Syllabus for honors/majors organic chemistry laboratory: Chemistry 2923/2213
Fall 2018

COURSE DESCRIPTION:
This course provides an introduction to computational and laboratory techniques in organic chemistry. It places emphasis on independent learning. Students are required to plan their experiments, manipulate equipment to separate, purify and characterize organic compounds and write reports after each experiment detailing their laboratory experience. Hands on use of spectroscopic (infrared [IR] and nuclear magnetic resonance [NMR]) and computational (Spartan, Trinity Spectroscopy software) tools is involved.

GOALS:
1. To apply the organic synthesis principles and techniques to safely set up simple reactions with small amounts of material and to extract, isolate & analyze the desired products.
2. Analyze molecular shapes, 3D-structures, and reactivities using computer based molecular modeling programs.
3. Perform literature search using resources such as Scifinder Scholar and to record your results through formal scientific reports.
4. Extend the principles of organic synthesis to understand the chemical reactions happening in the real world and our lives including but not limited to food, clothing, environment and technology.
5. Apply the theories of chemical bonding and reactivity to find explanations and solutions in your areas of interest such as health sciences, engineering, environment and beyond.

REQUIRED TEXTBOOK AND SUPPLEMENTARY MATERIALS:
3. A flash drive or similar USB device.
4. A bound lab notebook for record keeping and some laboratory notes. You could also use the top bound, duplicate pages, notebook published by Hayden-McNeil (ISBN 978-1-930882-00-3) and available for purchase at Temple University Bookstore.
5. Eye Protection glasses/goggles that meet ANSI Z.87.1 1989 requirements are available for purchase at Temple University Bookstore

Co-requisite: Chemistry 2211/2921 - Majors/Honors Organic Chemistry Lecture (minimum grade of C’ if already taken)
Pre-requisite: General chemistry 1032/1034 (minimum grade C’)

INSTRUCTOR: Jaskiran Kaur, BE426B, Jaskiran.kaur@temple.edu, 215-204-7161
OFFICE HOURS: MTR- 11am to 1pm, F- 11am to noon or by appointment (email to set appointment).
Undergraduate Course assistants: Robin Haller Office Hours: tuf87720@temple.edu
Caroline Wilson Office Hours: Caroline.wilson@temple.edu
Section 001, Monday, 2:00-4:50 PM, BE401  Section 002, Tuesday, 2:00-4:50 PM, BE401
Section 003, Thursday, 2:00-4:50 PM, BE 401  Section 004, Friday, 1:00-3:50 PM, BE 401
## Tentative Lab Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject/Experiment</th>
<th>Comments and page numbers from the book (top numbers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27th August - 31st August</td>
<td><strong>SPARTAN #1</strong> BE220</td>
<td>Introduction to lab, procedures and syllabus. Practicing with Spartan. Building ethane. Introduction to common computational and research based tools.</td>
</tr>
<tr>
<td>4th September - 10th September</td>
<td><strong>SPARTAN #2</strong> BE220</td>
<td>Building BUTANE molecule. Introduction to common computational and research based tools. Practice time. Check in for wet lab.</td>
</tr>
<tr>
<td>11th September - 17th September</td>
<td>Thin-Layer Chromatography</td>
<td>Analysis of Dyes. Syllabus modifications and pages #97 to 99</td>
</tr>
<tr>
<td>18th September - 24th September</td>
<td><strong>Column Chromatography</strong></td>
<td>Separation of Ferrocene and Acetylferrocene by column chromatography. Syllabus background</td>
</tr>
<tr>
<td>25th September - 1st October</td>
<td><strong>Determination of a Partition Coefficient</strong></td>
<td>Solvent extraction technique (#4), page 67. Background and pages #141-147 and 75-77</td>
</tr>
<tr>
<td>2nd October - 8th October</td>
<td><strong>SPARTAN #3</strong> BE220</td>
<td>An introduction to cyclic molecules. Examine the conformers of cyclohexane and substituted cyclohexane.</td>
</tr>
<tr>
<td>9th October - 15th October</td>
<td>Isolation of caffeine from tea</td>
<td>Sublimation technique pages #112-113. Background and pages #229-235 (11B)</td>
</tr>
<tr>
<td>16th October - 22nd October</td>
<td><strong>Fractional Distillation</strong></td>
<td>Semi-microscale distillation pages #55-60. Background and pages #132-135</td>
</tr>
<tr>
<td>23rd October - 29th October</td>
<td><em>Dehydration of 2-Methylcyclohexanol</em></td>
<td>Reading about reaction using a different substrate pages #209-216. Background (procedure)</td>
</tr>
<tr>
<td>30th October - 5th November</td>
<td><strong>Williamson Ether Synthesis</strong></td>
<td>Synthesis of 1-methoxy-4-propoxybenzene. S&lt;sub&gt;n&lt;/sub&gt;2 reaction: Experiment 22, pages #321-326</td>
</tr>
<tr>
<td>6th November - 12th November</td>
<td>Spectroscopy Lab</td>
<td>Record the &lt;sup&gt;1&lt;/sup&gt;H NMR and IR spectra of an unknown compound. Trinity Software: Tutorials and problems</td>
</tr>
<tr>
<td>13th November - 16th November 26th November</td>
<td><strong>Bromination of E-Stilbene</strong></td>
<td>Experiment A&lt;sub&gt;b&lt;/sub&gt;, pages #444-449</td>
</tr>
<tr>
<td>27th November - 3rd December</td>
<td><strong>Reductive Hydrogenation</strong></td>
<td>Reductive Hydrogenation of an 1-Decene. Experiment 12, pages #244-250</td>
</tr>
<tr>
<td>4th December - 10th December</td>
<td>Final exam, Check-out and clean up</td>
<td>Submit your lab notebooks (returned at the end of session).</td>
</tr>
</tbody>
</table>

