Organic Chemistry Lab for Chemical Sciences Majors

Instructor: Professor Amnon Kohen  
Office: E274 CB  
e-mail: amnon-kohen@uiowa.edu  
Note: Please write “2420 or 142” in the subject line.

Office Hours: During scheduled laboratory sessions or by appointment

Prerequisite: Grade of ‘C’ or higher in CHEM:2230 (4:123) or CHEM:2210 (4:121).

Corequisite: CHEM:2240 (4:124) or 2220 (4:122)

Lectures: Tuesday 8:30–9:20 AM W55 CB

Laboratory:  
Section 0A01 TTh 9:30 –12:20 PM E424 CB  
(TAs Daniel Goetz & Nicholas Luedtke)  
Section 0A02 TTh 2:00 – 4:50 PM E424 CB  
(TAs Reid Hein & Gonzalo Campillo-Alvarado)  
Section 0A03 MW 1:30 – 4:20 PM E424 CB  
(TAs Alisa Fairweather & Dibyendu Mondal)

Laboratories will begin promptly at the scheduled starting time. No make-up labs are scheduled. Reasonable accommodations will be made for students with disabilities, according to standard UI policy. Please identify yourself to the instructor the first day of class so that appropriate adjustments can be made.

TAs:  
Daniel Goetz (daniel-goetz@uiowa.edu)  
Nicholas Luedtke (nicholas-luedtke@uiowa.edu)  
Reid Hein (reid-hein@uiowa.edu)  
Gonzalo Campillo-Alvarado (gonzalo-campillo-alvarado@uiowa.edu)  
Alisa Fairweather (alisa-fairweather@uiowa.edu)  
Dibyendu Mondal (dibyendu-mondal@uiowa.edu)

Objectives: This course is intended to illustrate some important methods and reactions of organic chemistry, to highlight issues of stereochemistry, and to employ modern analytical instrumentation.

(The second or fourth editions could be used if you make minor adjustments)

Equipment: Laboratory goggles are required.  
An approved laboratory notebook that provides “carbon copies” is required.  
Students must supply their own ruler and pencil.  
Optional protective gear includes rubber (not latex) gloves and a lab coat.
Midterm Exams:
I  Tuesday, March 7th  8:30 AM
II  Tuesday, April 25th  8:30 AM

Exams will consist of problems and essay questions. Answers must be written in ink, but not in red ink. Reasonable accommodations will be made for students with disabilities, according to standard UI policy.

Grade components:
Two Exams (100 pts each) .................................. 200 pts
Prelab flow charts (excluding last exp) ..................... 100 pts
Laboratory notebook entries (30 pts each for 8 exps) .... 240 pts
Formal laboratory report: Davis reagents .................. 60 pts
Formal laboratory report: Wittig reaction .................... 60 pts
Unknown report .................................................. 140 pts
General laboratory performance ........................... 200 pts

1000 pts

Reports: Reports must be typed or printed legibly in blue or black ink. Reports not conforming to this format will be downgraded. Unless otherwise announced, reports are due at the beginning of the period one week following completion of the experiment. Late reports must be turned in to the instructor, and will be down-graded substantially. Reports will not be accepted more than 3 days after the due date. Reports must be done individually, and must reflect the experimental findings of the student.

Regrades: Reports and exams to be reconsidered should be given to the lab TA not later than 7 days after the initial date of return. Items for regrade must be written in ink, have the point in question clearly marked on the front page, and have an explanation no longer than one sentence. Items submitted for regrade will be considered in their entirety.

Laboratory Performance: This portion of the grade reflects how the student functions in the lab. Are you prepared? Do you work safely? Do you understand what you're doing? Are your experiments finished in a timely way? Do you arrive/leave on time?

Attendance: Students are expected to attend all lecture and laboratory sessions. Due to the complexity and schedule of the experiments, students in general may only attend the lab period for which they are registered. Additional make up experiments will not be permitted. Handouts may be distributed during lectures. “In-class” notes will not be distributed, but other information will be posted routinely on ICON.
Lists of office hours for this course TAs and other organic TAs will be posted when they become available.
For students desiring additional assistance, the Chemistry Center maintains a list of chemistry tutors.

Cell phones, ipods, mp3 players, earbuds, etc. are not permitted in the laboratory. If you are carrying a cell phone, please turn it off when you enter the lab or lecture.

Students are required to pass a safety quiz.

1. Safety goggles must be worn at all times!
2. Wearing contact lenses in the lab is prohibited.
3. Feet must be completely covered. Laced shoes/sneakers or boots are required. (no sandals, no sandals with socks, no high heels, no ballet flats, no boat shoes, no shoes that do not have the toes, tops and backs of the feet covered).
4. Report any injury to your TA immediately – even if you think it is minor!
5. Legs must be covered. Shorts, short skirts and short dresses are not acceptable. Tank tops and muscle shirts are not permitted.
6. Students are allowed in the labs only during the assigned times and with proper supervision. Do not enter the lab if your TA is not present!
7. Eating, drinking, and smoking are prohibited in the laboratory.
8. No open flames are permitted in the laboratory (unless part of the experimental procedure and under TA supervision).
9. Proper disposal of solvents, solids, and sharps is essential for the safety of all. If you are not sure how to dispose of something, ask your TA. Nothing goes down the drain!
10. Many organic chemicals pose potential hazards to the fetus or to young children. Women who are pregnant, nursing, or who suspect they may be pregnant are strongly advised to consult with their obstetrician, and if possible to take this course at a later time.
11. Come to lab prepared! This is the first rule of safety!
12. The language of instruction is English. Use of other languages in the lab will be considered a safety violation.
13. Repeated violations of these safety practices will result in dismissal from the course.

