CHEM:2410 — Organic Chemistry Laboratory For Non-Majors — Spring 2020

Professors Mona Maalouf and Shuvendu Das

1. COURSE OBJECTIVES
This course is intended to illustrate some important methods and reactions of organic chemistry, and to employ modern analytical instrumentation. Students will be introduced to and learn standard laboratory techniques. In addition, students will learn methods of separation, isolation, and identification of organic molecules.

2. PREREQUISITES AND COREQUISITE
2.1. Prerequisites: Grade of “C” or higher in CHEM:2210 or CHEM:2230
2.2. Corequisite: CHEM:2220 or CHEM:2240

3. COURSE WEBSITE
CHEM:2410 – 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. INSTRUCTOR INFORMATION

<table>
<thead>
<tr>
<th>Instructors:</th>
<th>Mona Maalouf</th>
<th>Shuvendu das</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Taught:</td>
<td>Lecture A</td>
<td>Lecture B</td>
</tr>
<tr>
<td>Office:</td>
<td>W337 CB</td>
<td>E359 CB</td>
</tr>
<tr>
<td>Phone:</td>
<td>319-335-4832</td>
<td>319-335-2717</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:mouna-a-maalouf@uiowa.edu">mouna-a-maalouf@uiowa.edu</a></td>
<td><a href="mailto:shuvendu-das@uiowa.edu">shuvendu-das@uiowa.edu</a></td>
</tr>
</tbody>
</table>

Walk-in Hours: (or by appt.)
- Held in W337 CB
  - M: 3:00 PM – 4:30 PM
  - T: 10:00 – 11:30 AM

- Held in E359 CB
  - W: 5:30 – 6:30 PM
  - F: 1:30 – 2:30 PM

During scheduled laboratory sessions or by appointment (use CHEM:2410 in the subject line of your email).
5. COURSE MATERIALS
5.1. Laboratory Manual: “Techniques and Experiments in Organic Chemistry. Biological Perspectives and Sustainability” (required, available as PDF file via ICON)
5.2. Laboratory notebook (with carbonless copy pages) (required, available in local bookstores).
5.3. Laboratory Safety Goggles (required, available in local bookstores).
5.4. Pen, pencil and ruler (required, available in stores)
5.5. Optional protective gear: rubber (not latex) gloves (available to students in lab)

6. LECTURE AND LABORATORY SECTIONS
6.1. Lecture A– Friday: 11:30- 12:20 PM  W151 PBB
    Lecture B– Wednesday: 4:30- 5:20 PM  40 SH
6.2. Laboratory Sections (Teaching assistant, TA):
    Section 0002: TTH: 9:30-12:20 PM E468 CB (Manshu Li)
    Section 0003: TTH: 9:30-12:20 PM E464 CB (Reid Hein)
    Section 0004: MW: 1:30- 4:20 PM E468 CB (Leah Scharlott)
    Section 0005: MW: 1:30-4:20 PM E464 CB (James Earl)
    Section 0006: TTH: 2:00-4:50 PM E468 CB (Dillon Krotz)
    Section 0007: TTH: 2:00-4:50 PM E464 CB (Maddie Parker)
    Section 0008: MW: 5:30-8:20 PM E468 CB (Changan Li)
    Section 0009: MW: 5:30-8:20 PM E464 CB (Scott Grzybowski)
    Section 0010: TTH: 5:00-7:50 PM E468 CB (Mahboubeh Varmazyad)
    Section 0011: TTH: 5:00-7:50 PM E464 CB (Soe Tun)

*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.

7. TEACHING ASSISTANTS (TA) WALK-IN HOURS:
Laboratory teaching assistants (TAs) have scheduled walk-in 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:2410 may also be able to assist you.

8. 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.

9. LECTURE AND LABORATORY EXPECTATIONS
9.1. Come prepared. Read the sections before you come. The reading in your lab manual/handouts provides background for and reinforces lecture. At the end of this syllabus is an approximate reading schedule.
9.2. Actively participate and ask questions during lecture and laboratory.
9.3. Respect your fellow students, their questions and comments, and our class/lab time.
    9.3.1. Cell phones should be quiet and stored away for the whole class/lab.
    9.3.2. No texting in class/lab. It is rude and a distraction to everyone.
    9.3.3. You should be prompt to class/lab.

10. EXAMS
10.1. Exams will consist of problems and essay questions. Answers must be written ink, but NOT in red ink. Exams are closed books. You should leave all course material at home or put at front of
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.

