CHEMISTRY 2125
Organic Chemistry II Laboratory
Fall 2017

Course Information
Laboratory for CHEM 2325. Prerequisite: A minimum grade of C in CHEM 2123, and prior credit for or concurrent enrollment in CHEM 2325. 1.0 Credit hour

Pre-Lab: CFS 103
Time: W 1:00-1:50 PM

Laboratory: CFS 119
Time: M 12:00-2:50 PM
or 3:00-5:50 PM

Instructor:
Dr. Dustin E. Gross
Phone: 936-294-4067
Email: deg013@shsu.edu
Office: CFS 108
Office Hours: MWF 11:00-12:00pm
or by appointment

Teaching Assistant:

Required Text:
- **Chemistry 2125 Laboratory Manual**
- **The Organic Chem Lab Survival Guide** by Zubrick (9th Ed., older editions are acceptable for use)
- **Organic Structures from Spectra** (5th Ed.) by Field, Sternhell, and Kalman

Suggested Text: Any Organic Chemistry Text.

Required Materials:
- **Safety GOGGLES** (Department-Approved, must be worn at all times while in the Laboratory.)
- **Laboratory notebook** (with duplicate copies for each page that is approved by the Department.) The CHEM 2125 Lab Manual is not allowed in the Laboratory.
- **BLUE or BLACK pen** are allowed for all laboratory work entries. Pencils, erasable pens, or white-out are not acceptable.

Suggested Materials:
Small bottle of a good grease-cutting dish-soap.
Latex or neoprene gloves to protect hands.
Sharpie marker to label your glass while in use.
Lab coat to protect body and clothing.

Blackboard: We do use Blackboard for this course. Your grades will be posted in the Blackboard grade book. Most announcements for the course will be posted in Blackboard.

Course Objectives:
Learn to apply the fundamentals of Organic Chemistry.
Learn to safely carry out organic syntheses safely and effectively.
Learn to purify organic compounds safely and effectively.
Improve your ability to characterize organic compounds using spectroscopy.

Course Format: Each week we will have a pre-lab meeting in room CFS 103. In this session you will take a quiz over the current and previous experiments, spectroscopy, and lab safety. You will then be given instructions for the week's experiment and any changes to the lab manual procedures will be announced. You will not be allowed to have your lab manual in the lab. All notes and instructions you need (see section on notebooks) will need to be ready to go in your lab notebook.

Lab Safety: Prior to coming to the laboratory, you must have a pair of department approved **safety goggles**. These goggles must be worn at all times in the laboratory. You will not be allowed to participate in the day's experiment or activities without safety goggles and will be counted absent with the loss of points associated with the experiment. Accidents occasionally happen, and chemical splatter is a common hazard in chemistry labs. Because of this, **shorts and open shoes will not be allowed** in the lab. Long hair must be tied back. If you show up for lab in shorts or open toes shoes you will not be allowed to participate and will be given a zero for that lab. More extensive safety requirements are located in the first few pages of your lab text and will be discussed the first day of class. Your TA does have my permission to remove you from lab and assign a zero for that experiment if they deem your behavior in the classroom to be disruptive and/or unsafe.
Students are expected to follow the TA's instructions, wear appropriate attire and safety equipment, treat others with respect, maintain honesty and integrity, and behave in a professional manner that is conducive to learning. There is to be no food or drink, no smoking, and no use of cell phones in the laboratory. Poor management of laboratory materials, sloppiness in the work area, improper waste disposal, and any other action the instructor feels is detrimental to the development of good laboratory skills may result in a lowered lab grade.

The TA and Instructor's main jobs are to:

A: monitor the safe operation of the laboratory.
B: ensure the availability of materials and equipment.
C: ensure the smooth operation of laboratory.
D: to protect your classmates from you and you from them.

Attendance: Attendance is very important, and missing experimental techniques that are used in later experiments can be very hazardous. Your lowest experiment grade will be dropped, allowing you to miss one lab day without penalty (this applies to any 'excused' absences as well). Any additional missed days will carry a grade of zero. You may not get credit for the course without completing at least nine of the ten experiments.