NMR spectroscopy will be employed throughout this course, and the heart of any NMR spectrometer is a powerful magnet. Students with pacemakers or metallic implants must not approach this magnet. Please identify yourself to the instructor the first day of classes so that appropriate adjustments can be made.
**Equipment:** All glassware and other equipment checked out at the beginning of the semester to a student registered for a given course and assigned a drawer/locker is the responsibility of that student. On the day of check-in the student must insure that the glassware has no chips or cracks and that the equipment is in good working order. The Chemistry Department will replace any glassware or equipment that is defective at the time of check-in. At the end of the semester, or at the time the student leaves the course, each piece of glassware and equipment must be returned to the Department without chips or cracks and in good working order. All pieces of glassware or equipment missing, chipped, broken, or not in good working order will be charged to the student through the University billing system.

**Clean Up:** Students are responsible for seeing that the lab is left clean. Your TA will prepare a schedule that designates students for clean up at the end of every lab.

**Add/Drops:** Check-in is scheduled for Thursday January 19 and 23, during the normal section times. Students must check-in a lab drawer in their section before they can do the first experiment. Once you have checked into a lab drawer, if you drop the course you must check-out of that drawer with your TA to avoid any fees.
## Tentative Schedule of Experiments

### Spring 2017

<table>
<thead>
<tr>
<th>Exp. #: (from Pavia 3rd Edition)</th>
<th>Dates: [Tentative]</th>
<th>Experiment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handout</td>
<td>Jan. 19/23</td>
<td>Check-in; this is your glassware (sep funnel, kit) and get used to solvents and glassware.</td>
</tr>
<tr>
<td>3D and 4A</td>
<td>Jan. 24/35</td>
<td>Separation of a multicomponent mixture by extraction. Identification of unknowns (p. 28 and p. 34).</td>
</tr>
<tr>
<td>6 and 37</td>
<td>Jan. 31/Feb 1</td>
<td>Distillation &amp; gas chromatography (p. 44). Aldol reaction and NMR (p. 309).</td>
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<tr>
<td>57a</td>
<td>Feb. 7/8</td>
<td>Isolation of an essential oil from spice (p. 497). GC-MS and NMR.</td>
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<tr>
<td>9 and 10</td>
<td>Feb. 14/15</td>
<td>Synthesis of acetaminophen and TLC of analgesics (pp. 64-73).</td>
</tr>
<tr>
<td>20 and 43</td>
<td>Feb. 21/22</td>
<td>Competitive nucleophiles (pp. 163-172). Nitration of methyl benzoate (pp. 338-357) and set up benzoin condensation (pp. 266).</td>
</tr>
<tr>
<td>32A</td>
<td>Feb 28/March 1</td>
<td>Isolate benzoin/finish Exp. 43 Oxidation of benzoin to benzil (Exp. 32B, pp. 272-274).</td>
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<tr>
<td>32C</td>
<td>March 7/8</td>
<td>Benzil to benzinic acid (pp. 274-276) (prep of tetraphenylcyclopentadienone (2nd Ed; pp.300-2).</td>
</tr>
<tr>
<td>62 Handout</td>
<td>March 21/22</td>
<td>The aldehyde enigma (pp. 520-522). Synthesis of a Davis Reagent (handout).</td>
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<tr>
<td></td>
<td>Mar 28/29</td>
<td>continued</td>
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<tr>
<td></td>
<td>Mar 30/April 3</td>
<td>continued</td>
</tr>
<tr>
<td>41</td>
<td>April 4/5</td>
<td>Wittig reaction (p. 327) and handout.</td>
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<tr>
<td></td>
<td>April 6/10</td>
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<tr>
<td>Pgs 280-282 Handout</td>
<td>April 11/12</td>
<td>Enolate formation and alkylation (handout).</td>
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<td>April 13/17</td>
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<tr>
<td>55</td>
<td>April 18/19 thru</td>
<td>Identification of a solid and a liquid unknown (pp. 467-516).</td>
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<td>May 1/2</td>
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<td>May 3/4</td>
<td>Check-out</td>
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The College of Liberal Arts and Sciences – Policies and Procedures*

Administrative Home. The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

Electronic Communication. University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

Accommodations for Disabilities. A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Academic Honesty. All CLAS students have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies. The final examination schedule for each class is announced around the fifth week of the semester by the Registrar. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the dates and times of each final exam, the complete schedule will be published on the Registrar's web site.

Making a Suggestion or a Complaint. Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

Understanding Sexual Harassment. Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather. In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

*These CLAS policy and procedural statements have been summarized from the web pages of the College of Liberal Arts and Sciences and The University of Iowa Operations Manual.