SPRING 2020, Chemistry 3210: Organic Chemistry Laboratory I

COURSE & INSTRUCTOR DETAILS:

LAB LECTURE:

3210.002 Wednesday 2.00 – 2.50 pm. (LIFE A 117)

INSTRUCTOR: Dr. Sreekar Marpu
OFFICE: Chemistry Building, Room 371
E-MAIL: sreekarbabu.marpu@unt.edu
OFFICE HOURS: Monday: 10.00 am to 12.30 pm; Tuesday: 10.00 am to 11.00 am or by appointment.
PHONE: 940-565-4850

A. UNT REQUIREMENTS:

MUST HAVE HAD OR BE CONCURRENTLY REGISTERED IN CHEM 2370. MUST ALSO BE ENROLLED IN A CHEM 3210 LAB.

B. LEARNING OBJECTIVES:

Objectives of this course include:

Providing a foundation of organic chemistry skills and techniques for students considering advanced studies in chemistry or medical fields or other life sciences.

After completing the course, the students are expected to:

Correlate and apply some of the theoretical concepts learned during the CHEM 2370 course.
Understand different types of physical properties of matter and their significance in organic chemistry.
Understand and perform at least five different organic experiment skills that are extensively utilized in organic labs.
Perform simple organic chemical reactions following a written experimental procedure.
Understand the methodology and rules for writing a chemistry lab report, able to write a lab report on their own.
Realize the significance of working in groups in the lab.
Understand guidelines for working safely in a chemical/organic lab.
Get prepared for more vigorous CHEM 3220 labs.

C. TEXTBOOK(S):

Recommended Reading: "Macroscale and Microscale Organic Experiments," 6th or 7th Edition,
Kenneth L. Williamson and Katherine M. Masters
Any format of the textbook is acceptable for the course.
All the information required for performing the experiments in the lab will be provided by the instructor in the form of handouts and lab lectures. Any missing information can be obtained from openly available online resources.
No special lab notebooks are needed, students can use regular plain white paper notebooks for writing the reports.

D. LAB LECTURES DESCRIPTION:

	TOPIC	DESCRIPTION
1	**Melting Point (MP)**	Understanding the concept of melting point in organic chemistry, determining the MP of known substances, mixtures and determining the unknown from the MP values. The lab lecture and lab will also help to understand the significance of MP in daily applications.
2	**Recrystallization**	The understanding of the recrystallization technique in organic chemistry. Performing a recrystallization technique using a single solvent and dual solvent methods.
3	**Thin Layer Chromatography (TLC)**	The understanding of the TLC technique in organic chemistry. Performing TLC of analgesics and other colored pigments. The lecture and lab will help to understand and differentiate organic substances based on polarity. Using TLC the students will identify the unknown from a mixture of compounds.
4	**Sublimation**	Introducing concepts of sublimation, understanding the significance of sublimation in daily applications. Performing sublimation of known and unknown substances.
5	**Distillation**	The lab lecture and the labs will introduce the students to the concepts of distillation technique and types of distillation. The labs will also help to understand how different types of distillation are performed in an organic lab.

		Perform simple and fractional distillation, separate and analyze a mixture of solvents by both simple and fractional distillation.
6	**Liquid-Liquid Extraction**	Understand concepts of extraction, perform liquid-liquid extraction based on acid-base chemistry. The lab lecture and the labs will emphasize on differentiating organic compounds into acids and bases and the process to separate them as needed in an organic reaction. At the end of the labs, the students will be in a position to separate an acid and a base from a mixture.
7	**Extraction and Sublimation**	The students will learn the application of both extraction and sublimation techniques in one laboratory for extracting and purifying Caffeine, a well- known natural product.).
8	**Nucleophilic substitution reactions of alkyl halides.**	The labs will provide a perfect opportunity to perform and understand one of the important organic reactions taught during the 2370 course. Until this point, the lab lectures and the labs are focused on teaching and training students on different organic techniques that are helpful to perform different organic reactions in a lab setting.
9	**Alkenes from Alcohols**	An important organic reaction, the conversion of an alkene to alcohol will be performed in the lab. The lab will also provide an opportunity to understand the significance of reagents and identification tests in organic chemistry.
10	**Bromination of Cinnamic Acid**	An important stereospecific reaction will be performed and the stereospecific product will be analyzed. The experiment 9 and 10 will introduce the concepts of "yield" of a reaction, providing an opportunity to understand the significance of theoretical and experimental yields in an organic reaction.

