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# Syllabus Chemistry 143A Spring 2010

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<b>INSTRUCTOR:</b>	Dr. Haim Weizman, E-mail: <a href="mailto:hweizman@ucsd.edu">hweizman@ucsd.edu</a>
<b>LECTURE HOURS:</b>	F 9:00 – 9:50 am, Petr 108
<b>OFFICE HOURS:</b>	W 10:00-12:00 or by appointment, Urey Hall 2254
<b>COURSE WEB PAGE:</b>	All materials will be distributed electronically via WebCT

**REQUIRED TEXT:** *Techniques in Organic Chemistry* by Jerry R. Mohrig, Christina Noring Hammond, Paul F. Schatz. 2<sup>nd</sup> Ed, Freeman and Company, 2006.

Welcome to 143A. This course consists of a single 1-hour lecture and two 3-hour laboratories per week. Lectures will focus on the theory and practice of techniques employed in the organic chemistry laboratory. Lecture attendance is not required, but lack of attendance will most likely result in a limited lab performance, a lower quiz and exam score and ultimately a lower grade in the course. If you are unable to attend your lab section, you must notify the instructor or your TA before you are scheduled to be in the laboratory. This laboratory course operates near maximum student capacity; **therefore no make-up labs are possible.**

**SAFETY GEAR:** The department of Chemistry and Biochemistry conducts hazard assessment for each laboratory. Based on this evaluation, 143A students are required to wear chemical **splash goggles**. Splash goggles completely surround the eyes and seal to the face. The indirect air vents prevents the possibility of any splashed liquid reaching either eye from any location. **Safety glasses do not provide splash protection and are not permitted.** A long lab coat and closed shoes are required at all times. Secure long hair and loose clothing away from flames, equipment, and chemical contamination. Wearing headphones/earbuds is not permitted in the lab. Splash goggles and lab coats are available in the University Bookstore. Gloves will be provided in the labs.

## SAFETY EXAM

**143A students must take a mandatory safety exam** to demonstrate their knowledge of laboratory safety within the first week of the quarter. All 143A students have access to a safety course on WebCT where current information about the safety exam and useful study materials are available. Read very carefully this information and follow the directions. Should you fail the exam or fail to take the exam, or for any reason are unsure whether or not you passed the exam, then you must take the make-up exam (passing score = 85%).

**VERY IMPORTANT NOTE:** A student will be dropped from chemistry 143A by the department of Chemistry and Biochemistry if they fail to pass the mandatory safety exam.

## PREPARATION FOR THE LABORATORY

Careful preparation prior to every lab is crucial for your safety and successful experiment. Although the procedures may look like a cooking recipes, organic chemistry experiments are different from cooking lessons. Understanding each step, its fundamental theoretical roots and the expected results are essential to success. Thus, **you must read all assigned material and have a prelab write-up in your notebook when you arrive** (see below). **You will not be permitted to do the experiment if you come to lab unprepared. Neither photocopies of the experiment nor your text book will be allowed in lab.**

## LABORATORY NOTEBOOKS:

Documenting experimental procedures and results is an important part of scientific research. 143A students are required to maintain a laboratory notebook in a standard that is acceptable in academic or commercial laboratory. The lab notebook must have sequentially numbered pages which cannot easily be removed. In addition, the notebook must have a removable duplicate of each numbered page which records a carbon-less copy of each written entry on the original page.

An ACS student lab notebook is available from the American Chemical Society Student Affiliates. ACSSA will be selling lab notebooks and goggles during the first week of the quarter from in York 2200. An alternative notebook is carried by the bookstore and is the national Brand #43-644 Lab Research Notebook (carbon-less duplicate).

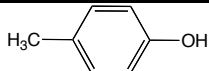

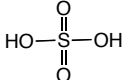
The records for each experiment will be divided into two sections. The first section must be completed prior to the lab and will include a detailed **Protocol**. A protocol is a set of experimental steps one expects to follow. The second section will include a **Procedure**, which describes a set of steps actually carried out. Usually there are some differences between the protocol and procedure due to changes during the course of the experiment. The procedure will also include observations and data. It must be recorded in a clear manner that allows someone else to carry out the written procedure if needed. I recommend splitting the page and writing the protocol on the left side, leaving empty space on the right for the procedure and observation.

