Organic Laboratory: CH 2280  
Introduction to Organic Laboratory and Techniques  
Syllabus, Summer II 2017

Time: 1:15-4:45 TTh  
Room: 329 Hunter Lab

Teaching Assistants: Christian Rausch (Section 1) and Manjula Senanayake (Section 2)

All information related to the lab curriculum, syllabus, experiments, assignments and/or other administrative matters will be posted on Canvas learning system. Information concerning experiments and pre-lab and post-lab question sheets (which you will also find on Canvas under quizzes) are on the laboratory home page at: http://www.clemson.edu/ces/chemistry/organic/Labs/CH2280.html

Required: Laboratory Notebook: Carbonless Lab Notebook

<table>
<thead>
<tr>
<th>Lab#</th>
<th>Date</th>
<th>Activity</th>
<th>Assignment(s) Due</th>
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</table>
| 1    | June 29  | Check-in, Overview of Lab Procedures; Form Groups; Bring Laptop/Tablet/Smartphone to Lab  
Introduction to FTIR & NMR Spectroscopy (Hands-on) | Check-in Online  
Contact lens disclaimer sheet                                                                                     |
| 2    | July 6   | Start Synthesis of p-Chlorophenoxyacetic Acid  
Continue FTIR & NMR Spectroscopy introduction (if needed) | Pre-Lab for p-Chlorophenoxyacetic Acid                                                                                   |
| 3    | July 11  | Start Bromination of N,N-Dimethylaniline  
Finish p-Chlorophenoxyacetic Acid (mp, FTIR, NMR) | Pre-Lab for Bromination of N,N-Dimethylaniline                                                                  |
| 4    | July 13  | Start and Finish Colorful Grignard Reaction  
Finish Bromination of N,N-Dimethylaniline (mp, FTIR, NMR) | Pre-Lab for Colorful Grignard Reaction  
Post-Lab for p-Chlorophenoxyacetic Acid  
Notebook Pages – p-Chlorophenoxyacetic Acid                                                                 |
| 5    | July 18  | Start Synthesis of N-Phenylsuccinimide | Pre-Lab for Synthesis of N-Phenylsuccinimide  
Post-Lab for Bromination of N,N-Dimethylaniline  
Notebook Pages – Bromination of N,N-Dimethylaniline  
Peer Evaluation #1  
Preliminary Written Report for p-Chlorophenoxyacetic Acid |
| 6    | July 20  | Start Synthesis of Chalcones  
Finish Synthesis of N-Phenylsuccinimide (mp, FTIR, NMR) | Pre-Lab for Synthesis of Chalcones  
Post-Lab for Colorful Grignard Reaction  
Notebook Pages – Colorful Grignard Reaction  
Post-Lab for p-Chlorophenoxyacetic Acid  
Notebook Pages – p-Chlorophenoxyacetic Acid  
Preliminary Written Report for p-Chlorophenoxyacetic Acid |
| 7    | July 25  | Start Hydrogenation of Chalcones  
Finish Synthesis of Chalcones (mp, FTIR, NMR) | Pre-Lab for Hydrogenation of Chalcones  
Post-Lab for Synthesis of N-Phenylsuccinimide  
Notebook Pages – Synthesis of N-Phenylsuccinimide  
Final Written Report for Bromination of N,N-Dimethylaniline |
| 8    | July 27  | Finish Hydrogenation of Chalcones (mp, FTIR, NMR)  
Start and Finish Diels-Alder Reaction: Synthesis of Hexaphenylbenzene  
CHECK OUT | Final Written Report for p-Chlorophenoxyacetic Acid  
Post-Lab for Hydrogenation of Chalcones  
Post-Lab for Synthesis of Chalcones  
Notebook Pages – Synthesis of Chalcones  
Notebook Pages – Hydrogenation of Chalcones  
Pre-Lab for Diels-Alder Reaction  
Post-Lab for Diels-Alder Reaction  
Notebook Pages – Diels Alder Reaction  
PEER EVALUATION #2  
TA EVALUATION  
COURSE EVALUATION |

The schedule outlined for the course is tentative and may be subject to change.

Important Dates
The last day to register or add a class is Thursday June 29th Organic Labs begin on Thursday June 29th
The last day to drop a class or withdraw from the University without a W grade is Monday July 3rd
The last day to drop a class or withdraw from the University without a final grade is Friday July 21st
The last day of organic labs is Thursday July 27th
*Peer Evaluations will be conducted in the middle and at the end of the semester and will total 100 points. A total of 2450 points is possible in the course.