NOTE: Any minor changes in the syllabus will be updated immediately. Check announcements on Canvas

E. SAFETY:

Texas State Law and common sense require eye protection in the form of goggles for all persons in academic chemical laboratories. Along with eye protection, all other laboratory safety guidelines that are listed in the item "R"- "**New Safety Rules Fall 2019"** will be strictly enforced. TA's and Laboratory Supervisors have the right to ask the students to leave the lab with a "0" grade for disobeying or not following any of these rules or guidelines. **PERSISTENT OFFENDERS WILL BE DROPPED WITH "WF". Please see the list of guidelines at the end of this document.** The instructor will discuss these rules during the first recitation/lecture.

NOTE: Students will have to sign the "New Safety Rules Fall 2019" form before they begin their labs. Please do not hesitate to ask the lab TA or the instructor any questions related to safety and good lab practices.

F. ODA STATEMENT

DISABILITY:

The University of North Texas makes reasonable academic accommodations for students with disabilities. **Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility.** If a disability is verified, the ODA will provide an accommodation letter that is delivered to the instructor on record directly. Students are welcome to discuss with the faculty regarding specific needs in a course. You may request accommodations at any time, however, **ODA notices of 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at http://www.unt.edu/oda. You may also contact them by phone at 940.565.4323. Please talk to the instructor or the TA for any further questions.

G. ATTENDANCE POLICY:

Lab-Lectures (also called lab recitations) and Labs: Required!

The lab-lectures are designed to help you understand not only the procedural details of the scheduled experiments but also the theoretical principles underlying the experimental design. **You are required to attend all scheduled lab-lectures**. It is your responsibility to contact the instructor for your absence(s).

One excused absence is allowed without penalty for both labs and lectures. Please contact the instructor and the TA immediately for more than one excused absence(s).

Shifting lab sections or Makeup Labs: Only 20 students are allowed in each laboratory, students are not recommended to switch lab sections to cover for missing labs. Only under extreme situations, switching lab sections is allowed with permission from the current TA and the TA of the new lab section. **There are no makeup labs!!!**

Acceptable reasons for missing an experiment or lab lectures include:

1. Active military service, including travel for that purpose
2. Illness or other extenuating circumstances - please submit the necessary documentation as requested by the TA.

3. Religious holy day – please reach out and inform the instructor and Lab TA in advance
4. Participating in an official University function
5. Pregnancy and parenting under Title IX
6. When the University of officially closed by the President

Please check the https://policy.unt.edu/sites/default/files/06.049_CourseSyllabiRequirements_2017_0.pdf for more details.

Turn in the documentation for the missed laboratory to the TA or the instructor as soon as possible (within a week of the missed lab). For individuals with a single excused absence, the total possible points in the laboratory will be adjusted appropriately to reflect the one excused absence. For students with more than one excused absence, please discuss this with your TA.

Shifting Labs or Make-up Labs: Only 20 students are allowed in each laboratory, students are not recommended to switch labs. Only under extreme situations, switching labs is allowed with permission from the current TA and TA of the new lab section. **There are no makeup labs!!!**

H. BEHAVIOR POLICY

- Students cannot come to the lab more than **10 minutes late**, students coming late more than once will be asked to leave with "0".
- You are not allowed to work alone (in the absence of TA) in the lab. Follow all safety rules with no exceptions.
- Disruptive students will be asked to leave and will receive a 0 for that week's lab
- Disruptive behaviors include:
    - Cell phone use (games.)
    - "Horseplay" or running in the lab
    - Not following TA instructions
- Please check the "Safety Rules Agreement" and "Safety Tool Kit" documents for additional details on safety and behavior in the lab.