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**OFFICE HOURS:** MTR- noon to 1pm, F- 11am to noon or by appointment (email to set appointment).
GRADES AND ASSIGNMENTS: During this course you will be working on the following assignments. Check the hyperlinks for details of each assignment. There will be a total of 1500 possible points. The breakdown is as follows:

- **Pre-lab** - 11 x 30 points = 330 (total points) (22%)
- **Pre-lab presentation** - 100 (total points) (6.6%)
- **Post-lab quiz** - 13 x 30 points = 390 (total points) (26%)
- **Lab reports** - 13 x 40 points = 520 (total points) (34.6%)
- **Final exam** - 100 (total points) (6.6%)
- **Lab Notebook** and **Technique** - 20 + 40 (60 total points) (4%)

LABORATORY SAFETY: You must read the safety guidelines in the Red safety book and must sign and submit the compliance form at the end by the second week. 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 the Federal laws and regulations, students are required to dress appropriately for lab and wear specified personal equipment. Students who come to lab without safety glasses or dressed improperly will not be permitted to work in the lab.

- Long hair be tied back
- All students must wear approved safety glasses (contact lenses are not to be worn as organic solvents getting between your iris and the lens can damage your eyes). It is your responsibility to bring them to lab as loaners are not available.
- Long pants MUST be worn. Shorts and skirts are not allowed 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 all experiments (provided in the 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.
- Scarves, veils, etc. will be tied back or removed during the lab

For more specific information, please read carefully the Lab Safety and Waste Disposal documents.

COURSE POLICIES

**Academic Integrity:** Integrity is a crucial part of 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 your own lab reports 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 carefully read the Academic Integrity and Student Code of Conduct.
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, may not be admitted. Please inform your instructor any attendance issues as soon as possible.

Make-up policy: No make-up labs and/or make-up lab quizzes will be granted under a very limited and specific set of circumstances. 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 your instructor well in advance (at least one week). Please see the Make-up policy document for additional details.

Canvas: You are responsible for the information posted on the Canvas site. Course documents such as the syllabus, safety guidelines, lab notebook, report guidelines, and supplemental laboratory experiment information will be posted on syllabus hyperlinked on Canvas. Any general course assignments will also be posted on Canvas. Quizzes will 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. Also, you can't use laptops, ipads, or any other electronic devices during wet labs.

Withdrawal: 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 on Withdrawal may be found here.

Incomplete: Please note that an Incomplete ("I") Grade is only given in accord with institutional procedures. The "I" grade cannot be given until the specific requirements have been met and forms filled out, signed and submitted. This course is governed by the Temple University Policy (#03.12.13) on Incompletes. Please click here to view the policy.

Note of Student Coursework
Temple University is committed to providing excellent and innovative educational opportunities to its students. To help us maintain quality academic offerings, it may retain representative examples or copies of student work from all courses. This might include papers, exams, creative works, or portfolios developed and submitted in courses or to satisfy the requirements for degree programs as well as surveys, focus group information, and reflective exercises.

Disability Disclosure
Any student who has a need for accommodation based on the impact of a documented disability or otherwise, should contact me privately to discuss the specific situation. If you have not done so already, please contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available to you. We will work with DRS to coordinate reasonable accommodations for all students with documented disabilities.

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