Chem 325 LABORATORY SYLLABUS Fall 2020

Labs begin Tuesday September 8, 2020 – You must bring goggles (in person), a lab notebook and complete the prelab 1 hour before your lab period.
Those attending in person will be assigned a Lab Room Hood, and Drawer before 9/8/20.

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Lab Section	Day	Time	Room	Instructor
Section 01L1A	Monday	8 AM	CBB 420	Bowling
Section 01L1B	Monday	8 AM	CBB 426	Bowling
Section 01L3	Monday	2PM	CBB 420	Bowling
Section 02L1	Tuesday	11AM	CBB 420	Tanke
Section 01L2A	Wednesday	8 AM	CBB 420	Tanke
Section 01L2B	Wednesday	8 AM	CBB 426	Tanke
Section 02L2A	Thursday	2PM	CBB 420	Tanke
Section 02L2B	Thursday	2 PM	CBB 420	Tanke
Section 01L4/02L3	Friday	11AM	CBB420	Bowling

Objectives To safely perform basic organic chemistry laboratory skills, to maintain a laboratory notebook that legally documents your work, to collect, analyze and interpret data and to write technical reports.

Online Resource for Prelab videos and Quizzes and On-line lab experiences as needed
The Online resource is available for purchase at the UWSP bookstore or directly from Labflow.
Please see the "LABFLOW SignUp Instructions "document in this module.

Lab Activities These will be available on CANVAS. The videos, quizzes and online lab materials will be on LABFLOW. All notebook and report submissions will be on CANVAS.

Notebook You will need a bound laboratory notebook. The pages will need to be numbered; you may buy one with numbered pages or number the pages yourself. Your properly labeled spectral data should saved as or "printed" as a PDF file and uploaded with your lab reports. You will need a camera or scanner to submit your lab notebook.

Goggles **You will need to obtain safety GOGGLES for lab activities. You can help prevent fogging by placing the goggles over the face cloth covering your nose.**

Face Coverings **Must be worn at all times. You must wash your hands with soap and water or use hand sanitizer before and after you use common equipment.**

Attendance In order to develop laboratory skills (not just learn about them) we encourage in person labs. However, we realize these are extraordinary times, so an online experience that will teach you about laboratory techniques is available this semester. Some may choose the on-line option from the start; others may need to adopt it later. Should you become ill, need to quarantine, or feel uncomfortable in lab, you should tell your instructors and move to the online course. You may start the in-person labs and move to online; however, once you begin the online labs, you must remain with the online lab program.

General Laboratory Procedures

Safety in the laboratory is very important. Organic chemicals are often flammable and hazardous. You are encouraged to work in the hoods as much as possible. Specific safety requirements include:

1. **Safety goggles must be worn over the eyes whenever anyone is handling chemicals in the lab.** This includes the seated area.
2. **Close-toed shoes must be worn in the lab.**
3. **Clothing that is worn should cover your entire torso**. Shorts, short sleeve shirts or blouses, etc. permit the possibility of chemicals coming into contact with your bare skin. Either wear "covering" clothing or purchase a lab apron or lab coat. Use gloves when advised or whenever you feel you need to protect your hands.
4. Perform chemical operations in the hood. See procedures for proper hood use below.
5. **Come to class prepared and ask questions.**
6. You may not work in the laboratory outside of the normal class without permission.
7. Keep your work area and common work areas clean. Wash or sanitize your hands before and after using common equipment (like balances, reagent bottles, etc).
8. Report all accidents and spills, however minor. All powders must be disposed in hazardous or non-hazardous waste containers; loose powder in the trash is unacceptable.
9. Neither food nor drink are allowed in the laboratory; this includes the seating area. Should you need to leave the lab make sure any heating source is turned off and let those you pass know you are walking by. Restrooms are across from the elevators and you may fill water bottles at the "filling station" if you need a drink.
10. Headphones are not to be used in the lab. Distractions from phone use lead to accidents. If you must use your phone for personal use (texting included) secure the work area and move to the seated area or out of the lab.
11. Read the safety information (MSDS) of each substance that you use.
12. Anyone with special health considerations (for example pregnancy) should consult with her doctor before participating in this class.
13. Anyone with a pacemaker or known allergies to chemical substances (like latex) should

inform their instructor. Please note that we generally use nitrile (not latex) gloves in lab.