Be punctual: If you arrive late, you will miss the instructions given by your TA at the beginning of the lab period, which may lead to unnecessary confusion as well as unsafe work. Reagents will only be available for the indicated week. If you must miss a lab, contact your TA as soon as possible. Reports for missed labs will not be accepted - your TA will explain how you might earn partial credit for completing pre-lab component and post-lab questions for the missed experiment.

The students will receive a "0" if late to the lab by more than 10 minutes. Can turn on the prelab for partial credit during the first incident. Students showing up late for more than one occasion will receive a "0".

Under special situations, TA's can allow students with partial credit. "TA's discretion".

I. GRADING:

Teaching Assistants will enter grades on Canvas under the course page for labs. The TA's are expected to update the grades on the Canvas for every 2 weeks. It is the responsibility of the student to regularly check for consistency of grades and report to the TA for any inconsistencies. Students are advised to report to the instructor regarding any delays in the grading of their lab reports. Please wait for at least 2 weeks before complaining to the instructor or talk to your TA first.
Your grade will be determined entirely by your performance in the laboratory and quizzes. This semester 10 laboratory experiments and three quizzes. The 300 total points in the laboratory are broken down as follows:

10 Experiments	**Possible Points = 10 x 20 = 200**
3 Quizzes (one safety, two-take home)	**Points Possible = 20 x 3 = 60**
TA Assessment of Safe Laboratory Practices	**Points Possible = 10**
Total:	**= 270**
90 – 100 % of the total points	Grade = A
80 – 89 % of the total points	Grade = B
70 – 79 % of the total points	Grade = C
60 – 69 % of the total points	Grade = D
Below 60 %	Grade = F

The additional bonus points for recitation, labs, and quizzes are at the instructor's discretion.

QUIZZES: Quiz 1 is a safety quiz that deals with aspects of general lab safety and the location of various safety items in the organic laboratory. You may not begin your experimental work for the course unless you have satisfactorily completed the safety quiz. The hard copy of the Quiz 2 and 3 will be handed over to the students.

J. **LAB REPORTS: MANDATORY!** DETAILS FOR WRITING THE LAB REPORT ARE INCLUDED IN A SEPARATE DOCUMENT.

K. TENTATIVE SCHEDULE FOR LAB LECTURES AND LABORATORY EXPERIMENTS

EXPERIMENT (Page numbers on both editions of the manual)	*Lab Lecture - Wednesdays*	*Experiment Dates for (Friday Sections)*	*Experiment Dates for (Monday and Tuesday Sections)*
Week of Jan 13th, No Lab Lecture, No Labs			
Check-In, Safety *Passing a safety quiz with 70% points is mandatory before starting any experiments in the lab. Any additional information required for completing the safety quiz will be provided by the TA in the labs.*	**January 22** *Quiz #1, safety quiz - will be given.* *If absent to the first lecture, reach out to the TA for the safety quiz – 2 points will be deducted.*	**January 24** *Quiz #1 Due*	**January 27 and 28** *Quiz #1 Due*
EXP 1: Melting Point 3.2: Melting Points of Pure Urea and Cinnamic Acid 3.3: Melting Points of Urea - Cinnamic Acid Mixtures 3.4: Identification of an Unknown pp. 48-55/48-55	**January 29**	**January 31** .	**February 3 and 4**
EXP 2: Recrystallization 4.5: Recrystallization of Benzoic Acid from Water and Solvent Pair (water-methanol). pp. 79-81/80-82	February 5	February 7	February 10 and 11
EXP 3: Thin Layer Chromatography: 8.1**:** Analgesics, Identification of Unknown. pp. 175-177/176-178 **OR similar compounds**	February 12	February 14	February 17 and 18