### 10.2. Exam schedule:

**Exam 1:** Tuesday, March 24th, 8:45 PM – 10:15 PM in W290 CB and W228 CB.

**Final Exam:** TBA by the Registrar by 5th week.

### 11. Grade components

Two Exams (150 points each) = 300 points  
Laboratory Performance (midterm and final) = 100 points  
Laboratory reports (refer to table below) = 380 points  
**Maximum points** = **780 points**

<table>
<thead>
<tr>
<th>Exp. #</th>
<th>Experiment Title</th>
<th>Prelab Quiz</th>
<th>Report Format</th>
<th>Lab report</th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Literature</td>
<td>None</td>
<td>Formal</td>
<td>30</td>
<td>30</td>
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<tr>
<td>2</td>
<td>Extraction</td>
<td>10 points</td>
<td>Formal</td>
<td>25</td>
<td>35</td>
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<tr>
<td>3</td>
<td>NMR Spectrometry</td>
<td>None</td>
<td>Short</td>
<td>35</td>
<td>35</td>
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<tr>
<td>4</td>
<td>Tetraphenylporphyrin</td>
<td>10 points</td>
<td>Formal</td>
<td>25</td>
<td>35</td>
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<tr>
<td>5</td>
<td>Adipic Acid</td>
<td>2 x10 points</td>
<td>Short</td>
<td>15</td>
<td>35</td>
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<td>6</td>
<td>Wittig Reaction</td>
<td>10 points</td>
<td>Formal</td>
<td>25</td>
<td>35</td>
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<td>7</td>
<td>Photocycloaddition</td>
<td>10 points</td>
<td>Formal</td>
<td>25</td>
<td>35</td>
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<tr>
<td>8</td>
<td>Furoin Condensation</td>
<td>2 x10 points</td>
<td>Short</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>9</td>
<td>Suzuki Coupling or Acetaminophen</td>
<td>10 points</td>
<td>Short or Formal</td>
<td>25</td>
<td>35</td>
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<tr>
<td>10</td>
<td>Unknown</td>
<td>10 points</td>
<td>Short</td>
<td>25</td>
<td>35</td>
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<tr>
<td>11</td>
<td>Molecular Modeling</td>
<td>10 points</td>
<td>Formal</td>
<td>25</td>
<td>35</td>
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</tbody>
</table>

Final letter grades will be assigned following the recommended guidelines provided by the College of Liberal Arts and Sciences for Intermediate Courses (norm-referenced grading). CLAS Recommended Grade Distribution (% of class): A 18%, B 36%, C 39%, D 5%, F 2%. ([https://clas.uiowa.edu/faculty/grades-grading-system-and-distribution](https://clas.uiowa.edu/faculty/grades-grading-system-and-distribution))

If a student has 2 or more unexcused absences in lab, they cannot receive a passing grade in the course.  
*Typical Grade Average in this course is ~ 3.0*

### 12. Prelab quizzes

12.1. Prelab quizzes are completed in lab before you start the experiment.

12.2. Questions on prelab quizzes will address student’s understanding of the chemistry concepts and techniques needed to successfully complete the experiment. In addition, questions will address important safety knowledge related to the handling of chemicals, glassware, and instruments.

### 13. Prelab flowcharts and Short reports

13.1. Prelab flowcharts must be entered in the laboratory notebook in blue or black ink only and should follow the guidelines described in the lab manual (chapter 2). Any changes, if any, will be announced in lecture/lab and posted on ICON.
13.2. Prelab flowcharts are due at the beginning of the lab period at the start of an experiment. The carbon copy of the lab notebook page must be turned in to the TA.
13.3. Late prelab flowcharts are NOT accepted for ANY reason.
13.4. Short reports must be completed in the lab notebook and must follow the guidelines described in lecture/lab and posted on ICON. Refer to lab manual chapter 3 and 4 for further details on the sections to be complete before, during and after lab.
13.5. Short lab reports are due at the beginning of lab period according to due dates in Table on last page (any change, if any, in due date will be announced in lecture/lab and posted on ICON).
13.6. Late short lab reports must be turned in to the chemistry center (E225 CB). The document must be time-stamped when you turn it in otherwise it will NOT be graded (it is the student’s responsibility to make sure that their assignment is timestamped). Late reports will be assessed a penalty of 10% of the available points per day. Reports late a week or more are only accepted if permission is granted by the instructors (Professors Maalouf and Das). The accepted late report must be turned in directly to one of the instructors.