**CH 2280 Objectives**

The purpose of this course (lab) is for the student to succeed. Sometimes this means that students fail on the first attempt at the experiment. In that case, the students should think about what happened, and try again. There is a great deal of time allowed for these experiments. The reason is that an unsuccessful experiment may be repeated. If a reaction is unsuccessful (i.e. you get the wrong result (answer)), you are expected to repeat that experiment. If you do not repeat the experiment, your technique grade for that experiment will be zero. If after one repetition, you still get erroneous results, further repetition will not be required, but you may repeat again if you wish.

**However**, it is not sufficient for you to merely acquire the skills to perform a task. You need to acquire the skills to understand the task. This involves planning, monitoring, and evaluating your experiment. Research has shown that one-third of organic laboratory students think as little as possible about what they are doing. One-third thinks procedurally – they follow directions step by step. One-third thinks meaningfully, trying to understand what is happening on a molecular and macromolecular level. To succeed in this course you will think meaningfully.

**Procedural Outline**

Each experiment will be evaluated somewhat differently as shown above, but in general there are grades for answering pre-lab and post-lab questions for every experiment, one experiment will have a written report and one an oral report. Your TA also will give you a grade for technique and keeping up your lab notebook. Your notebook sheets will be collected at the conclusion of each experiment.
**Grades**

The total grade for the lab will be the total of all the project grades divided by the total possible number of points and multiplied by 100%.

The grading scale will be:
- A: 90 – 100%
- B: 80 – 89%
- C: 70 – 79%
- D: 60 – 69%
- F: Below 60%

**Late work will be penalized by 10% per day.**

Your TA is expected to grade each assignment within one week of you submitting the work. The TA should enter the grade in Canvas, and return the assignment to you at the next lab meeting. Grading your written report may take longer. **If your TA does not return your work within a week, please contact Dr. Houjeiry.**

All grade protests must be done in writing to the TA (cc the lab coordinator Dr. Houjeiry) and submitted within one week of the date in which graded work was posted on Blackboard. An emailed protest suffices for “in writing.” Any grievances filed later than one week after the grade was due to be posted will not be considered.

**Academic Integrity Statement**

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a “high seminary of learning.” Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

**Noteworthy:**

1. All grades except for the pre- and post-lab questions and the oral reports are individual grades. **Please bear in mind the University policies on academic dishonesty.**

2. **REPORT:**

   The report you write, even though it will be based on the experimental work of your group, must be your own work.

   Details on preparation of oral and written reports are given on the CH 2280 home page:

   [http://www.clemson.edu/ces/chemistry/organic/Labs/CH2280.html](http://www.clemson.edu/ces/chemistry/organic/Labs/CH2280.html) under “Guidelines and Grading Documents.”

   A. Clemson University has a site license for the (organic) chemistry drawing software program “ChemDraw.” The link to the site from which you can download the program is: [http://sitlicense.cambridgesoft.com/sitlicense.cfm?sid=315](http://sitlicense.cambridgesoft.com/sitlicense.cfm?sid=315). Follow the instructions.

   B. Your TA may choose to divide the 500 points for the written report into two parts: preliminary report and final report.

   C. The written report will be submitted on Canvas, and graded with TurnItIn, as a deterrent to plagiarism. Plagiarism is the "wrongful appropriation" and "purloining and publication" of another author's "language, thoughts, ideas, or expressions," and the representation of them as one's own original work.

   D. Re-using your own work is not allowed. Self-plagiarism is still plagiarism – you did not do the work as required by your instructor in this semester. Make sure you talk with your instructor about using parts of work done for previous classes.
E. It is also illegal to even use someone else’s report as a template for how to organize your own. In other words, do not “cut and paste” any part of someone else’s report into part of yours. TurnItIn will flag it as plagiarism and there will be a problem.

F. Please see the university Plagiarism Link.

G. Your report needs to show your individual understanding of the experiment. You will also be required to put the following statement on the Title Page of your lab report indicating that your report is your own work and sign it.

“My signature indicates that this document represents my own work. Outside of shared data, the information, thoughts and ideas are my own except as indicated in the references. I have submitted an electronic copy through Blackboard to be scanned by TurnItIn.com. In addition, I have not given aid to another student on this assignment.”

H. Any violations of the academic integrity policy will be prosecuted according to Clemson’s guidelines as noted above and as outlined on the Clemson plagiarism web page noted above. The hard copy of each lab report will not be accepted until the electronic copy is submitted.

I. The electronic copy must be submitted by the deadline or the lab report will be considered late. The time the electronic copy is submitted will be the time considered for the late point deductions. All work must be original for the present semester and course.