Using a Fume Hood

To minimize exposure to chemical vapors and maximize safety we will perform most chemical operations inside a fume hood. The hood only works if operated properly.

The hood should be closed unless you are performing operations in the hood. (Figure 1). The hood is equipped with an air flow monitor (Figure 2). Should the alarm sound, make certain the hood is placed in the closed position. If the alarm continues, contact your instructor.

Figure 1

Figure 2

Opening the hood There are two ways to open the hood.

1) Raising the sash (Figure 3). This can be used when setting up an experiment but will rarely be used when performing chemical operations. If you raise the sash too far, the hood will alarm, and additional fans will be engaged for several minutes. Also, do not raise the hood unless the side sash openings are closed.
2) Opening the sash side to side (Figure 4). This will be the most common way to work in the hood.

Figure 3

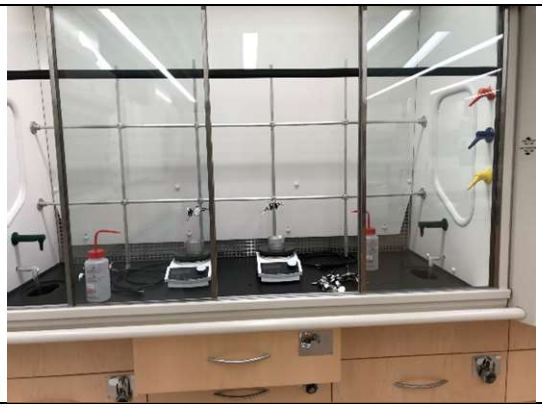

Figure 4

Hood Maintenance

At the end of the lab period, please put away any common equipment in the proper location, clean the hood with disinfection solution, and remove any paper towels, Kleenex and chem wipes from the hood and place them in the trash.

Laboratory Experiments will be graded on the four criteria listed below. The points for each criterion, which vary with each experiment, will be delineated throughout the semester.

- ☺ **Pre-lab -** The pre-lab questions will be graded. Most of the time they will involve an on-line lab flow quiz and a lab notebook entry. **ALL STUDENTS – online and in person- must complete the prelab. They are due one hour before your lab period begins.** There is usually a LABFLOW quiz and often additional prelab questions that may be answered in your lab notebook and uploaded to CANVAS.
- ☺ **Notebook** - A complete notebook is an essential component of any work done in an organic laboratory. See supplemental material on keeping a laboratory notebook. Your laboratory notebook and spectral data will be uploaded with your postlab. For those doing the online labs you will also keep a notebook and receive data most often from LABFLOW but at times through CANVAS.
- ☺ **Characterization** – Data and its proper collection, documentation, and interpretation.
- ☺ **Postlab** - This will vary with each experiment and will often be different for on-line and in person labs.

References

You will cite literature or reference boiling points, melting points, and/ or spectra in your lab notebooks and assignments. Several sources available to you. The following may be useful:

- You may find physical properties and safety information by searching "Compound name" SDS.
- You may also find some spectral data on the Integrated Spectral Data Base System for Organic Compounds: https://sdbs.db.aist.go.jp/sdbs/cgi-bin/cre_index.cgi

Academic Misconduct - I expect you to do your own work. I will enforce University policy if violations such as the following occur.

1. claiming work of others to be your own
2. falsifying laboratory data
3. knowingly assisting others in any of the above

Grade

Your lab grade will be based upon the total points you earn throughout the semester. The lab grade is worth 25% of your final grade for Chem 325. There are 165 points possible, which are apportioned as described in the lab schedule. Anyone not following safety and housekeeping procedures may have points deducted from their lab grade and may be requested to leave the laboratory at any time.

POLICY ON LATE WORK **I hope that you will avoid turning in an assignment late. If you must turn in work late, it will be accepted up to one week late with a 10% grade point penalty. Work handed in more than one week late will generally not be accepted.**

Chem 325 Lab Experiments for Fall 2020 with LABFLOW Details

Everyone whether in person or on-line must complete the prelab 1 hour before their lab period meets. All labs (in person or online) will require photos or scans of your laboratory notebook.

