<table>
<thead>
<tr>
<th>Week</th>
<th>Lab</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 12-15</td>
<td>Chapter 1: Check-In / Pipette Calibration / MP</td>
<td>Introduction / Syllabus / Nutmeg</td>
</tr>
<tr>
<td>Jan 19-22</td>
<td>NO LAB (MLKJ Day)</td>
<td>Nutmeg / Lab Techniques</td>
</tr>
<tr>
<td>Jan 26-29</td>
<td>Chapter 2: Nutmeg Extraction</td>
<td>Fermentation &amp; Distillation</td>
</tr>
<tr>
<td></td>
<td>Chapter 4: Fermentation (set up only)</td>
<td>Partition Coefficient</td>
</tr>
<tr>
<td>Feb 2-5</td>
<td>Chapter 4: Fermentation &amp; Distillation</td>
<td>Anthraquinone Dyes - Chromatography</td>
</tr>
<tr>
<td>Feb 9-12</td>
<td>Chapter 5: Partition Coefficient</td>
<td>Spectroscopy: IR &amp; MS</td>
</tr>
<tr>
<td>Feb 16-19</td>
<td>Chapter 7: Anthraquinone Dyes</td>
<td>Spectroscopy: NMR</td>
</tr>
<tr>
<td>Feb 23-26</td>
<td>Chapter 9.1: Spectroscopy IR &amp; MS</td>
<td></td>
</tr>
<tr>
<td>Mar 2-5</td>
<td>Chapter 9.2: Spectroscopy NMR</td>
<td>Diels-Alder / Chromate Oxidation</td>
</tr>
<tr>
<td>Mar 9-12</td>
<td>Chapter 10: Diels-Alder</td>
<td>Midterm Exam (Mar 12)</td>
</tr>
<tr>
<td>Mar 16-19</td>
<td>NO LAB (Spring Break)</td>
<td>NO LECTURE (Spring Break)</td>
</tr>
<tr>
<td>Mar 23-26</td>
<td>Chapter 12: Chromate Oxidation: Fluorenone</td>
<td>Williamson Ether Synthesis</td>
</tr>
<tr>
<td>Mar 30-Apr 2</td>
<td>Chapter 13: Williamson Ether Synthesis</td>
<td>Borohydride Reduction</td>
</tr>
<tr>
<td>Apr 6-9</td>
<td>Chapter 14: Borohydride Reduction</td>
<td>Multistep Synthesis Types</td>
</tr>
<tr>
<td>Apr 13-16</td>
<td>Chapter 17: Multistep Synthesis</td>
<td>Benzocaine Synthesis</td>
</tr>
<tr>
<td>Apr 20-23</td>
<td>Chapter 19: Benzocaine Synthesis</td>
<td>Exam Review</td>
</tr>
<tr>
<td>Apr 27-30</td>
<td>Check-Out ($75 No-Show Fee)</td>
<td>Final Exam</td>
</tr>
<tr>
<td>May 4-7</td>
<td>NO LAB (Finals Week)</td>
<td>NO LECTURE (Finals Week)</td>
</tr>
</tbody>
</table>

Lab sections and teaching assistants (Lab location: PHSC 305)

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-11:20</td>
<td>Section 021 Krzysztof Bielak (Rm 306)</td>
<td>Section 15 Anh Tran</td>
<td>Section 16 Anh Tran</td>
<td></td>
</tr>
<tr>
<td>11:30-2:20</td>
<td>Section 11 Justin Garrett</td>
<td>Section 17 Josh Smith</td>
<td>Section 12 Erwin Abucayon</td>
<td>Section 18 Josh Smith</td>
</tr>
</tbody>
</table>
Updated Jan, 2015

Office Hours in PHSC 434

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 -</td>
<td></td>
<td></td>
<td></td>
<td>Brian: 4:00-5:00</td>
</tr>
</tbody>
</table>

Updated Spring 2015
CHEM3152: Organic Chemistry Laboratory: Biological Emphasis  
Spring 2015 Syllabus

Instructor: Brian Stobbe  
Office hours: Thursday, 4:00-5:00 in PHSC 434 or by appointment  
Email: Brian.Stobbe-1@ou.edu  
Course website: https://learn.ou.edu/ 