J. To guard against your report being lost if/when your computer crashes before you can submit an electronic version of your report to Canvas, save it on the cloud. You can find a link to Clemson Box cloud storage at: http://tinyurl.com/clemsonbox. This is free.

K. If your TA requires you to submit a preliminary report, you are required to return the hard copy of the corrected preliminary report attached to your final report. This is to ensure you have

3. Pre-lab assignments are assigned for almost every experiment throughout the semester and should be done on Canvas before the beginning of that experiment’s lab period. Pre-labs are on the CH 2280 home page under “Experiment Documents” (if you want to check them out), but will be answered and submitted on Canvas under each lab module.

4. There are also post-lab assignments and they usually submitted to Canvas before the lab period following the completion of the project. Check the schedule on page 1 of this syllabus for exceptions. Post-labs are also on the CH 2280 home page under “Experiment Documents” (if you want to check them out), but will be answered and submitted on Canvas under each lab module.

5. LAB NOTEBOOK
You are required to submit “carbonless” copies of your lab notebook pages. This is one of students’ least favorite (most hated?) activities in lab. Nevertheless, you are taking an organic chemistry course and you are expected to act like an organic chemist.

A. The notebook is a day-to-day record of your activities in the lab. It is the place where you will describe experiments as you do them and note observations as you make them. It is where you will record and analyze your data. Your notebook will be an invaluable tool throughout the semester, as you must have an accurate record of what you did and what you observed in the laboratory when the time comes to write your laboratory report and oral presentation. Even though you will not write a report for every experiment, your TA will grade your notebooks as if you had to write a report from that document.

B. All data, results and weights, etc. should be recorded directly into your notebook in ink. Loose pieces of paper might easily get lost and are not acceptable substitutes for a notebook. Remember that it is to your benefit to keep a detailed notebook, which will make it easier for you to reconstruct the experiment accurately in a report later. Any mistakes should be crossed out so that they can still be read. They should not be erased or removed with “white-out”.

C. The notebook should not be a neatly copied reiteration of the laboratory procedure. Rather, you should write what you did and observed. Neatness, spelling, punctuation and grammar are not essential in this notebook, but it should be possible for someone else to repeat your work by reading your account, i.e., it should be legible and intelligible. “Real” chemists working in industrial,
government, and academic labs are required to do this. There is not one particular format that can be used for all situations, and it is important to be flexible.

D. Use this thought as a measure of your notebook success: “could one of my group members miss a lab but make it up by only using the procedure found in my notebook?” If you can honestly answer, “Yes” then your notebook write-up is fine.

E. Your lab instructor will read your notebook in order to see whether you are keeping up with your work, whether you understand what you are doing, and whether you are recording everything you need to.

F. Leave a few pages blank at the beginning of the notebook. As you begin new experiments and projects you can use these pages to prepare a table of contents that can be updated as you go.

G. Guidelines for your notebook and a grading rubric are given on the CH 2280 home page: under “Guidelines and Grading Documents.”

COMMUNICATION
Please communicate with your TA and/or the laboratory coordinator by e-mail. This establishes a record. Whenever you e-mail either your TA or the laboratory coordinator (Dr. Houjeiry), please cc the other. That way we all know what the situation is and can resolve any problems expeditiously.

ATTENDANCE
Attendance in this lab is required. If you do not attend the first day of lab you may be dropped from the course. As a rule, make up labs are only permitted if done during the same week as the absence. If you know in advance you will miss a lab, please contact your TA (and the lab coordinator, Dr. Houjeiry) as soon as possible. You will not receive credit for missed work and your group members may decide to penalize you on peer evaluations. If you have to miss a lab for some valid reason you should inform the members of your group and your TA in advance. However, you are only allowed one absence, whether authorized or unauthorized, without penalty. The penalty for each absence is loss of five percent of your total final grade.

We do not make up missed labs, especially in summer, but you must still submit a pre-lab and post-lab (get data from group members if necessary) for that missed lab for grading. You will not be graded on notebook pages or technique for a missed excused lab. Absences for funerals are excused but you must provide documentation of the event or a link to an obituary website and a description of your relationship to the deceased is required. Again, only one absence to attend a funeral is allowed each semester without penalty; likewise for medical appointments.

If you miss more than 30% of the experiments FOR ANY REASON without making them up, you may opt for a grade of Incomplete. In that case you will have to make up the experiments you missed in the next semester.

If your TA is more than fifteen minutes late you may leave without any penalty on your part. Your TA however will be in a lot of trouble and will be penalized. Please contact the lab coordinator, Dr. Houjeiry by email if this is the case.