Therefore the lab notebook will include the following:

**Preceding the lab**

1. Name, section number, experiment number and title of experiment
2. **Short** introduction or purpose of the experiment and theory of the technique studied.
3. Balanced chemical equations, mechanisms of reactions, etc (if applicable).
4. Table of reagents (see below) including quantities and physical constants of chemical materials used in the experiment
5. Laboratory and health hazards of reagents (e.g. flammable, corrosive, carcinogenic), check resources
6. Calculation of theoretical yield or recovery.
7. Experimental protocol and sketches of any special apparatus. Each step in the protocol should be numbered and written in your own words. **Do not copy word for word** from the handout or the course book (OCL).

*Table of Reagents*

Compound	Chemical Structure	MW (g/mol)	mmoles	Density (g/ml)	Amount	Physical Constants	Hazards
p-Cresol		108.14	20		2.16 g	mp 32-35 °C bp 202 °C	Toxic
t-Butyl alcohol		74.14	60	0.775	5.74 ml	mp 23-26 °C bp 83 °C	Highly Flammable
Con. H <sub>2</sub> SO <sub>4</sub>					0.5 ml		Corrosive

**During the lab** (*on new page*)

1. Data and observations
2. Equations, calculations and results complete with units
3. Signature and Date

The TA will sign the pre-lab protocol in the beginning of each laboratory session and collect a copy of the procedure at the end.

**LABORATORY REPORTS**

After each lab you should complete a lab report that will include results, discussion, conclusions and supplemental material (such as TLC's, spectra and chromatograms). Your TA will provide you with a detailed description of the format that you need to follow.

**Typed reports must be submitted as a hardcopy and as a digital version on Turnitin.com.** Laboratory reports are **limited to 5 pages** (double spaced, fonts size 12). Reports are due as indicated in the attached schedule. Hardcopies must be turned in person to your TA at the **beginning** of the session.

To insure academic integrity of lab reports, a copy of the report must be submitted to turnitin.com. Detailed information about the procedure and self-registration can be found at <http://acms.ucsd.edu/units/iwdc/students.shtml>. Your TA will provide you with a **section ID** and a **class enrollment password** prior to the submission of the first lab report.

Digital copies must be submitted online prior to times indicated on Turnitin.com. Since the system is not flexible and will not allow late submission, don't wait until the last minute. No excuses related to internet availability will be accepted. If you missed the deadline on turnit.com, you may submit a hard copy to your TA, but 10 points will be deducted for late submission. **Additional 10 points will be deducted for each extra day.**

**Maintaining Academic Integrity of lab reports:** Students agree that by taking this course all required papers will be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting

plagiarism of such papers. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

### Products

All products must be placed in a small plastic bag and turned in to your TA along with your report. Products will be evaluated for quality and quantity. Reported physical data and yields are checked. The bag must be labeled with the following information:

Name, Structural formula of product  
Date, Experiment number, Chemical name of product  
Weight in grams (% yield)  
Relevant physical data (mp, bp, etc.)

### OPEN DRY LAB

The laboratories will be open from 10:00 am -1:00 pm on the Fridays specified in the calendar section of the syllabus. During this time, you may weigh products, take melting points, obtain IR spectra, perform gas chromatography, or consult the TA's. **No wet chemistry** will be permitted during these hours. Safety goggles are required during the open lab time.

### COURSE MATERIALS FEE AND BREAKAGE

Upon enrollment in this course, a \$50 fee has been charged to you to cover the cost of course materials. In addition, each student will be held responsible for any lost or broken equipment, including glassware, electrical equipment, etc. Breakage will be noted by the stockroom staff, and the student will be billed at the end of the quarter.

### EXAMINATION AND GRADING:

The total points for this course are as follows:

Quizzes	175 points	(7 x 25 points)
Lab reports	350 points	(7 x 50 points)
<u>Final</u>	<u>150 points</u>	
Total	675 points	

### Quizzes

Laboratory quizzes will be given in the laboratory during the first 20 minutes of each new experiment. **The purpose of a quiz is to test your preparation for the laboratory experiment.** The quizzes will cover background reading, theory, techniques, and safety issues for the experiment that week. There are no make-up quizzes.

### Laboratory reports

Laboratory reports will be evaluated in terms of the following: pre-lab protocol (10 pts), post-lab write up (20 pts), quality and yield of products (10 pts), TA evaluation (10 pts).

The TA will evaluate your laboratory performance based on your efficiency, safety, and cleanliness during laboratory experiments. The TA will deduct major points from a student laboratory score who improperly dispose of chemicals and broken glassware.

