

Chem 2543: Organic Chemistry I Lab Syllabus Spring Semester 2020

INSTRUCTOR: Dr. Viktor V. Zhdankin

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office hours: M, W, F 9:30 to 11:00 am or by appointment

TEACHING ASSISTANTS:

Greeshma Kumpati	kumpa002@d.umn.edu	Tu-8 (Sec. 2), W-2 (Sec. 4), Th-11 (Sec. 5)
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TA Office Hours: TBA

LABORATORY TIME: Section 1: 2:00 - 4:50 pm, M, SSB 226
Section 2: 8:00 - 10:50 am, Tu, SSB 226
Section 4: 2:00 - 4:50 pm, W, SSB 226
Section 5: 11:00 - 1:50 pm, Th, SSB 226

COURSE PREREQUISITES: 1152 or 1162 or 1155 and 1156 or 1175 and 1176; must be taken after or concurrently with CHEM 2541

STUDENT LEARNING OUTCOMES:

Upon successful completion of this course students will learn how to carry out basic organic laboratory techniques and to collect and analyze experimental data.

LABORATORY MATERIALS:

“Macroscale and Microscale Organic Experiments” 5th, 6th or 7th Edition by Williamson
Safety Goggles; Bound Laboratory Notebook (Composition type)

COURSE WEB PAGE:

All class handouts are available on the following web page: <http://www.d.umn.edu/~vzhdanki/2541/>.

SCHEDULE OF EXPERIMENTS:

Jan 20-24	<u>Check-in</u> & Safety orientation, Read Chapters 1&2 [Monday, Jan 20, sections will check-in on Monday, Jan 27]
Jan 27- Jan 31	Crystallization, Chapter 4
Feb 3-Feb 7	Melting Points and Boiling Points, Chapter 3
Feb 10-14	Distillation, Chapter 5
Feb 17-21	Sublimation, Chapter 6
Feb 24-Feb 27	Molecular Shapes (Handout; supplementary read Chapter 15)
Mar 2-Mar 6	Extraction: Isolation of Caffeine from Instant Coffee, Chapter 7
Mar 9-13	Spring break, NO LABS
Mar 16-20	Thin Layer Chromatography: Analysis of Analgesics, Chapter 8
Mar 23-27	Column Chromatography: Ferrocene and Acetyl Ferrocene mixture separation, Chapter 9
Mar 30- Apr 3	Nucleophilic Substitution Reactions of Alkyl Halides, Chapter 17
Apr 6-10	Reactions of Triphenylmethyl Carbocation, Chapter 33. Trityl Methyl Ether and Trityl Bromide

Apr 13-24 (Note: 2 weeks) Bromination of Cholesterol, Chapter 20 and Alkenes from Alcohols: Cyclohexene from Cyclohexanol, Chapter 19/Macroscale (First laboratory period: Bromination of Cholesterol and Dehydration of Cyclohexanol; Second laboratory period: Recrystallization of bromination product and distillation of Cyclohexene) & Check-out
Apr 27-May 1 Check-out

NOTE: There is **NO make-up lab** or extra credit option.

Grading:

This organic chemistry lab is worth **300** points.

- **12 Experiments:** 20 points for each lab (20 x 12 = 240 points)
- **10 five-minutes Quizzes:** 6 points for each quiz (6 x 10 = 60 points)

The purpose of the quizzes is to verify that you did prepare for the up-coming experiments of each laboratory session. The quizzes will be given in the first 5 minutes at the beginning of each laboratory session.

General Laboratory Rules and Requirements:

- You **MUST** have a bound laboratory notebook - Composition style.
- You **MUST** have and wear fully enclosing goggles (glasses don't count). If you do not own a pair you can buy them from the stockroom. If you forget your goggles you can rent them from the stockroom. The first time is free and it is \$.50 after that.
- You **MUST NOT** wear shorts, sandals, or nylon type running pants. These offer little protection from chemicals in the event of an accident.
- Don't sit on the lab benches.
- Place your bags and coats on the shelves provided or specified area.
- You are not allowed to eat or drink in the lab.
- For your safety we suggest you wash your hands when leaving the lab.

Keep an informative and NEAT lab notebook. Make sure you:

1. Use a pen.
2. Draw a single line through a mistake. Do not scribble or use whiteout.
3. Keep notebook in column format.
4. Write on one side of the page.
5. Make sure your procedures are complete **before** you begin the lab.

What your notebook should contain:

- I Title and date should be at the top of every lab.
- II Reaction scheme.
- III Lab Partner(s).
- IV Procedure written in your own words (it should be able to be used instead of the book. You should not need your book in lab).
- V Observations: (Very important)
 1. Write down **EVERYTHING** you notice. Color change, precipitate formation, if the solution turns clear, melting point, anything you weigh down, starting weight of material, end weight of product, boiling point, solubility's etc.
 2. Put the changes in the lab here (if you forget to put them in the procedure).
- VI Results: Put data in **tabular format** if possible
 1. Show any and all calculations used, like theoretical yield and percent yield.
 2. Indicate starting weight and ending weights of your starting material and product.
 3. Melting point or boiling point should be stated.

4. Staple or tape IR, NMR and TLC plates in your lab notebook.

The University of Minnesota Duluth policies related to teaching and learning apply for this course. For details see: www.d.umn.edu/vcaa/SyllabusStatements.html

Access for Students with Disabilities: It is the policy and practice of the University of Minnesota Duluth to create inclusive learning environments for all students, including students with disabilities. If there are aspects of this course that result in barriers to your inclusion or your ability to meet course requirements please notify the instructor as soon as possible. You are also encouraged to contact the Office of Disability Resources to discuss and arrange reasonable accommodations. Please call 218-726-6130 or visit the DR website at www.d.umn.edu/access for more information.

Title of the Experiment and Date: (0.5 pt)	
Lab Partner's Name (0.5 pt)	
Chemical Structures, Reaction Scheme/Techniques: (2 pt)	
Draw chemical <u>structures</u> with chemical names, not just the chemical names. If there is no chemical reaction in a certain experiment, explain the technique used in that experiment.	
Materials (Apparatus) used: (1 pts) i.e. the glassware, the instruments	
Procedures: (3 pts)	Observations: (3 pts)
<ul style="list-style-type: none"> * Write down the experimental Procedures in your own words by using the handout as the guideline. * Write point-wise * Using as many pages as you want * You should be able to use this procedure in lab * Draw figures if necessary (on left side) 	<ul style="list-style-type: none"> * Write down everything you notice * Starting weights; end weights; boiling point; melting point; color changes; precipitation formation; gas evolution; physical state changes
Calculations and Results: (3 pts)	
<ul style="list-style-type: none"> * Presenting your data in tabular format, no paragraphs * Need to present your starting materials and end products' weights in this session. * Show all the calculations used, i.e. theoretical yield and percent yield or % recovery. * States the melting points and boiling points if are required during the experiment. 	
Discussion: (6 pts)	
<ul style="list-style-type: none"> * Do not rewrite the procedure here. * Write in paragraph form. * Discuss and interpret your results; compare literature values with your experimental values. * Discuss % yield. Is it low, high? Why? * If something went wrong in the lab for you state what happened and why. Did you forget a step, etc? 	
Cleaning Lab Area (1 pts):	
*Clean up your area and make it usable for the next group.	

Total points: 20

Note: You must have page numbers on each page of your lab notebook. Do not rip out pages from the notebook.