CHEM:2420 — Organic Chemistry Laboratory For Majors — Spring 2018

Professor: Dr. Mona Maalouf  
Email: mouna-a-maalouf@uiowa.edu  
Office: W337 CB 

Office hours (in W337 CB): Monday: 11:00 AM-12:00 PM and Tuesday: 11:30AM-12:20 PM. During scheduled laboratory sessions or by appointment.

1. COURSE 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.

2. PREREQUISITES AND COREQUISITE  
2.1. Prerequisites: Grade of “C” or higher in CHEM:2230 or CHEM:2210  
2.2. Corequisite: CHEM:2420 or CHEM:2220

3. COURSE WEBSITE  
CHEM:2420 – Iowa Courses Online (ICON) website (https://icon.uiowa.edu). Use your HawkID and password to login to ICON. The ICON site includes lecture notes, practice exams, course announcements, and other useful information will be posted regularly on ICON. You should check ICON frequently during the semester.

4. LECTURE AND LABORATORY SECTIONS  
3.1. Lecture – Wednesday: 8:30- 9:20 AM  125 TH  
3.2. Laboratory Sections:  
   Section 0A01: TTH: 9:30- 12:20 PM  E424 CB  
   Section 0A02: TTH: 2:00- 4:50 PM  E424 CB  
   Section 0A03: MW: 1:30- 4:30 PM  E424 CB  
*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 action may be taken.

5. TEACHING ASSISTANTS (TA)  
Laboratory teaching assistants (TAs) have scheduled office hours in Room E208 CB (Chemistry Resource Center). A schedule of specific TA/hours is posted on ICON. TAs for chemistry courses other than CHEM:2420 may also be able to assist you. Below is the list of CHEM:2420 TAs.

5.1. Manshu Li (manshu-li@uiowa.edu)  
5.2. Kyle Lobermeier (kyle-lobermeier@uiowa.edu)  
5.3. Jay Bell (jay-bell@uiowa.edu)  
5.4. Reid Hein (reid-hein@uiowa.edu)  
5.5. Daniel Goetz (daniel-goetz@uiowa.edu)  
5.6. Katherine Sulaitis (katherine-sulaitis@uiowa.edu)
6. COURSE MATERIALS


6.2. Laboratory notebook (with carbonless copy pages) (*required, available in local bookstores*).

6.3. Laboratory Safety Goggles (*required, available in local bookstores*).

6.4. Pen, pencil and ruler (*required, available in stores*)

6.5. **Optional protective gear:** rubber (not latex) gloves

7. COURSE ADMINISTRATION

Please go to the Chemistry Center (E225 CB) for drop/add signatures, section changes, tutor lists, and general questions. Center contact information: 319-335-1341, chemistry-center@uiowa.edu. Hrs: M-F 8 AM-noon, M-Th 1-5 PM, F 12:30-4:30 PM.

8. LECTURE AND LABORATORY EXPECTATIONS

8.1. Come prepared. Read the sections before you come. The reading in your textbook/handouts provides background for and reinforces lecture. At the end of this syllabus is an approximate reading schedule.

8.2. Actively participate and ask questions during lecture and laboratory.

8.3. Respect your fellow students, their questions and comments, and our class/lab time.
   8.3.1. Cell phones should be quiet and stored away for the whole class/lab.
   8.3.2. No texting in class/lab. It is rude and a distraction to everyone.
   8.3.3. You should be prompt to class/lab.

9. EXAMS

9.1. There are two 50-minute term exams. Exams will consist of problems and essay questions. Answers must be written in ink, but NOT in red ink. Exams are closed books. You should leave all course material at home or put at front of room. Data transmitting devices (e.g., tablet, laptop, cell phone, watch) will not be allowed during exam. Reasonable accommodations will be made for students with disabilities, according to standard UI policy.

9.2. **Exam schedule:**
   - **Exam 1:** Wednesday, March 7th, 8:30 AM – 9:20 AM in 125 TH and E215 CB (details will be announced in class)
   - **Exam 2:** Wednesday, April 25th, 8:30 AM- 9:20 AM in 125 TH and E215 CB (details will be announced in class)

10. GRADE COMPONENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Two Exams (100 points each)</td>
<td>200</td>
</tr>
<tr>
<td>Prelab flow charts (Exp. 1-10)</td>
<td>100</td>
</tr>
<tr>
<td>Laboratory notebook reports (30 points each)</td>
<td>240</td>
</tr>
<tr>
<td>Formal Laboratory Report: Davis Reagent (Exp. 8)</td>
<td>60</td>
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<tr>
<td>Formal Laboratory Report: Wittig reaction (Exp. 9)</td>
<td>60</td>
</tr>
<tr>
<td>Formal Laboratory Report: Unknown Identification (Exp. 11)</td>
<td>140</td>
</tr>
<tr>
<td>General Laboratory Performance</td>
<td>200</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
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Final letter grades will be assigned following the recommended guidelines provided by the College of Liberal Arts and Sciences for Intermediate Courses (https://clas.uiowa.edu/faculty/grades-grading-system-and-distribution#Grading%20Guidelines).

