

**Organic Chemistry I Laboratory**  
CHE313 (2 hours credit)

**Syllabus**

**Fall 2013**

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**Class:** Joint Laboratory Section: Pre-laboratory discussion: Monday 1:30-2:20 p.m. (Self 210)  
Tuesday, Wednesday & Thursday Laboratory Sections: 1:30-5:30 p.m. (MCC 402)  
(Plan to be here the entire period: DO NOT SCHEDULE WORK, PRACTICE, ETC. to conflict with these hours.)

**Textbook:** K. Williamson, "*Microscale and Macroscale Organic Experiments*," Sixth edition.  
Companion: An Organic Laboratory Notebook which permits production of an original and a copy of laboratory work.

**The last day to drop a class without receiving a grade is Friday October 25, 2012**

**Course description:** A study of laboratory techniques in synthesis, purification, and chemical and instrumental analysis

**Rationale:** This lab will provide a fundamental understanding of organic chemical compounds and principles and how they are involved in everyday life as well as in advanced chemical studies, biochemistry, and medicine on a molecular level.

**Student Objectives:** The objectives of this course are to provide the student with the necessary knowledge and experience to be able to:

1. understand structural theory as it relates to organic compounds.
2. relate structure and nomenclature of compounds.
3. carry out basic organic synthetic experiments.
4. characterize organic compounds.
5. predict the type of mechanism involved from the nature of the reactants and reaction conditions.
6. understand the mechanism and stereochemistry of organic reactions.
7. relate the study of organic chemistry to biochemistry, medicine, and environmental studies.

**Methods of Instruction:** Classes will consist primarily of laboratory, lecture and problem solving.

**Grading: Laboratory Reports** (25 points each, graded on completeness and accomplishment of goals/objectives, adherence to prescribed style, and on-time; and where products are submitted, materials are graded on amount, purity and adequate characterizations.)  
(Lowest grade will be dropped)

Laboratory **Midterm Examination** (100 points); **Laboratory Final Examination** (100 points)

**General Laboratory Department**, (25 points) Adherence to Safety rules, Cleanliness, and Attitude ( (A class or section earns and may lose these points generally if irresponsible individuals leave the laboratory in a dirty, disorganized or unsafe condition.)

**Grades:** (as percentages of all points) 89.5-100 (A); 79.5-89.4 (B); 69.5-79.4 (C); 59.5-69.4 (D); below 59.4 (F).

## TENATIVE COURSE OUTLINE

<u>Lab</u>	<u>Experiment/Exercise</u>	<u>Ref.</u>	<u>Exp. (pg.)</u>
1 (A27-29)	Introduction, Check-in, Lab Safety	Ch. 1-2	
<u>Techniques and Practices</u>			
2 (S3-5)	Separations by Extraction: Liquid/liquid ( <u>No Prelab on Mon.</u> )	Ch. 7	140-141
3 (S10-12)	Separations by Extraction: Acid/base	Ch. 7	145-147
4 (S17-19)	Boiling Point & Separation by Simple Distillation	Ch. 5	A 92-93
5 (S24-26)	Separation by Fractional Distillation	Ch. 5	A 95
6 (O1-3)	Recrystallization & Melting Point Determination	Ch. 4	70-71
7 (O9-11)	<b>Fall Break Mon. &amp; Tues</b> (Finish M.P.; Wed., Thurs., & Fri.)		
9 (O14, 15-17)	<b>Laboratory Midterm Examination</b> (Monday 1:30-2:20) <b>and IR Spectroscopy Lecture</b>		
8 (O22-24)	Column Chromatography & Thin-layer chromatography	Ch. 8,9	200-201
9 (O29-31)	Sublimation	Ch. 6	127-128
<u>Synthesis and Analysis</u>			
10 (N5-7)	Nucleophilic Substitution rxns of alkyl halides	Ch. 17	323-325
11 (N12-14)	Dehydration of 2-methyl-2-butanol (GC analysis)	Ch. 10	213-216
12 (N19-21)	Bromobutane from 1-butanol	Ch. 16	314-315
13 (N25)	<b>Laboratory Final Examination</b>		
14 (N26-28)	<b>Thanksgiving Holiday</b> (No labs this week)		
15 (D2-4)	Radical polymerization of styrene	Ch. 67	771-772

Most laboratory exercises will be discussed in advance on the Monday (1:30) class preceding the Tuesday, Wednesday and Thursday afternoon sessions. Read the relevant sections in the lab text for preparation.

**Academic Integrity:** Mississippi College students are expected to be completely honest in all aspects of the course. Dishonesty, such as cheating or plagiarism, will not be tolerated and will be dealt with according to the stated policies of the university. For details, see the current *Mississippi College Undergraduate Catalog*, the *Tomahawk*, and Policy 2.19.

**Students with disabilities:** *This department believes in reasonably accommodating individuals with disabilities and complies with university policy established under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (1990) to provide for equal access and opportunity. Please communicate with your professor as to your specific needs so appropriate arrangements can be made through the department. In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services immediately upon recognition of their disability (if their disability is known they must come in before the semester begins or make an appointment immediately upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (within 3 years). The student must meet with SCS face-to-face and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in each semester to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan).*

**Laboratory notebook.** At the conclusion of each laboratory exercise (each week), students will submit the copy (yellow) pages of their laboratory notebook. The student's name (and laboratory partner), and Lab section (Tues, Wed., or Thurs.) should be placed in the appropriate blocks on the first page. **The report should be stapled in the upper left corner.** Students retain the white, original copy. Attach any other relevant documents, like spectra, etc. needed.

### Components of the Laboratory Report for each Experiment

**Title** of the Laboratory (also, your name, your lab partners name, day of week for your lab)

**Purpose** Brief statement of the **goals or objectives** of the experience. (100 words or less)

**References** (Numbered list of explicit sources: books, handouts, notes; give title, chapter, etc.; be specific.) (Ephemeral/web-based resources: the web address [url], and what you searched for.) \*\*\*\*\* **Wikipedia is not an acceptable reference** \*\*\*\*\*

**Mechanism** Use curved arrows to show the mechanism of the chemical reaction(s) that you are performing.

**Materials, Safety and Disposal.** Table of materials used, CAS #, relevant properties, hazards (especially "contacts to be avoided", other hazards like flammability, corrosiveness, carcinogenicity, etc.), and disposal route.

**Procedure** (write this section after the [Monday] pre-laboratory introduction.)  
Give enough detail so that another could follow your procedure and reproduce the lab.  
If a reaction is performed, give the balanced chemical reaction with formulas, formula weights, masses, moles, etc. for the materials involved; compute the theoretical (100%) yield.

**\*\*\*The Above Sections Must Be Completed Before Coming To Lab\*\*\***

**Observations** (Composed during the laboratory experience.)

- Full outline of activities and observations (chronologic or by lab activity)
- Bullets can be used here
- You do not have to rewrite the procedure from the prelab in this section. You can refer to the steps from the procedure by number.

**Discussions / Conclusions.** (Compose this after the laboratory has been concluded. Refer to your goals for closure.)

- Discuss what your experimental findings mean. Refer to the purpose of the experiment and the theory behind the experiment. Interpret the data from the experiment (melting point, IR, NMR, etc.) using the numbers (quantitative data) from your records.
- Brief and concise prose statement of important findings and its evidence (100 words or less).

**Laboratory reports, using the appropriate form, are due not later than 5:00 p.m. two days following the completion of the laboratory exercise. Place these in the box on the door of your professor's office.**