EXP 4: Sublimation: 6.3: Sublimation, Identification of an Unknown Substance by Sublimation. pp. 125-128/127-130	February 19	February 21	February 24 and 25
EXP 5: Distillation Separation of Cyclohexane: Toulene mixture by Distillation 5.4: Simple Distillation. 5.5: Fractional Distillation. pp. 92-95/93-96 (macro distillation will be performed)	March 4 *(Quiz #2 will be given)* *If absent to the lecture, reach out to the TA for the quiz – 2 points will be deducted.*	March 6	March 16 and 17
UNT SPRING BREAK – WEEK OF MARCH 9th – NO LAB LECTURE, NO LABS			
EXP 6: Liquid-Liquid Extraction 7.3: Separate a Binary Mixture by Liquid-Liquid Extraction Based on their Acid/Base Properties (Handout)	March 18	March 20 (*Quiz #2 Due).*	March 23 and 24 (*Quiz #2 Due).*
EXP 7: Extraction and Sublimation 7.2.6: Extraction of Caffeine from Tea pp. 155-157/156-158	March 25	March 27	March 30 and 31
EXP 8: Nucleophilic substitution reactions of alkyl halides. 17.1: Sodium Iodide in Acetone. 17.2: Ethanolic Silver Nitrate Solution. pp. 323-324/325-326	April 1	April 3	April 6 and 7
EXP 9: Alkenes from Alcohols19.1: Preparation of Cyclohexene from Cyclohexanol pp. 335-336/ 337-338	April 8	April 10	April 13 and 14

EXP 10: Bromination of Cinnamic Acid: Stereospecific Bromination of trans-cinnamic acid to 2,3-Dibromo-3-phenylpropanoic acid (Handout) **Checkout**	April 15 *(Quiz #3 will be given, if absent to the lecture, reach out to the TA for the quiz – 2 points will be deducted.*	April 17 (perform the experiment and check out)	April 20 and 21 (perform the experiment and check out)
Quiz # 3 and experiment 10 reports are due in one week. Both the documents can be submitted at the same time to the TA (in office). TA's will finalize the grades and submit the final grades to the instructor the week of May 4th.			

Any changes in the syllabus and grading due to chemicals availability, success, and progress of the reactions will be immediately updated.

Any changes to the syllabus will be updated by the instructor

L. EMERGENCY NOTIFICATION & PROCEDURES

UNT uses a system called Eagle Alert to quickly notify you 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). The system sends voice messages (and text messages upon permission) to the phones of all active faculty staff and students. Please make certain to update your phone numbers at http://www.my.unt.edu. Some helpful emergency preparedness actions include: 1) know the evacuation routes and severe weather shelter areas in the buildings where your classes are held, 2) determine how you will contact family and friends if phones are temporarily unavailable, and 3) identify where you will go if you need to evacuate the Denton area suddenly. In the event of a university closure, labs scheduled during that time are excused absences in addition to the one dropped lab.

M. ACADEMIC INTEGRITY EXPECTATIONS AND CONSEQUENCES (UNT POLICY 06.003)

UNT promotes the integrity of learning processed and embraces the core values of trust and honesty. Academic integrity is based on educational principles and procedures that protect the rights of all participants in the educational process and validate the legitimacy of degrees awarded by the university. In the investigation and resolution of allegations of student academic dishonesty, the university's actions are intended to be corrective, educationally sound, fundamentally fair, and based on reliable evidence. Please see the document for more details. https://policy.unt.edu/sites/default/files/06.003.pdf

N. STUDENT PERCEPTION OF TEACHING (SPOT)

Student feedback is important and an essential part of participation in this course. The Student Perception of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available at the end of the semester to provide you with an opportunity to evaluate how this course is taught.
Extra credit: TA may give up to 5 points extra credit for completing the SPOT online evaluation form.

O. SUCCEED AT UNT

UNT endeavors to offer you a high-quality education and to provide a supportive environment to help you learn and grow. And, as a faculty member, I am committed to helping you be successful as a student. Here's how to succeed at UNT: **Show up. Find Support. Get advised. Be prepared. Get involved. Stay focused.** To learn more about campus resources and information on how you can achieve success, go to http://success.unt.edu/

P. STUDENT LABORATORY SAFETY AGREEMENT – SEE THE FALL 2019 AGREEMENT ON CANVAS

Q. **HELPFUL VIDEO DEMONSTRATION LINKS**