14. FORMAL LABORATORY REPORTS
14.1. Reports must be typed only. Students must submit an electronic copy of the lab report via ICON by the due date. Procedure: save report as word document (.doc or .docx) and name the file as Lastname_Firstname_Exp_X.docx. Then upload to course website on ICON. The software “Turntin” will be used to check for originality of lab report.

14.2. Refer to lab manual chapter 3 and 4 for sections and format for formal report. Additional guidelines for specific reports will be announced in lecture/lab and posted on ICON.
14.3. Reports not following these instruction (14.1 and 14.2) will be substantially downgraded.
14.4. Reports are due at the beginning of the lab period on the due date (refer to table on last page). Changes, if any, in report submission due dates will be announced in lecture/lab and posted on ICON.
14.5. Late reports (refer to section 13.6 for penalty). If approved submission must be done online via ICON.

15. GENERAL LABORATORY PERFORMANCE
15.1. TAs will use specific guidelines (will be addressed in lecture/lab and posted on ICON) to assess your performance (work) in the lab on a daily basis.
15.2. 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 leave your work station clean?
15.3. The laboratory performance assessments will be normalized to a constant average across all lab sections.

16. REGRADERS
16.1. 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 (it is the student’s responsibility to make sure that their assignment/document is timestamped).
16.2. Items for regrade must originally have been written in ink.
16.3. 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.
16.4. Exams and lab reports submitted for regrade will be considered in their entirety.
17. MAKE-UP INFORMATION

Attendance to all lectures and laboratory sessions is expected.
17.1. **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 Professors Maalouf and Das on the same day at the latest. Also, you will need to submit appropriate supporting documentation with your request. The instructors will let you know if your request is approved.
17.2. **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. However, if you miss a lab day due to illness or a university-sanctioned excuse, you need to email Professors Maalouf and Das on the same day at the latest. Also, you will need to submit appropriate supporting documentation. The instructors will let you know what action to take next.

18. ACADEMIC MISCONDUCT

The College of Liberal Arts and Sciences academic misconduct policy is available in the Student Academic Handbook. Academic misconduct may result in a grade reduction and/or other serious penalties, up to and including expulsion from the University. Each of the items below describes the instructors’ expectations.
18.1. **Exams and quizzes:** Students must work alone.
18.2. **Laboratory experiments:** Representing scientific or professional work of others as your own is unethical, dishonest, and unacceptable. All course work must be done individually (unless directed otherwise by your TA) and must reflect the experimental findings of the student in this course (Spring 2020). Open discussion before, during and after the lab is encouraged.
18.3. **Prelab flowchart and laboratory reports:** Students must write their own lab reports, using their own words. Discussion is encouraged while preparing to write, but all students must ultimately do their own writing. Copying the work of others, whether they are current or prior students in this course, is plagiarism, and such academic misconduct will not be tolerated. Use of data not collected by the author of the report in the current semester, use of data not acquired during the lab period, and/or use of fabricated data constitute serious academic misconduct.

19. MANDATORY LABORATORY CHECK-IN AND SAFETY IN LAB OVERVIEW

**Check-in:** Wednesday, January 22nd and Thursday, January 23rd, during regular lab period. Students must attend check-in during their section before they can do the first experiment.

20. SAFETY GUIDELINES AND MANDATORY SAFETY QUIZ

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

*Safety Guidelines (also available in lab manual, Chapter 1):*

1. Come to lab prepared! This is the first rule of safety!
2. Safety goggles must be worn at all times!
3. Wearing contact lenses in the lab is prohibited.
4. 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).
5. Report any injury to your TA immediately – even if you think it is minor!
6. Legs must be covered. Shorts, short skirts and short dresses are not acceptable. Tank tops and muscle shirts are not permitted.
7. 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!

8. Eating, drinking, and smoking are prohibited in the laboratory.

9. No open flames are permitted in the laboratory.

10. 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!

11. 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.

12. 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 and must use this official e-mail address for all communication. For additional information, please consult the policy statement on the Dean of Students web site.

Accommodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-related conditions). 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 Integrity

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, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address. (CLAS Academic Policies Handbook).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar around 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 executive officer (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 must uphold this UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must 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.

Absences and Attendance

Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, unavoidable circumstances, or University authorized activities (https://clas.uiowa.edu/students/handbook/attendance-absences).