Do not hesitate to ask your TA his/her grading practices; yet don't expect to get an explanation for every point that was deducted. Grading lab reports is based on overall quality and not on absolute right or wrong. Arguing for an extra points on a lab report rather than obtaining constructive criticism won't lead you to better grade in this class. **At the end of the quarter, all Chem 143A sections are "normalized" by statistical methods to remove differences between the grading of the TA's.** There is a 7 day limit to request a re-grade of a laboratory report once the TA has graded and returned the report to you.

### Final Examination

A 45 minute comprehensive final examination will be given during the last lecture (**not on finals week**). The exam will be given only at the scheduled time. Make-up exams are not a possibility. Be prepared to show a picture ID. Carefully check the grading on your examination after it is returned to you. **Make no new marks on the exam!** If there is an error, return the exam to me with a note indicating the error. If you feel a question has been improperly graded, return the test to me and I will regrade the entire exam. You may use either pencil or pen for the examinations. However, examinations taken in pencil will not be eligible for regrades. Be aware that when you request a regrade of an exam, the entire exam will be regraded and your score for that exam may go up or down! Exam scores will be considered final three days after the exams are returned to the class.

The final letter grade will be “curved”. That means that an average student will get a B. Yet, if the performance of the class will not show a ‘normal curve’, the grades will not be curved down to force a bell shape.

**ACADEMIC HONESTY:** Please be aware of the UCSD policy on Integrity of Scholarship. Copying lab reports or manipulating experimental data is dishonest. Discussing material or using reference material during an examination is cheating. Taking an examination for someone else or having someone else take an examination for you is a very serious offense for which expulsion from the University will be urged. Changing an answer on an exam that has been returned to you and then requesting a regrade is also a very serious offense. Any student found cheating will receive a "0" on that report/examination and a letter explaining the reasons for this grade will be sent to the appropriate University officials for additional disciplinary action. Remember that you may not drop or withdraw from a course while a dishonesty case is pending, or if found guilty. Any student who is found guilty of academic dishonesty will receive an F.

I wish that this journey will be scientifically stimulating and enjoyable for you.

Haim Weizman

*143A Spring 2010: Schedule of experiments*

	M	T	W	Th	F
	3/29	3/30	3/31	4/1	4/2
Expt No.	Check-in 0 basic techniques	Check-in 0 basic techniques	0 basic techniques	0 basic techniques	
Quiz					
Lab report due					
	4/5	4/6	4/7	4/8	4/9
Expt No.	1 purification by recrystallization	1 purification by recrystallization	1	1	Open dry lab
Quiz	Quiz 1	Quiz 1			
Lab report due					
	4/12	4/13	4/14	4/15	4/16
Expt No.	2 separation by extractions	2 separation by extractions	2	2	
Quiz	Quiz 2	Quiz 2			
Lab report due			Report 1	Report 1	
	4/19	4/20	4/21	4/22	4/23
Expt No.	2	2	3 extractions of caffeine	3 extractions of caffeine	Open dry lab
Quiz			Quiz 3	Quiz 3	
Lab report due					
	4/26	4/27	4/28	4/29	4/30
Expt No.	3	3	4a separation by TLC	4a separation by TLC	
Quiz			Quiz 4	Quiz 4	
Lab report due	Report 2	Report 2			
	5/3	5/4	5/5	5/6	5/7
Expt No.	4b column chromatography	4b column chromatography	5 separation by distillation	5 separation by distillation	Open dry lab
Quiz			Quiz 5	Quiz 5	
Lab report due	Report 3	Report 3			

	M	T	W	Th	F
	5/10	5/11	5/12	5/13	5/14
Expt No.	5	5	6 Fisher esterification	6 Fisher esterification	
Quiz			Quiz 6	Quiz 6	
Lab report due	Report 4	Report 4			
	5/17	5/18	5/19	5/20	5/21
Expt No.	6	6	7 Identification of Unknown	7 Identification of Unknown	Open dry lab
Quiz			Quiz 7	Quiz 7	
Lab report due	Report 5	Report 5			
	5/24	5/25	5/26	5/27	5/28
Expt No.	7	7	7	7	
Quiz					
Lab report due			Report 6	Report 6	
	5/31	6/1	6/2	6/3	6/4
Expt No.	<b>Memorial Day</b>	<b>No lab</b>	<i>Check-Out</i>	<i>Check-Out</i>	<b>Final exam 9:00-9:50</b>
Quiz					Good luck!
Lab report due					Report 7 due before final