Lecture meetings: Thursday, 5:30-6:20 pm in Neilsen Hall 270  
Lab meetings: M/T/W/R in PHSC 305 (see the attached schedule)

*It is the responsibility of the student to both read and understand all information contained within the syllabus.*

A. Prerequisite: CHEM 3153 (with grade C or better) or concurrent enrollment in CHEM 3153

B. Materials Required

Text: Organic Chemistry Laboratory Manual by Mark C. Morvant and Ronald L. Halterman (2012 or later) (Free interactive iBook is available on iPads/iPhones > iBook store. Also a PDF version is posted on D2L)


(A 100 page lab notebook is recommended. The lab notebook must have numbered pages and carbon/carbonless copy pages.)

Lab supplies: Approved safety goggles, nitrile gloves, a black sharpie marker, laboratory coat (optional)

Recommended reading: Any current organic chemistry textbook.


C. Course Description

Intended for life science majors. This laboratory course is designed to accompany CHEM 3053 and 3153. Selected experiments are designed to illustrate the fundamental techniques used in organic chemistry, to develop familiarity with the properties of organic compounds, and to introduce analytical techniques essential to an organic laboratory including chromatography and spectroscopy.

By the end of this course, the student should be able to

- Carry out chemical reactions, work up, separate, purify and analyze the products. Manipulate synthetic apparatuses and glassware.
- Carry out mathematical procedures necessary in organic synthesis and analysis.
- Interpret analytical data (melting point, boiling point, thin layer chromatography, column chromatography, gas chromatography, infrared spectroscopy, NMR spectroscopy, mass spectrometry) to verify the product/composition of a reaction.
- Explain the procedures and concepts of basic organic, synthetic, and analytical laboratory techniques.
- Communicate the outcome of an experiment to a scientific audience.
D. Grades

The course grade will be determined by the average of lab notebook, attendance, quizzes, Mid-term Exam, and Final Exam. The final letter grade for the lecture course will be as follows: A = 500-450, B = 449-400, C = 399-350, D = 345-300, F = <300. The class will not be curved; however, it is the instructor’s decision to make any adjustments in order to normalize the grades among individual sections.

Points distribution

| Lab notebook | Best 11 out of 12 (20 pts each) | 220 |
| Attendance | Present for >80% of random checks (all or nothing) | 20 |
| Quizzes | 5 unannounced quizzes (15 pts each; lowest quiz grade dropped) | 60 |
| Mid-term exam | March 12 | 100 |
| Final exam | April 30 | 100 |
| Total points possible | | 500 |

Lab reports are due by the end of next lab meetings.

Once the above items are graded and returned to the students, students should review it in the presence of their TA and bring any possible errors to their attention immediately. The TA will then take it to the instructor for verification of the grade and any disputed questions. The instructor will re-grade the item using the original key. It is possible that a student’s grade may decrease or increase from the original grade based on the instructor’s re-grade. Once the student takes possession of their graded papers and leaves the supervision of their TA, only errors in calculating the total points will be corrected. Calculation errors should be brought to the instructor’s attention within one week the exam.

E. Lab Notebook

See the guidelines on page 9 of lab manual (iBook or PDF version). Each lab report is worth 20 points, distributed among (i) pre-lab, (ii) lab observation and (iii) post-lab. Use ink pen to write on lab notebook and turn in the carbon copy pages for grading. Your writing should be distinct from your lab partner’s, though the experimental data are same. It should be legible to read and grade. If the lab instructor deems that the report is illegible, then they reserve the right to deduct points accordingly. You should attach a grade sheet (given on D2L) to your report. The pre-lab for each experiment may take a couple of hours to prepare properly and it is important that the student understand the intent and purpose of the experiment before attending the lab. Your TA will sign in and sign out on your notebook for each experiment. The discussion part of a lab report should address all learning objectives given on D2L. Lab reports are due by the end of next lab meeting (i.e., one week after the completion of the experiment). No late lab reports will be accepted. Typed or “original” notebook pages will not be accepted. The individual laboratory TAs will grade lab notebook assignments.

