Syllabus for Chemistry 2253, Fall 2019

Wednesdays from 2:00-4:50 PM in Beury 403
OR
Fridays 8:00-10:50 AM in Beury 403

Instructor: Jaskiran Kaur, Ph.D.  Office Hours: Thomas Boller  Coordinator: Robert-André F. Rarig

Required Materials


Student Lab Notebook: Top-bound, duplicate pages, published by Hayden-McNeil (ISBN 978-1-930882-00-3) and available for purchase at the Temple University Bookstore. (You can use the same notebook you used for gen chem if there’s room)


Eye Protection: Safety glasses or safety goggles that meet the ANSI Z.87.1 1989 requirements are available for purchase at the Temple University Bookstore, or through TUCS (228 Beury).

Course description: This course provides an introduction to laboratory techniques in organic chemistry with emphasis on learning to prepare, separate, purify, and analyze (characterize) organic compounds. The student will learn experimental techniques in organic chemistry while working with small amounts of materials. Knowledge of stoichiometry (including determination of limiting reagents), solution preparation, volume measurement, temperature measurement, and the proper use of a balance are assumed.

Course objectives: Upon completion of this laboratory course, it is expected that students will have learned to:

- Work safely in the laboratory.
- Maintain a laboratory notebook.
- Learn basic laboratory techniques such as extraction, recrystallization, reflux, fractional distillation, and gas chromatography.
- Work effectively with small amounts of material.
**Lab Instructors:** Your section will be under the direction of an instructor/graduate TA or the lab coordinator. The instructors will provide a pre-lab lecture each week as well as assistance and advice during the course of each experiment. The instructors will monitor pre-lab notebook preparations, grade lab reports, and enforce the departmental and University safety guidelines. Finally, the instructors will schedule office hours each week for help with pre-labs and/or lab reports.

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**Course policies**

**Academic integrity:** Integrity is a crucial part of the academic experience, and students are expected to adhere to the highest standards of academic honesty. Collaboration and discussion are encouraged, but **you are responsible for writing in your own words.** You are expected to work independently on exams and quizzes. Cheating of any kind will not be tolerated and will result in a score of zero on the assignment(s) in question, and/or a failing grade in the course. Please read carefully the Academic Integrity document posted on Canvas and the Student Code of Conduct for more information:

http://policies.temple.edu/getdoc.asp?policy_no=03.70.12

**Attendance:** Students are expected to attend all laboratory meetings, to arrive on time, and to be prepared to perform the scheduled experiment. Students are required to attend their registered laboratory section at the scheduled time. If you arrive more than 15 minutes late, you may not be admitted. **Please inform both your lab instructor and the lab coordinator of any attendance issues as soon as possible.**

**NOTE:** Due to the experimental nature of this course, it is essential that students are present for each lab meeting. A missed lab imposes a much more significant limitation on student learning than a missed lecture. One lab comprises a larger percentage of the overall course than one lecture, and there is simply no way to replace the **hands-on learning experience.** Completing a lab report with borrowed experimental data, for instance, offers substantially diminished educational value.

**Make-up Policy:** Make-up labs will be granted under a very limited and specific set of circumstances only. Otherwise, score of zero will be recorded for any missed labs or quizzes. Student athletes and other students with legitimate absences will be accommodated **only if the planned absence is brought to the attention of the lab coordinator well in advance (at least one week).**

**Canvas:** You are responsible for the information posted on the Canvas course site. Course documents such as the syllabus, safety guidelines, lab notebook guidelines, and supplemental laboratory experiment information will be posted on Canvas. Any general course announcements will also be posted on Canvas.

**Electronic Devices:** The use of graphing and/or programmable calculators, PDAs, and cell phones is strictly prohibited when taking quizzes and exams.
**Withdrawals**: A withdrawal is an institutional procedure that is not complete until the withdrawal form has been signed and submitted to the Registrar's office. Details of the Temple University Policy (#02.10.14) on Withdrawal may be found at http://policies.temple.edu/getdoc.asp?policy_no=02.10.14.

**Incompletes**: An incomplete is only given in accordance with institutional procedures. An incomplete will not be assigned until the specific requirements are met (an incomplete is NOT a means to circumvent course policies for make-up labs and lab report due dates) and the appropriate forms have been signed and approved by the Dean's Office. Details of the Temple University Policy (#03.12.13) on Withdrawal may be found at http://policies.temple.edu/getdoc.asp?policy_no=02.10.13. Note that even if the specific requirements are met, assignment of an incomplete in this laboratory course is severely limited by the fact that performing make-up labs in future lab sections is NOT a viable option.