Lab Dates	Prelab Assignment	In person Activity	Online Activity	Assignment due
9/2	Dr Tanke will introduce the lab program with a video on CANVAS	No lab this week but obtain goggles, a bound laboratory notebook and register for LABFLOW.	If online contact instructor, register for LABFLOW and a notebook for notes and calculations	
9/8 - 9/14	Lab begins on Tuesday SAFETY videos (LABFLOW) and Quiz and LABFLOW Video *Performing a Melting Point Determination*	Safety, Check in and Lab 1: Room Specific safety and melting point determination of a pure substance and a mixture.	Lab 1 Melting Points of Compounds and Mixtures	Lab 1 LABFLOW quiz
9/15-9/21	Videos on *Using a Separatory Funnel*, *Working up Reactions with Washes and Extractions, Working up with Drying Agents* and LABFLOW QUIZ AND Prelab questions on in person handout.	Lab 2: Extraction and Crystallization	Lab 2 LABFLOW Extraction of Caffeine	Lab 1 Prelab 2 Day 1 LABFLOW quiz + additional questions
9/22-9/28	Videos on *Performing a crystallization* and *Performing a vacuum filtration* and LABFLOW Quiz.	Lab 2 Continued	LABFLOW on-line post lab for students	Prelab Lab 2 Day2 LABFLOW Quiz
9/29-10/5	Videos on *Working with Ground Glass Joints*; *Performing a Macroscale simple distillation,* and *Preforming a Macroscale Fractional distillation* and LABFLOW Quiz plus question on in person hand out	Lab 3: Parts I and II Distillation	Lab 3 Part I LABFLOW Fractional Distillation Lab	Post Lab 2 LABFLOW quiz and in person questions uploaded to CANVAS

10/6-10/12	Watch the Youtube video on miniGCs: https://youtu.be/e8l9ny745E0?t=31 and answer question on in person handout	Lab 3 Part III Gas Chromatography	Lab 3 Part III – Calculations with provided GC data -Request data	Lab 3 day 2 questions uploaded to
10/13 - 10/19	Watch LABFLOW videos *Running a TLC* and *Interpreting IR spectra* complete quiz and in-person lab questions.	Lab 4: Thin Layer Chromatography and IR spectroscopy of Solids	Complete LAB FLOW Amino Acids Lab AND analyze IR spectra of all Lab 4 in person compounds.	Post Lab 3 LABFLOW Prelab Quiz TLC and IR
10/20-10/26	Watch the LABFLOW Video Interpreting Proton NMR data, complete the Quiz and Lab 5 Prelab Questions.	Lab 5 NMR spectroscopy Lab	LABFLOW Using Nuclear Magnetic Resonance Spectroscopy	Lab 4 due Prelab Lab5
10/27-11/2	Review Labflow videos: *Working up reactions with washes, Working up reactions with drying agents, Performing a crystallization, Performing a vacuum filtration*	Lab 6: Modified lab practical – unknown acid and amine planning **and finish** Lab 5 as needed	Modified lab practical – unknown acid or amine planning	Plan due at end of Lab period
11/3-11/9		Lab Practical	LABFLOW Separation Aniline, benzoic acid and napthalene	Lab 5 due
11/10 - 11/16		Lab Practical	LABFLOW SN2 preparation of Nerolin	
11/17-11/23		Lab Practical wet chemistry needs to be completed this week		
11/24-11/30	No lab	THANKSGIVING		
12/1-12/7	Complete on-line lab exam on Canvas			Lab 6 due and Lab Exam

Activity	**Prelab points**	**Notebook and Post lab Points**
Lab 1	5 (LABFLOW quiz)	10 (in person or online)
Lab 2	5 (LABFLOW quiz) + 2; 5(LABFLOW quiz)	18 (in person or online)
Lab 3	5(LABFLOW quiz) + 2; 3	15 (in person or online)
Lab 4	5 (LABFLOW quiz) + 3	12 (in person or online)
Lab 5	5 (LABFLOW quiz) + 7	8 (in person or online)
Lab Practical Prep	-	5 points for practical plan
Lab practical – in person Online 2 labs Separation and SN2	-	30 points total in person 2 Online labs 15 points each
Lab Exam		30 online
Total Points (165)	47 (Prelab points)	118 (Postlab items and Exam)