F. Attendance

Attendance will be checked randomly throughout the semester. Roughly 4% of the student’s grade is based on attendance to encourage participation in the lecture portion of the course. The points for attendance will be awarded on an all or nothing basis at the end of the semester (≥80% of checks = 20 pts; <80% of checks = 0 pts). Attendance may be checked at any point during the lecture period (including but not limited to: before or after quiz, using the quiz as the attendance check, or multiple times during the same lecture period). If multiple checks are
taken in one period an absence in any of those checks counts as an absence for the entire period. If attendance is checked and a student has a university approved excuse for that lecture period, the student’s grade will be normalized if validation (e.g. doctor’s note) for the absence is provided to the instructor via email within one week of the absence and normalization is warranted.

G. Quizzes

Quizzes may test material from previous laboratory experiments, from the background and pre-lab for the current/next experiment, and from the lecture. Most quizzes will consist of theoretical, practical, and calculation questions. The quizzes will be given unannounced during the lecture period throughout the semester.

H. Exams

The exams will cover material from the lecture notes, class discussions, the background in the laboratory manual, and learning objectives. Exams will test the students’ understanding of both the theoretical knowledge of the conceptual material and the practical knowledge of the actual techniques and operations in the laboratory. The exams will be prepared by the instructor and will be uniformly graded under the instructor’s supervision.

I. Communication

For most questions about the laboratory, see your laboratory TA. They can handle the majority of your questions directly. For questions about the lecture grades, the exams, or the administrative aspects of the laboratory, please contact the instructor. For questions about the lecture material or concerning the D2L site and materials, please contact the instructor. It is always better to visit office hours for quick response. TAs’ office hours are listed in the attachment.

You have the responsibility to read (every e-mail) and respond (if required) to any e-mails sent by the instructor or the TA. Messages will only be sent to OU accounts. Use CHEM3152 in the subject line of your emails to enable proper filtering. The instructor will attempt to respond to emails by the following weekday. More general questions will be addressed in the following lecture.

J. Make-up policy

No make-up labs will be offered. Due to space and safety concerns and availability of materials, it is not feasible to schedule make-up labs.

As the best 11 out of 12 lab grades will be counted, the lowest scored lab will automatically be dropped. If a student misses two lab experiments for a University-sponsored or legally required activity, both days that the student was absent must be for an excused reason. The student that misses two lab days due to an acceptable reason will have their grade scale adjusted by removing that day’s lab experiment from the total points. The missed lab will not have an impact on the student’s grade, but this will increase the impact of the remaining grades on the final average and grade. If a student has missed two lab days but only one of the days was for an acceptable reason, then the assignments for the excused day will be dropped and the other day’s assignments will receive a grade of zero. If a student misses more than two lab experiments, it is recommended that the student contact the instructor to discuss the situation. A student cannot receive a grade for a lab experiment that they did not attend and complete.

Examples of the provost-approved university-sponsored activities are scholarly competitions, fine arts performances, and academic field trips. It is also the policy of the University to excuse absences of students that observe religious
holidays. Examples of legally required activities are emergency military service and jury duty. The instructor also reserves the right to excuse an absence to a lab or exam in cases of immediate medical emergencies and family deaths.

**A make-up exam may be offered.** If a student misses an exam for a university-sponsored or legally required activity the student should **contact the instructor before the exam.** An equivalent exam will be prepared and a time to take the exam will be scheduled before the end of the week. The instructor also reserves the right to excuse an absence to an exam in cases of immediate medical emergencies and family deaths. Make-up exams will not be offered unless the instructor is **contacted by e-mail prior to the start of the exam.** The student should produce a letter from authorized person(s) to excuse the absence before taking the make-up exam.

There will be no make-ups for quizzes as the lowest quiz grade will be dropped. If a student has a university approved/excused absence during a period where an unannounced quiz is given, the student must contact the instructor via e-mail within one week of the quiz to make an accommodation.

It is the student's responsibility to contact the instructor if he or she misses an exam or quiz. The instructor will not contact a student if he or she misses an exam or quiz.

**Laboratory drawer check out** will be conducted at the end of the semester on the given date. Students must show-up on that day to avoid the no-show fee of $75.

**K. Safety Policy**

See the appendix “Standard Operational Procedures in the Organic Chemistry Laboratory.”