**Disabilities and Services**: Students who think they may need accommodations in this course due to the impact of a learning, physical, or psychological disability are encouraged to meet with Dr. Rarig privately early in the semester to discuss their concerns. In addition, students must contact Disability Resources and Services (DRS) in 100 Ritter Annex (215-204-1280) as soon as possible to verify their eligibility for reasonable academic accommodations. Early contact will help to avoid unnecessary inconvenience and delays.

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**Laboratory**: Before coming to lab, students are required to have done the following:

- Dress appropriately in accordance with safety guidelines.
- Bring safety glasses or goggles that are in accordance with the specified regulations Read the introduction, procedure, and any other relevant sections of the textbook or supplemental materials for the experiment to be performed.
- Construct an appropriate pre-lab write-up in your laboratory notebook.
- Completed the post-lab questions for the previous week’s experiment, to be handed in to your lab instructor at the beginning of the lab period.
Laboratory Safety

Students are required to conduct themselves in a professional and safe manner at all times. Failure to do so will result in immediate dismissal from the lab. In order to comply with Federal laws and regulations, students are required to dress appropriately for lab and wear specified personal protective equipment. **Students who come to lab without safety glasses or dressed improperly will not be permitted to work in the lab.**

All students MUST wear a pair of ANSI Z87.1 approved **safety glasses or goggles** the entire time they are in the laboratory. It is your responsibility to bring them to lab as “loaners” are not available.

**Long pants MUST be worn.** Shorts and skirts are not permitted in the lab at any time. Arms should be covered to the elbow and midriffs should not be exposed. A full-length lab coat or apron must be worn for most experiments (provided in lab).

**Shoes that cover the entire foot should be worn.** Sandals, clogs, open-top, or open-toe shoes are not permitted in the lab at any time.

**Lab safety guidelines** will be discussed in more detail during the first lab meeting, and relevant information will be stressed before each experiment. You are required to complete a safety quiz by the end of the second week of classes. For more specific information, please read carefully the Lab Safety and Waste Disposal documents posted on Canvas.

**Chemical Hygiene:** Neatness and cleanliness are important components of laboratory safety. You are responsible for the cleanliness of your work area. The entire lab section is responsible for the cleanliness of the entire lab (balances, sinks, fume hoods, etc.). Lab grades of individuals or the entire class may be lowered if issues with cleanliness are consistently observed. For more specific information, please read carefully the Chemistry Lab Best Practices document posted on Canvas.

Assignments and Exams

**Reading:** Assigned reading from the laboratory textbook and/or supplemental materials shown in the lab schedule must be completed before the beginning of each lab period. Please consult Canvas for additional information while preparing for each experiment. To ensure a safe and productive lab experience, **it is critical that students read and understand the manipulations that will be performed before beginning an experiment.**

**Pre-Labs:** In addition to reading carefully the experiment, your pre-lab preparations will include entering a pre-lab write-up in your laboratory notebook, the carbon copy of which you will hand in before lab begins. **If you have not completed a pre-lab write-up you will not be allowed to start the lab.**
Lab Notebooks: Each student must bring a suitable notebook to lab each week. You will prepare a pre-lab section in your notebook for each experiment and record data and observations during each experiment. You will hand in a copy of your completed notebook pages each week, and your lab instructor may ask to review your lab notebook at any time. See the Lab Notebooks document in Canvas for more information.

Lab Reports (Post-Labs): Post Lab Questions/Exercises are due one week after an experiment is completed, at the beginning of the next lab period. After that time, a penalty of 5 points will be deducted from your score for each 24-hour period (including weekends), or portion thereof, that the report is late (so, starting from the beginning of your lab period, until 24 hours later, 5 points will be deducted, etc.). **Late lab reports should be delivered directly to your instructor.** If you are unable to deliver the report directly and leave it in a mailbox or under an office door, then you must notify your instructor of this circumstance, but you are responsible should the report be lost or delayed. Do not assume that your TA will check their mailbox regularly. In calculating your final grade, the lowest lab report score (zero is a score) will be dropped. **You are responsible for adhering to all academic integrity policies of this course when writing lab reports.**

When is the post-lab exercise due in case of a missed lab?: If you do not attend a lab period or are approved for a make-up lab, your lab report is still due as scheduled (an extension is not automatically granted for a missed lab). Options for submitting on time include scanning and emailing to your instructor, or asking a fellow student to hand it in. **Any requests for an extension must be made directly to the lab coordinator and must include appropriate documentation.**

Final Exam: A lab final exam will be given on the last scheduled meeting of lab. This exam is intended to assess your comprehensive knowledge of the experiments performed throughout the semester.