Tardiness
You are expected to be present at the beginning of each lab period. If you are not in lab within five minutes of the start, you are tardy. Three unauthorized tardies equal one unauthorized absence. Your TA may penalize you for any degree of tardiness at her/his discretion.

TECHNIQUE
Your TA will grade your technique for each project using a rubric on the CH 2280 website under “Guidelines and Grading Documents” which will include: your preparation for the experiments, your ability to use the laboratory apparatus, your ability to work independently, your participation (effort), your observance of lab safety, your practice of lab housekeeping etc. If an experiment is unsuccessful (i.e. you get the incorrect answer), you are expected to repeat that experiment. If you do not repeat the experiment and there is sufficient time to do so, your total technique grade for that experiment will be zero.

LAB BREAKAGE FEE
If a piece of glassware in your drawer needs to be replaced or glassware/equipment checked out from the stockroom is broken/missing you must sign for it at the stockroom. This will note the cost of the item. There is a price list of glassware/equipment by/on the stockroom door. You will be allowed $50.00 in breakage before you will be charged
for anything. For example, if you break $60.00 worth of glassware you are liable for $10.00 at the end of the semester. If you break $40.00, you don’t owe anything. The amount you owe must be paid before the end of the semester or you will receive a grade of Incomplete. Each replacement of a broken/lost piece of equipment will be a reduction of a technique point.

**HOUSEKEEPING**

You are responsible for the cleanliness of your general laboratory area. Waste chemicals and papers must be disposed of in the proper containers (observe labels on the waste chemicals containers!). Solid waste on the bench top should be swept up (there are dustpans and brushes on the cabinet by the stockroom door and in the stockroom). Water on the bench top should also be sponged up (there is a sponge in your drawer). Failure to follow proper housekeeping procedures will result in a lowering of your technique grade. You need to maintain good housekeeping in the balance/IR room. This means cleaning up spilled chemicals and disposing of paper towels, glass pipets and other non-reusable equipment in the appropriate container.

The different Hazardous Liquid Waste containers in the organic lab are for:

- Liquid hazardous organic waste (not acidic, not basic, not halogenated) (five-gallon white plastic bottle with a flip-top lid.)
- Acid hazardous organic waste (five-gallon white plastic bottle with a flip-top lid.)
- Base hazardous organic waste (five-gallon white plastic bottle with a flip-top lid.)
- Halogenated hazardous organic waste (five-gallon white plastic bottle with a flip-top lid.)

*These are all located in the same hood in the lab.*

Solid hazardous organic waste (this is a black five-gallon bucket). This is located in a different hood from the liquid waste.

Solid waste on the bench top should be swept up (there is a dustpan and brush on the side of the wooden cabinet by the stockroom door). Water on the bench top must be sponged up (there is a sponge in your drawer). Failure to clean your bench top will result in a lowering of your technique grade.

You also need to maintain good housekeeping in the balance room. This means cleaning up spilled chemicals and disposing of paper towels, glass pipets and other non-reusable equipment in the appropriate container. One group during each lab period will be assigned the task of cleaning the room. Failure to clean the balance room will result in a lowering of your technique grade.

**STOCKROOM**

For many of the experiments you will be required to check out equipment from the organic stockroom. This involves you telling the stockroom personnel what your group number/letter is. When you return the equipment the stockroom personnel will remove your group designation from their list. If you notice chemicals in the lab are either missing or have been depleted, please inform the stockroom personnel. If you notice the “disposables” on the side shelf are depleted, again inform the stockroom personnel. If you notice the hazardous waste containers are full, inform the stockroom personnel. The stockroom personnel have been instructed to be friendly, professional, and courteous. You are expected to behave likewise.

Rude behavior by stockroom personnel or students will not be tolerated.

**LAB EVACUATION**

If the alarm sounds for an evacuation of the lab, turn off the hot plates if they are in use, exit the lab in an orderly manner and go down the most convenient stairwell. Your lab is in Hunter 329, so go to the second floor, exit the building and proceed to the parking lot. Try to stay with your group members and report to your TA once you have reached the “safe” area. After the “all clear” alarm has sounded please return to lab.

**DRAWER**

You are responsible for the equipment in your drawer. Record your lock combination in a safe place. (Your cell phone is a good idea!) You will also enter it into Blackboard during check-in the first day of lab. Failure to lock your drawer or if you forget or lose your combination will result in a lowering of your technique grade. Do not store unauthorized (not on your check-in list) equipment in your drawer. There will be a technique grade reduction for each violation.
Withdrawal/Dropping the Course
If you find that you have to withdraw from the course, please inform your TA and the members of your group, so that they may make arrangements to accommodate your absence from the group/section. Please make every effort to show consideration for the group members who are staying in the course.