Proper attire in the lab is important for your safety. Therefore, a student will be required to leave the lab if they are not dressed appropriately for the lab, including check-in and check-out. In general, all of the student's skin should be covered except for the lower arms and hands (up to mid-bicep) and the neck and head. A good description of what would be acceptable dress would be **tennis shoes, full-length pants, and a short sleeve T-shirt.** Shoes should contain and cover the full foot. Pants/Skirts/Dress should cover all the legs to the ankle and up to the shirt/top. Shirts/Tops should cover from the pants/skirt to the neck and mid-bicep.

**Approved laboratory goggles MUST be worn at all times in the lab.** If goggles are removed while an experiment is in progress, the student may be asked to leave by the laboratory instructor, thereby forfeiting all points for that experiment. If goggles should fog or become dirty, students should clean them outside of the laboratory.

There are several experiments where gloves are required. Students should wear gloves during all experiments. **Gloves should be purchased and brought to lab for check-in.** Students should anticipate to bring extra pairs of gloves for all experiments in case of tearing or spills. Students may not at anytime wear gloves outside of the laboratory. If a student is found outside of the lab with gloves, the student may forfeit technique points (for first offense) or be asked to leave the lab forfeiting all points for that experiment (subsequent offenses).

The students should be focused on the experiment being performed during the lab. Therefore, the use of cell phones, audio devices, video devices, and tablets are prohibited during the lab. The students should also not be reading course material unrelated to the laboratory or completing assignments from other courses. The TA has the right to ask the student to put away any and all material not related to the lab. Students in violation of this protocol may be asked to leave the lab forfeiting all points for the experiment.

**L. Academic Integrity and Honesty**

All students are expected to conform to college-level standards of ethics, academic integrity, and academic honesty. By enrolling in this course, you agree to be bound by the Academic Misconduct Code published in The University

All members of the community recognize the necessity of being honest with themselves and with others. Cheating in class, plagiarizing, lying, and/or employing other modes of deceit diminish the integrity of the educational experience. None of these should be used as a strategy to obtain a false sense of success. The need for honest relations among all members of the community is essential.

Any instance of a student receiving any type of help on an exam or quiz from another person or any source (notes, online, etc.) not authorized by the instructor shall be considered academic misconduct and, as a result, will be penalized to the fullest extent possible.

M. Electronic Communications/Storage/Recording Devices:

All students should have cell phones off or silenced during all lab and lecture periods. If you are anticipating an emergency, you may have your cell phone on and set to vibrate. In such a case, you should let the instructor know in advance and situate yourself near a door so you can take the call outside the room with a minimum amount of disruption to class. Sending and/or receiving text or other electronic media is considered inappropriate, even if the device is used to take notes during the period. If inappropriate messaging is observed you may receive a grade penalty or be asked to leave and forfeit attendance for the day (see Academic Integrity and Honesty). Electronic recording of lectures (pictures, video, audio, etc.) is prohibited unless written permission is given by the instructor in advance.

N. Accommodations:

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities. Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website:

http://www.ou.edu/drc/home.html.

O. Modification of the Syllabus

Though the main points of this syllabus are unlikely to change, the instructor reserves the right to modify all or part of this syllabus at any time during the semester.

______________________________

Appendix

Standard Operational Procedures in the Organic Chemistry Laboratory

*Any student working in an unsafe manner may be dismissed from the laboratory by an instructor.*

1. Laboratory Notebook
   a. For each experiment students must keep a written record of their work. In many scientific professions, laboratory notebooks are legal documents containing background information, repeatable directions, observations, data, calculations, results, conclusions, and spectral analysis in a permanent format.
2. Preparation
   a. Pre-Lab
      i. Students will have the pre-lab and procedure written and completed before coming to class.
      ii. It is the student's responsibility to obtain their TA's signature at the beginning and end of the class.
   b. Procedure
      i. Students will have a thorough, concise, and bulleted procedure ready before coming to class.
      ii. Laboratory manuals are not allowed to be used during the experiment. The student's procedure should be detailed enough to allow anyone to follow the instructions and complete the experiment.