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**Grading**

9 Pre Lab Write-ups ........................................ 15 points each......drop your lowest..................120 points
9 Notebook Entries ....................................... 20 points each........drop your lowest ..............160 points
11 Post Lab Problem Sets .............................. 25 points each......drop your lowest ..............250 points
9 techniques............................................... 2 points each........drop your lowest ..............16 points
Final Exam..........................................................104 points

Total Points Possible..........................................................650 points

Grading cutoffs: The worst grade you can earn with the following course percentages are as follows: 100%-90% (A-); 89%-80% (B-); 79%-70% (C-); 69%-60% (D); <60% (F).
<table>
<thead>
<tr>
<th>Date</th>
<th>MCAT Content Category</th>
<th>Experiment</th>
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<tbody>
<tr>
<td>Aug 28/30</td>
<td>N/A</td>
<td>Course Overview, Safety Guidelines, Check-in</td>
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<tr>
<td>Sep 04/06</td>
<td>5C (Extraction)</td>
<td>Partition Coefficient; Separatory Funnel Extraction I (4A &amp; 4B : 60-70 &amp; 122-127)</td>
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<tr>
<td>Sep 11/13</td>
<td>5C (Extraction)</td>
<td>Separatory Funnel Extraction II (4C : 60-70 &amp; 128-127)</td>
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<td>Sep 18</td>
<td>5C (S&lt;sub&gt;N1&lt;/sub&gt; or S&lt;sub&gt;N2&lt;/sub&gt;)</td>
<td>Dry Lab: Predicting S&lt;sub&gt;N1&lt;/sub&gt; vs. S&lt;sub&gt;N2&lt;/sub&gt; vs. E1 vs. E2</td>
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<tr>
<td>Sep 25/27</td>
<td>5C (Distillation)</td>
<td>Fractional Distillation &amp; Gas Chromatography (3B : 54-59 &amp; 118-121)</td>
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<td>Oct 2/4</td>
<td>5C (Extraction)</td>
<td>Natural Product Isolation: Cinnamaldehyde (11C : 179-185 &amp; sections referenced within)</td>
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<td>Oct 09</td>
<td>4E (Characterization &amp; Spectroscopy)</td>
<td>Dry Lab: Infrared &amp; Ultraviolet Spectroscopy (IR &amp; UV) Mass Spectrometry (MS)</td>
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<td>Oct 16/18</td>
<td>5C (Chromatography)</td>
<td>Thin-Layer Chromatography: Analysis of Dyes (Reading Will be Posted on Canvas)</td>
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<td>Oct 23/25</td>
<td>5C (acid derivatives)</td>
<td>Esterification: n-Butyl Acetate (8B : 157-159)</td>
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<td>Oct 30 / Nov 01</td>
<td>5C (S&lt;sub&gt;N1&lt;/sub&gt; or S&lt;sub&gt;N2&lt;/sub&gt;)</td>
<td>S&lt;sub&gt;N2&lt;/sub&gt; Reaction: Williamson Ether Synthesis (22 ; 230-235 sections referenced within)</td>
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<td>Nov 06/08</td>
<td>5C (Aldehydes &amp; Ketones)</td>
<td>3-hydroxy-3-(4-nitrophenyl)-1-(2-pyridyl)-1-propanone (TBA)</td>
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<td>Nov 13/15</td>
<td>5D</td>
<td>Alcohol Oxidation: 9-Fluorenone (33B : 271-272)</td>
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<td>Nov 21</td>
<td>N/A</td>
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<td>Nov 28</td>
<td>N/A</td>
<td>No Class: Fall Break / Thanksgiving</td>
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<td>Dec 04</td>
<td>N/A</td>
<td>Cleanup, Check-out</td>
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<td>Dec 05</td>
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<td>Lab Exam</td>
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