Check-In & Check-Out: At the first scheduled meeting of the laboratory (9/11) each student will be assigned a lab drawer containing equipment to perform the experiments scheduled for the semester. During this time make sure to examine each piece of glassware for chips, cracks, and breaks for your own safety and so that you will not be charged to replace it later. Make a note of

any missing equipment on the sheet provided. After you have "checked-in", you are responsible for the equipment in your drawer, so do not leave it unlocked. If you decide to drop the lab, resign from the University, or finish the course, you must "check-out" with your TA. During "check-out" the drawer is inventoried against the "check-in" sheet. If you do not "check-out", you may not take the lab final, the TA will check-out the cabinet and you will be charged a $25 check-out fee.

Lab Schedule:

Week (dates)	Agenda
Pre (Aug 30)	Intro, syllabus, OSS,
1 (Sept 6&11)	Check-in, Barbier reaction (spec problems 101-115 due in prelab)
2 (Sept 13&18)	Diels-Alder reaction (spec problems 116-130 due in prelab)
3 (Sept 20&25)	Nitration of methyl benzoate (spec problems 131-145 due in prelab)
4 (Oct 27&2)	*t*-Butylation of 2,5-dimethoxybenzene (spec problems 146-160 due in prelab)
5 (Oct 4&9)	*meso*-Tetraphenylporphyrin (spec problems 161-175 due in prelab)
6 (Oct 11&16)	Aldol condensation (spec problems 176-190 due in prelab)
7 (Oct 18&23)	Benzoin condensation (spec problems 191-205 due in prelab)
8 (Oct 25&30)	Chemistry of amines (spec problems 206-220 due in prelab)
9 (Nov 1&6)	Hydrolysis of an ester (spec problems 221-235 due in prelab)
10 (Nov 8&13)	Synthesis of 3-carboethoxycoumarin, clean-up, check out (spec problems 236-250 due in prelab)
11 (Nov 15)	Final in Prelab

Preparation for the Pre-Lab: Before coming to Pre-lab, you must prepare for the lab quiz, set up your lab notebook, complete the problem set and read and study any assigned or necessary materials.
(1) Check schedule of experiments to find out which experiment is to be performed that week and any additional requirements.
(2) Read the experimental description from the lab manual and any appropriate sections in the Zubrick book covering techniques to be used in the experiment.
(3) Set up your lab notebook as described below. **NOTE:** You will not be allowed to bring your lab manual to lab. The only personal items allowed in the laboratory are your notebook, Zubrick, calculator, and blue/black non-erasable pen.

Notebooks: The notebook should be of the type specified in Required Materials and only blue or black ink pen may be used to make entries in the notebook. No pencil is allowed in the notebook and use of pencil will cost all notebook points for the labs for it was used. You may not use loose-leaf paper to record information to be put into your lab notebook later. If you make a mistake in an entry, put only one (1) line through the mistake and write the correct entry immediately above or after the mistake. Prior to lab, the notebook must be prepared as outlined:

I. Table of Contents (First page of notebook).
   a. Name and ID # at the Top.
   b. Table of Contents to show |Page | Experiment Title |
   c. An entry must be made for every experiment.

II. For each Experiment (Start each experiment on a new page)
   a. Title
   b. A one or two sentence summary of the Experiment.
   c. If a reaction is to be performed, the reaction should be shown using complete structural formulas.
   d. Reagent table as follows: should include all reagents used in the experiment

Reagent	Formula	MW (g/mol)	mass or vol	mmoles	mp or bp °C	Notes
sodium hydroxide	NaOH	40.0	5.0 g	125 mmol	High	Caustic, strong base

   e. Outline of experimental procedure with sufficient detail to actually perform the experiment. This is very important since the lab manual is not allowed in the laboratory.
   f. **Describe your actual procedure.** The true amounts of materials weighed out and equipment used. Include any observations such as temperature or color changes. For example: "I weighed out 4.98 g of NaOH pellets and placed them into a 100 mL single-neck boiling flask. Two boiling chips were added to the flask with 25 mL of water. The dissolved NaOH was very warm, ...
   g. Calculation of percent yield (if you don't remember how find your freshman text).
   h. Discussion/Conclusions: Discuss any observations, or concerns about the experiments, Did it match your expectations for results?, Why was my yield so low or high?, What did the test results mean?
   i. Answers to questions for the experiment.