3. Attendance & Participation
   a. Laboratory experiments are held each week unless otherwise noted. Attendance is mandatory and required to get a grade for the experiment. Preparation, efficient and appropriate use of time, attention to detail, staying on task, and a willingness to learn and participate are valuable qualities that will lead to a successful lab experience.
   b. No make-up labs are given for CHEM 3152.
   c. Students will work in groups of two unless otherwise instructed. Both students should participate equally in the lab.
   d. **Students will turn in individual lab reports that are reasonably different from their partner's work.**
   e. Students should check their e-mail at least once a day to look for additional important information.

4. Working Environment
   a. No food, drink, or chewing gum is allowed while in the lab.
   b. Students should disassemble and return common equipment to the TA, drawer, or cabinet at the end of the lab period.
   c. Students should take care to not contaminate chemicals, standards, solutions, or solvents by using the same pipette or spatula in different containers without first cleaning and drying the item thoroughly.
   d. Students should not sit or lean on the counters as there may be chemical residue remaining which may damage the skin or clothing.
   e. Students should not leave the lab while wearing gloves or lab coats.
   f. Students should complete all lab work and finish clean up by at least ten minutes before the end of lab. Students should be out of the lab on time to allow for the next class to be prepared.
   g. Students should wash glassware, clean the workspace area, and put the stool on the counter at the end of the lab period unless otherwise instructed.
   h. It is recommended that students wash their hands before leaving the lab. Even if gloves were used, residual chemicals may still be present on the skin.

5. Glassware
   a. Students should keep their glassware reasonably clean throughout the experiment.
   b. Glassware should be cleaned at the end of each laboratory experiment.
   c. **Never use a thermometer as a stirrer!** Always support a thermometer in a beaker or flask with a clamp. If a mercury thermometer breaks, immediately contact the laboratory instructor and restrict access to the area of contamination until cleanup can be arranged.
   d. Students should immediately report all breakage of glassware to their instructor for disposal instructions. All glass breakages must be immediately recorded on the student's breakage card.

6. Safety
   a. Safety policies and procedures are given in both the syllabus and the laboratory manual. All safety policies must be followed by all people entering the Organic laboratories.
   b. Students must wear appropriate attire while in the laboratory. This includes:
i. Long pants
ii. T-shirt or long sleeve
   1. No bare shoulders, midriffs, etc.
iii. Closed toe, closed heel shoes.
iv. Goggles (on the face and over the eyes)
v. Nitrile gloves
c. If you wear contact lenses, try to avoid wearing them in the lab. If you must wear contact lenses, your goggles must seal well to your face.
d. Students should be familiar with the locations of the exits, eyewash stations, safety shower, and first aid kit.
e. Fire extinguishers are restricted to the use of persons who are properly trained. Small fires may be extinguished by covering with a beaker or larger container.

7. Heating Equipment
   a. No open flames are allowed in the organic lab.
   b. Reactions that are exothermic and/or being heated must be monitored. Do not leave them without having your partner present to keep an eye on the reaction.
   c. Turn off electrical equipment immediately after you have finished unless your instructor has stated otherwise.
   d. Never heat a closed system. Pressure will build up and cause the glass to fail. This could result in glass projectiles being sent in all directions.

8. Waste Disposal
   a. Students should record waste properly by spelling out all the components on both the liquid and solid waste sheets. No abbreviations, formulas, or symbols are allowed.
   b. Do not dispose of waste by pouring it down the drain or throwing it away in the trash. Dispose of waste in the proper location. If the student is uncertain, the laboratory instructor can provide the correct information.

9. Electronic Usage
   a. All students should have cell phones off or silenced. If you are anticipating an emergency, you may have your cell phone on and set to vibrate. In such a case, you should let the instructor know in advance and take the call outside the room with a minimum of disruption to class. Sending and/or receiving text or other electronic media is considered inappropriate, even if the device is used to take notes during the period. If inappropriate messaging is observed you may receive a grade penalty or be asked to leave and forfeit all points for that experiment. Use of cell phones, iPods, iPads, music players, computers, or other electronic devices are prohibited while in the lab unless written permission is given by the instructor in advance.

10. Consequences of Violations
    a. First violation will result in the loss of technique points for the current experiment.
    b. Second violation will result in the grade of zero for the current lab.
    c. Third violation will be grounds for removal from the course.