11. PRELAB FLOWCHARTS AND LABORATORY NOTEBOOK REPORTS
   11.1. Prelab flowcharts must be entered in the laboratory notebook in blue or black ink only and should follow the guidelines described in class/lab.
   11.2. Prelab flowcharts are due at the beginning of the lab period at the start of an experiment. The original copy must be turned in to the TA.
   11.3. Late prelab flowcharts are NOT accepted for ANY reason.
   11.4. Laboratory notebook reports must be completed in the lab notebook and must follow the guidelines described in class/lab.
   11.5. A sample laboratory notebook report is posted on ICON.
   11.6. Lab notebook reports are due at the beginning of lab period of the next experiment (details will be announced in class/lab)

12. FORMAL LABORATORY REPORTS
   12.1. Reports must be typed or printed legibly in blue or black ink only. Reports not following these guidelines announced in lecture and lab will be substantially downgraded.
   12.2. Reports are due at the beginning of the lab period one week after the experiment is completed and must be time-stamped in the lab (check the tentative schedule at the end of syllabus). Any changes in report submission due dates will be announced in class.
   12.3. Students must also submit an electronic copy of the lab report by the due date. Procedure: save report as word document (.doc or .docx) and email file to Professor Maalouf (mouna-maalouf@uiowa.edu). Name the file as Lastname_Firstname_Exp_X.docx. The software “Turnitin” will be used to check for originality of lab report. (https://its.uiowa.edu/plagiarism)
   12.4. Late reports must be time-stamped and turned in to the Chemistry Center (E225 CB). Late reports will be downgraded substantially.
   12.5. Reports must be done individually and must reflect the experimental findings of the student in this course (Spring 2018).

13. GENERAL LABORATORY PERFORMANCE
   13.1. TAs will use specific guidelines (will be addressed in lecture and lab)
   13.2. Examples of items on evaluation form: Do you arrive/leave on time? Do you work safely? Do you come prepared? Do you know what and why you are doing? Do you attend lecture (quiz may be used)?

14. REGRADES
   14.1. Reports and Exams: Turn in to the chemistry center (E225 CB) no later than 5 business days after the initial date of return. The document must be time-stamped when you turn it in otherwise it will NOT be regraded.
   14.2. Items for regrade must be written in ink.
   14.3. Indicate the question/item with a brief explanation (one sentence maximum) on a separate paper and attach it to the front of the document submitted for regrading.
   14.4. Exams and reports submitted for regrade will be considered in their entirety.

15. MAKE-UP INFORMATION
   Attendance to all lectures and laboratory sessions is expected.
15.1. **Exams:** There are **NO** scheduled make-up times for any of the exams. However, if you miss an exam due to illness or a university-sanctioned excuse, you need to email Professor Maalouf on the same day at the latest. Also, you will need to submit appropriate supporting documentation to the chemistry center (E225 CB).

15.2. **Laboratory:** There are **NO** make-up lab sessions for any experiment. Students are NOT permitted to attend a lab section they are not enrolled in.

16. **NUCLEAR MAGNETIC RESONANCE (NMR) INSTRUMENT WARNING**

NMR spectroscopy will be employed throughout this course, and the heart of 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.

17. **LABORATORY GLASSWARE, EQUIPMENT, AND INSTRUMENTS**

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.

18. **MANDATORY LABORATORY CHECK-IN AND CHECK-OUT**

**Check-in:** Wednesday, January 17th and Thursday, January 18th, during regular lab period. Students must check-in a lab drawer in their section before they can do the first experiment. **Check-out:** Wednesday, May 2nd, and Thursday, May 3rd.

If a student drops the course they must check-out of that drawer with their TA to avoid any fees.

19. **SAFETY GUIDELINES AND MANDATORY SAFETY QUIZ**

19.1. **Safety Quiz:** Students must complete and pass the safety quiz before they can start any experiment (instructions posted on ICON site)

**Safety Guidelines:**

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.
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
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. Students will be warned once, and then dismissed from the lab that day for repeated violations.

13. Repeated violations of these safety practices will result in dismissal from the course.
College of Liberal Arts and Sciences Policies and Procedures

Administrative Home of the Course

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, academic fraud, and other issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook.