Grading

Experiments: For each experiment grades will be composed of 4 parts (5 points each totaling 20 points). The first 5 points will be allocated to lab/experiment performance and product. It is at the TA's discretion how these points are assigned. Tardiness and safety violations are a sure way to lose some of these points.

The report for each experiment will consist of two sets of the duplicate sheets from your laboratory notebook. The first set will be the sheets for the Pre-lab write-up (5 points, see a-e above). These will be turned in to or checked by the TA at the start of lab. The second set will consist of the lab notebook page sheets with the actual lab procedure, observations, and discussion section (5 points, see f-h above). There will also be post lab questions to answer (5 points, see i above). The post-lab is turned in at the beginning of the next lab period after

completion of the experiment. Every experiment must have a conclusion (discussion) as part of its write-up and report. (If there is a reaction involved in the experiment, a required part of the discussion is description of the work-up detailing the purpose of each step, what happens, what dissolves or does not dissolve, and how it is effective for purifying the expected product.)

Quizzes: A quiz will be given at the beginning of pre-lab discussion. The quiz will cover safety, spectroscopy, the previous laboratory experiment, and the current experiment. It may ask about the reactions, the workups, what would be the expected product with a different starting material, etc. Students arriving late to class will not be given extra time to take the quiz, you must arrive on time.

Problem Sets: During the pre-lab, problem sets (15 problems/week) bearing on the use and interpretation of spectroscopy will be assigned see schedule above for each weeks' assignment. They are due at the beginning of the pre-lab period. The problem sets will be from the **Organic Structures from Spectra (OSS)** book. These problems are chosen to give you the opportunity for self-development and to apply in a real manner what is covered in the laboratory to the types of problems that must be dealt with in the real world. For each assignment, you are to turn in your book to your TA to check during the prelab along with a single sheet of paper with your name and the structural answers numbered according to the problem number. Each question will be graded for showing your work (complete=1 point, somewhat complete=0.5 point, and nothing=0 points) and correctness (correct=1 point, somewhat correct=0.5 point, and incorrect=0 points).

Final Exam: The final exam is comprehensive and will have two parts, one covering experimental organic chemistry (~80%) and one focused specifically on spectral interpretation and theory (~20%). The experimental organic chemistry portion will include questions over theory (chemical mechanisms, how techniques work, etc.) and practice (lab safety issues, steps in techniques, etc.). The final exam will be held November 15th.

Final Grades:

Experiments/Reports (best 9/10)	40%
Quizzes (best 9/10)	15%
Problem Sets (best 9/10)	15%
Final Exam (comprehensive)	30%
Total	100%

UNIVERSITY WIDE POLICIES

Additional details can be found at http://www.shsu.edu/syllabus/.

ACADEMIC DISHONESTY:
All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. For a complete listing of the university policy, see: http://www.shsu.edu/administrative/faculty/sectionb.html#dishonesty

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY:
Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20...." A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.
University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed. For a complete listing of the university policy, see: http://www.shsu.edu/~vaf_www/aps/documents/861001.pdf

STUDENTS WITH DISABILITIES POLICY:
It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance are expected to visit with the Office of Services for Students with Disabilities located in the Counseling Center . They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.
SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Counseling Center and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Counseling Center . For a complete listing of the university policy, see:
http://www.shsu.edu/~vaf_www/aps/811006.pdf

VISITORS IN THE CLASSROOM:
Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.