding the work of other students. A practice quiz will be available within each module. This practice quiz can be taken as many times as desired and has no time limit.

PRE-LAB PLAN/PROCEDURE (50 POINTS)

Concise and understandable *stepwise* instructions the student plans to perform in the laboratory must be submitted through Canvas LMS one day prior to attending the laboratory to conduct the experimental procedure. A detailed set of instructions for the procedure will be provided by the instructor on Canvas. Students are expected to read and condense these directions. 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 expected to print this plan before their assigned lab starts to use as a guide. Students who do not submit an approved *stepwise* 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, a bond-line formula (if needed), potential hazards, and disposal information.

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

Clarity	10
Stepwise	30
Submitted >24 hrs before lab	10

LAB REPORT (100 POINTS)

A report of laboratory activities must be submitted one week 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. (TITLE) The title of the report, the students name, the dates on which the procedure was completed and the report submitted and your lab section number.
2. (INTRODUCTION) A brief introduction to the procedure which includes a short description of the procedure, 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.
3. (DETAILS AND OBSERVATIONS) 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 written description of what was observed as the procedure occurred. First or third person is acceptable. Past tense is required. Passive voice is preferred.
4. (RESULTS) A data table summarizing all numerical observations reported in the observation section.
5. (CONCLUSIONS) 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 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.

The points distribution for each section of the lab report is in the table below.

Title	10
Introduction	20
Details and Observations	40
Results	10
Conclusions	20

SAFETY TEST (100 POINTS)

Students must pass a test covering chemical safety before entering the laboratory. The safety test can be taken twice for the highest grade. The student must also agree to the Student Laboratory Safety Agreement to receive credit for the test and enter the lab. This test and agreement will be available on Canvas LMS.

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, and proper waste disposal.

SECTION SAFETY CREW (BONUS 50 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 up to two modules but will not receive more than 50 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. Good safety crews work to ensure that all students in their section receive the full LESS point value and the students entering the lab after have a safe and clean environment to work in.

SPOT EVALUATION (BONUS 50 POINTS)

The instructor and teaching assistants value students' opinions and feedback on this course, the laboratory, and teaching methods. Anonymous online evaluations of the instructor and teaching assistant will be towards the end of the semester. Students should send confirmation to the teaching assistant to claim these bonus points.

MODULES AND SCHEDULE

Schedules for each section will be available in the syllabi for their respective sections. Below is the general schedule for all CHEM 3210 sections organized by modules and learning objectives. Laboratories will meet beginning the first week of the semester and end one week before pre-finals days to allow time for lab report submissions.

Module number	Module name	Learning Objectives (Students will understand…)
1	Three Physical Properties of Organic Compounds	• Intermolecular forces in solvation and crystallization • Intermolecular forces relating to the stability of pure and impure solids. • Use of the Mel-Temp apparatus and preparation of capillary tubes. • Safe handling and disposal of organic solvents.
2	Solubility and Polarity of Organic compounds	• Miscibility of solvents and liquid-liquid extraction • Dangers of handling chlorinated solvents • Qualitative analysis of purity by thin-layer chromatography
3	Acid-Base Extraction	• pK_a in acid-base extractions • Dangers of handling corrosive solutions • Solubility of weak acids and their ionic salts • Qualitative identification of carboxylic acids
4	Separation of Volatile Organic Compounds	• Separation of two volatile liquids by distillation • Dangers of heating flammable solvents • Theoretical plates in chromatography • Separation of substances by gas chromatography
5	Acid Catalyzed Dehydration of Alcohols	• Elimination by acid catalyzed dehydration • E1 vs E2 mechanism • Dangers of peroxide formation and strong oxidizers • Qualitative identification of pi-bonds and alcohols
6	Dibromination of an Asymmetrical Alkene	• Stereospecificity of alkene dibromination • Fischer projections • Qualitative analysis of organic compounds by proton-NMR

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.