Laboratory Coordinator
Dr. Tania Houjeiry  thoujej@clemson.edu
Office: 279 Hunter Laboratory
Cell: (864)-650-1566 (There is no phone in the office.)
Office Hours: 9:00 am – 12:00 (noon) and 1:30 – 5:00 pm M-F

The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.

Title IX (Sexual Harassment) Statement
Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran’s status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Mr. Lewis J. (Jerry) Knighton is the Clemson University Title IX Coordinator. He also is the Director of Access and Equity. His office is located at 110 Holtzendorff Hall, 864-656-3184 (voice) or 864-565-0899 (TDD).

Disability Accommodations:
Students with disabilities requesting accommodations should make an appointment with Ms. Margaret Camp (864-656-6848), Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services to your TA and the laboratory coordinator and we will comply with the accommodation. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.
Organic Laboratory Safety Rules

1. Material Safety Data Sheets (MSDSs) for all chemicals used in the organic laboratory are available in the organic stockroom. Please ask for them if you wish to know about the chemicals you are using in lab.

2. Wear eye protection at all times. Locate the eyewash stations and know how to use them. Even if you wear prescription glasses, you must wear safety goggles over them. Wear approved eye protection at all times while in the laboratory and in any area where chemicals are stored or handled. There is a ten-point technique grade reduction for every violation of this policy.

3. Eye protection should protect against impact and chemical splashes. Goggles may be rented from the organic stockroom ($3.00/rental). You will have a ten-point technique grade reduction for that week. Subsequent rentals in following weeks will result in an additional ten-point grade reduction (e.g. twenty points the second week, thirty points the third week, etc.). The cost will still be $3.00 per rental.

Wearing contact lenses in the chemistry laboratory is dangerous and you should not wear them. However, if you insist on wearing them, you may. Everyone is required to sign the Contact Lens Waiver Form.

The laboratory has an eyewash fountain for your use. In the event that a chemical splashes near your eyes, use the fountain before the material runs behind your safety glasses and into your eyes. You should irrigate your eyes for at least five minutes and call your instructor.

4. Eating and drinking are prohibited in the laboratory at all times. There are trashcans outside the doors of the organic labs. If you must eat during lab time, please consume your snack and/or drink outside the lab and dispose of your food wrappers and drink cans or bottles in the trashcan outside the lab door. We are not allowed to even have empty food wrappers, or drink bottles, or cans in the lab or the lab trashcans. If you have a drink container in lab with liquid in it, you must put the container outside in the corridor or pour out the drink and store the container in your backpack. There is a ten-point technique grade reduction for every violation of this policy.

5. You are required to wear a lab coat in the laboratory at all times. Lab coats may be rented from the organic stockroom ($2.00/rental). You will have a ten-point technique grade reduction for that week. Subsequent rentals in following weeks will result in an additional ten-point grade reduction (e.g. twenty points the second week, thirty points the third week, etc.). This is limited to a maximum of three times.

6. Do not perform unauthorized experiments. Unauthorized experiments are absolutely prohibited.

7. Wear appropriate clothing in the laboratory in order to provide maximum body coverage. Shorts, skirts, etc. are completely inappropriate. Your clothing should come to at least your ankles. No skin should be visible below the waist. To be safe, wear long pants and socks. Tights, yoga pants or leggings are not allowed.

8. Wearing open-toed shoes and sandals is not allowed in lab. Your footwear must be non-woven and cover your foot back to your instep. Leather or rubber shoes are good for this purpose. “Ballet flats” are not allowed in lab. ESSENTIALLY, YOU CANNOT HAVE ANY SKIN EXPOSED BELOW YOUR WAIST.

9. If you come to lab dressed inappropriately you must leave, obtain the correct clothing and then return. This is a ten-point technique grade reduction. As with lab coats and goggles, subsequent transgressions result in additional point reductions, ten points more each time.

10. It is advisable to wear old clothes in the laboratory in case of spills; you might also want to keep a pair of sweat pants in your drawer.

11. Backpacks, purses, coats, jackets, computers and anything else you bring to lab and are not using must be properly stored. You must use either the cubbyholes in the wall at the end of the lab or empty cabinets underneath your lab bench. Do not leave them on the floor, on the stools, or on the benches. There is a ten-point technique grade reduction for every violation of this policy.

12. Any student who does not comply with any of the laboratory safety rules will be told to leave the lab, resulting in an unexcused absence and a grade of zero for the experiment’s technique score.

13. Willful repeated noncompliance provides adequate reason for expulsion from the course.