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).
**CHEM:2410 — Tentative Laboratory Schedule — Spring 2020**

**Lecture A:** Friday, 11:30-12:20PM in W151 PBB; **Lecture B:** Wednesday, 4:30-5:20PM in 40 SH.

Lab meets in rooms W468 CB and E464 CB (check your MyUI schedule for your lab room)

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Exp #</th>
<th>Chapter/section # (from Lab manual on ICON)</th>
<th>Experiment/Lecture</th>
<th>Lab Report Due Dates/ Exam Dates</th>
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<tbody>
<tr>
<td>1</td>
<td>M/T: Jan. 20/21</td>
<td>1</td>
<td>MLK Day 6.1</td>
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<td></td>
<td><strong>W/F Lectures</strong></td>
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<td>2</td>
<td>M/T: Jan. 27/28</td>
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<td>6.2</td>
<td>Extraction (Part A: Dry Ice, CO₂) Extraction (Part A: Dry Ice, CO₂)</td>
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<td>W/Th: Jan29/30</td>
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<td>6.2</td>
<td>Extraction (6.3 NMR)</td>
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<tr>
<td>3</td>
<td>M/T: Feb. 3/4</td>
<td>6.2</td>
<td>Extraction (Part B: Acid/Base) Extraction (Part B: Acid/Base)</td>
<td>Literature</td>
<td>Tetraphenylporphyrin</td>
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<td>W/Th: Feb 5/6</td>
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<td>4</td>
<td>M/T: Feb. 10/11</td>
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<td>Tetraphenylporphyrin Tetraphenylporphyrin</td>
<td>Experiment 3: NMR</td>
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<td>W/Th: Feb 12/13</td>
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<td>6.4</td>
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<td><strong>W/F Lectures</strong></td>
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<tr>
<td>5</td>
<td>M/T: Feb. 17/18</td>
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<td>6.5</td>
<td>Adipic acid: Dehydration rxn. Adipic acid: GC</td>
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<td>W/Th: Feb.19/20</td>
<td></td>
<td>6.5</td>
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<thead>
<tr>
<th>W/F Lectures</th>
<th>Adipic acid</th>
<th>Wittig reaction</th>
<th>Furoin Condensation</th>
<th>SPRING BREAK</th>
<th>NO LAB MEETING/NO LECTURE</th>
<th>Exam 1: Tuesday, March 24, 8:45-10:15PM in W290 CB and W228 CB.</th>
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<tbody>
<tr>
<td>6 M/T: Feb. 24/25 6 W/Th: Feb.26/27</td>
<td>6.5 Adipic acid: Oxidation rxn 6.5 Adipic acid: Oxidation rxn</td>
<td>Tetraphenylporphyrin</td>
<td>Wittig reaction</td>
<td>Wittig reaction</td>
<td>Adipic Acid</td>
<td>Photocycloaddition</td>
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<tr>
<td>7 M/T: March 2/3 6 W/Th: March 4/5</td>
<td>6.6 Wittig reaction 6.6 Wittig reaction</td>
<td>Wittig reaction</td>
<td>Photocycloaddition</td>
<td>Wittig reaction</td>
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<tr>
<td>8 M/T: March 9/10 7 W/Th: March 11/12</td>
<td>6.7 Photocycloaddition 6.7 Photocycloaddition</td>
<td>Wittig reaction</td>
<td>Furoin Condensation</td>
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<td>March 16-20</td>
<td>SPRING BREAK</td>
<td>NO LAB MEETING/NO LECTURE</td>
<td>Furoin Condensation</td>
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<td>9 M/T: March 23/24 8 W/Th: March 25/26</td>
<td>6.8 Furoin Condensation 6.8 Furoin Condensation</td>
<td>Furoin Condensation</td>
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<td>10 M/T: March 30/31 6.8 Furoin Condensation 6.8 Furoin Condensation</td>
<td>Photocycloaddition</td>
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<td>Week</td>
<td>M/T: Date</td>
<td>W/Th: Date</td>
<td>Date</td>
<td>Lecture</td>
<td>Lab</td>
<td>Notes</td>
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<tr>
<td>11</td>
<td>April 6/7</td>
<td>April 8/9</td>
<td>9</td>
<td>Handout on ICON</td>
<td>Suzuki Coupling</td>
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<td>12</td>
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<td>Furoin Condensation</td>
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<td>Wrap-up/Exam Review</td>
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<td>16</td>
<td>May 11-15</td>
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<td>FINAL EXAM WEEK</td>
<td>CHEM:2410 Final Exam TBA by Registrar by 5th week into semester</td>
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**Important Note:** The course instructors reserve 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.