Electronic Communication

The instructors will respond to student questions sent via e-mail with a typical response time of two working days. In addition, general notices concerning the course may be sent to students by electronic mail. Due to privacy considerations, the official University e-mail address (firstname.lastname@uiowa.edu) as listed on the class roster will be used for all communications. Each student is considered to be on notice for information sent to their official e-mail address. For additional information, please consult the policy statement on the Dean of Students web site.

Accommodations for Disabilities

The University upholds actions of diversity and inclusion. A student seeking academic accommodations should first register with Student Disability Services (3015 Burge Hall; 335-1462) and meet with a counselor in that office who reviews documentation and determines eligibility for services. A student approved for accommodations should then go to the Chemistry Center, Room E225 CB, to arrange particular accommodations.

Nondiscrimination in the Classroom

The University of Iowa is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University’s Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity, diversity@uiowa.edu.

Academic Honesty

All students taking classes offered by CLAS implicitly agree 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 by the Registrar by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. Until the final examination schedule has been published,
students should be prepared to be on campus until the last exam period of final exam week. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

**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 Office of the Sexual Misconduct Response Coordinator 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.

**Student Classroom Behavior**

The ability to learn is lessened when students engage in inappropriate classroom behavior; such behavior is a violation of the University’s Code of Student Life. When disruptive activity occurs, a University instructor has the authority to determine classroom seating patterns and to request that a student exit immediately for the remainder of the period. One-day suspensions are reported to appropriate departmental, collegiate, and Student Life personnel (Office of the Vice President for Student Life and Dean of Students).
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Exp. #</th>
<th>Exp. # (from Pavia 3rd ed.)</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W/Th: Jan.17/18</td>
<td>0</td>
<td>Handout</td>
<td>Check-in: lab drawer and glassware (sep funnel, kit). Get familiar with lab. Expectations for flowcharts and reports.</td>
</tr>
</tbody>
</table>
| 2    | M/T: Jan. 22/23  
W/Th: Jan24/25 | 1      | 3D and 4A                  | Separation of a multicomponent mixture by extraction. Identification of unknowns (p. 28 and p. 34). |
| 3    | M/T: Jan. 29/30  
W/Th: Jan.31/Feb. 1 | 2      | 6 and 37                    | Distillation & gas chromatography (p. 44). Aldol reaction and NMR (p. 309)  |
| 4    | M/T: Feb. 5/6  
W/Th: Feb7/Feb.8 | 3      | 57A                         | Isolation of an essential oil from spice (p. 97) GC-MS and NMR             |
| 5    | M/T: Feb. 12/13  
W/Th: Feb.14/Feb.15 | 4      | 9 and 10                    | Synthesis of Acetaminophen and TLC of Analgesics (pp. 64-73)                |
| 6    | M/T: Feb. 19/20  
W/Th: Feb.21/Feb.22 | 5      | 20                          | Competitive nucleophiles (pp. 163-172) Nitration of methyl benzoate (pp. 338-347) and set up benzoin condensation (p. 266) |
| 7    | M/T: Feb. 26/27  
W/Th: Feb.28/March.1 | 6      | 32A                         | Isolate benzoin/finish Exp. 43 Oxidation of benzoin to benzil (pp.272-274)  |
| 8    | M/T: March 5/6  
W/Th: March 7/8  | 3      | 32C                         | Benzil to Benzilic acid (pp. 274-276) and preparation of tetraphenylcyclopentadienone (Pavia 2nd edition; pp. 300-302) |
| 9    | M/T: March 19/20  
W/Th: March 21/22 | 7      | 62 Handout                  | The aldehyde enigma (pp. 520-522) Synthesis of a Davis Reagent (Handout)   |
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Sections</th>
<th>Pages/Handouts</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>M/T: March 26/27, Th: March 28/29</td>
<td>8</td>
<td>Davis Reagent (continued)</td>
</tr>
<tr>
<td>11</td>
<td>M/T: April 2/3, Th: April 4/5</td>
<td>9</td>
<td>Wittig reaction (p. 327) and handout</td>
</tr>
<tr>
<td>12</td>
<td>M/T: April 9/10, Th: April 11/12</td>
<td>10</td>
<td>Enolate formation and alkylation (handout)</td>
</tr>
<tr>
<td>13-14</td>
<td>April 16 through May 1</td>
<td>11</td>
<td>Identification of a solid and a liquid unknown (pp. 467-516)</td>
</tr>
<tr>
<td>15</td>
<td>Th: May 2/3</td>
<td>12</td>
<td>Check-out (Mandatory)</td>
</tr>
</tbody>
</table>

**Important Note:** The course instructor reserves the right to make changes, at any time during the semester, to the syllabus. These changes will be announced in class and updated on ICON.