UNIVERSITY OF TEXAS AT DALLAS

CHEM 2123 & 2023 – SPRING 2006

Organic Chemistry Lab I & Recitation

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Instructor's organic chemistry page: http://www.utdallas.edu/~scortes/ochem

TABLE OF CONTENTS

GENERAL INFORMATION

DESCRIPTION AND OBJECTIVES: This course is an introduction to basic experimental technique and chemical information sources. Major topics include safety, record keeping, written communication, information sources, physical separations, determination of physical constants, purification and characterization techniques, and basic organic reactions. An important goal of this course is to master technique before shifting the focus to outcome in Organic Chem. Lab II. Correlation with the organic lecture is adequate, but practical factors prevent full overlap.

PREREQUISITES: One year of General Chemistry, theory and experiment. NO EXCEPTIONS.

TEXTBOOK: Pavia, Lampman, Kriz, and Engel. Organic Laboratory Techniques: A Microscale Approach. 3rd ed. Fort Worth: Saunders, 1999.

SUPPLIES: The list below is good for two semesters of organic lab. Supplies must be obtained by the second week.

- HARDBOUND NOTEBOOK with duplicate sheets (carbon copies)
- APPROVED SAFETY GLASSES: Must have the Z87 code engraved on them. The spectacle type is strongly recommended over the goggle type. They look like regular glasses and can be worn over prescription glasses. Goggles cause discomfort due to the rubber band that wraps around the user's head and may cause certain individuals to sweat copiously.
- DISHWASHING GLOVES: Can be obtained at any store. See safety note below.
- PROTECTIVE CLOTHING: A lab coat is strongly recommended. Coats can be obtained at retail outlets such as Sears, and at most uniform and medical supplies stores.
- ITEMS OF PERSONAL USE: Hand soap, towel, economy sponge pack, tweezers, marker or pen, and masking tape (used for labeling).

SAFETY POLICY

Safety awareness is important in the organic chemistry lab due to the presence of fumes, solvents, flammables, and toxic materials. Students who disregard safety rules represent a liability to the university. When observing unsafe behavior, lab instructors have authority to reprimand offenders, deduct points from their lab report, ask them to leave the room, or refer them to the lab coordinator for

further counseling. The lab coordinator reserves the right to penalize, or even dismiss, such students.

IF YOU ARE UNWILLING TO COMPLY WITH SAFETY RULES,
READ NO FURTHER AND DROP THIS COURSE!

As a chemistry student, you are required to read the UTD undergraduate laboratory policies
manual. This manual is available at the UTD Chemistry website under Safety Manual, or directly at
http://www.utdallas.edu/nsm/chemistry/resources/safety.html. Key points are:

• Eye protection is mandatory for anyone physically present in the lab, whether conducting
experiments or not. You must wear approved safety goggles as described under supplies.
• Protective gear such as a lab coat or apron is mandatory at all times. Shorts and sandals are not
allowed, and long sleeves are preferred. Jewelry is discouraged.
• Gloves must be worn whenever the instructor, a chemical label, the textbook, or an MSDS
recommends them. Dishwashing gloves are adequate for most purposes. Disposable gloves are not
and their use is discouraged. If you wear disposable gloves YOU DO SO AT YOUR OWN RISK.

• Pregnant students are discouraged from taking this course. If you are or become pregnant while
taking this course and want to stay in it, you must submit written medical approval to the Chemistry
Department office (BE 2.318) or to the lab coordinator. Your request will be sent to the Dean of
Natural Sciences and Mathematics for final approval.
• Contact lenses are not allowed in the chemistry labs. Safety glasses can be comfortably worn over
prescription glasses. Certain commercial outlets offer prescription safety glasses. Please consult with
your instructor or lab coordinator if interested.
• Allergies or other medical conditions that may be adversely affected by certain chemicals should be
reported to the instructor and the lab coordinator before the student handles such chemicals.
• Drugs or medication that could impair normal mental or physical functioning are forbidden in the
organic lab. If you are taking prescription drugs that might Spring in this category, please notify the
lab coordinator before attempting any experiments. Anyone who displays questionable behavior, in
this or any other regard, is subject to referral to the lab coordinator or other authorities for further
counsel.
• All accidents must be reported immediately to the instructor or the lab coordinator, however minor
they might seem. Failure to do so may prevent taking appropriate measures and can further aggravate
the situation.

GRADING AND COURSE POLICY

• Online quizzes 20%
• Reports 60%
• Final exam 20%
Letter grades are assigned as shown below. The numbers indicate the final percent grade after round off.
95 - 100 = A+ 80 – 84 = B+ 65 – 69 = C+ 50 – 54 = D+
90 – 94 = A 75 – 79 = B 60 – 64 = C 45 – 49 = D

85 – 89 = A70 – 74 = B55 – 59 = C40 – 44 = D

THERE ARE NO EXCEPTIONS MADE FOR ANYONE

RECITATION LECTURES cover theory, safety issues, and procedural changes for experiments. They prepare students for experiments, quizzes, and the final exam. Some lectures will be delivered only online (available at the instructor's website). Please check the class schedule and plan ahead.

ONLINE QUIZZES. Quizzes are available for several days prior to the experiment to which they refer (see schedule on p. 5 for exact dates). If you miss a quiz you will receive a grade of zero. You're allowed two trials for each quiz and the highest grade prevails. You can drop one quiz grade per semester.

To take a quiz, log on to WebCT and locate the quiz link inside this course (recitation section, NOT lab section).

To access WebCT you need a UTD NetID, issued by the Computer Help Desk. Call 972-883-2911, or go to JO3.906 (Jonsson, third floor).

REPORTS. This term may refer to either assignments or experiment records. Assignments are typically completed outside the lab and handed in using a specified format. Experiment records result from work performed in the organic lab and must always be written in the lab notebook. All reports are graded on a 100 point scale. For a set of guidelines on how to write lab reports refer to the Guide for writing lab reports, available at the instructor's website under CLASS MATERIALS.

FINAL EXAM. This is a written test taken during class time on the last week of labs (see p. 5 for exact date). It is based on recitation notes, quizzes, and assigned questions from the textbook. Therefore, it is to your advantage to answer the quizzes without help if you want to do well in the final exam.

MISSED EXPERIMENTS POLICY

1. All incomplete experiments count as missed experiments. If you work with a partner, both must be present for the entire experiment. Doing otherwise negates the concept of team work and will result in a missed experiment for the missing partner.
2. The FIRST missed experiment will be dropped without penalty.
3. The SECOND missed experiment will carry a grade of zero.
4. The THIRD missed experiment will result in automatic failing grade in the course, regardless of how the student performs otherwise. If you miss more than two experiments you should drop the course.
5. No experiments can be made up, and no section switching is allowed.

LAB ETIQUETTE

DISRUPTIVE BEHAVIOR such as horseplay and pranks in the chemistry lab can be dangerous and precipitate accidents. Therefore, the lab coordinator and the lab staff reserve the right to reprimand,

penalize, or even dismiss students who consistently disregard the rules of etiquette.

PUNCTUALITY POLICY. Students who are late invariably cause unnecessary delays and strain in the organic lab schedule. After the first 15 minutes, any students who arrive late to the lab session without a justifiable reason will receive a 20 point deduction from the corresponding lab report.

TIDINESS. There are approximately 10 sections of organic lab running in the same room on any given week. It is imperative that you clean after yourself after every experiment, or others will have to do it.

As a matter of courtesy to others, always leave the work space as you would like to find it.

OTHER IMPORTANT POINTS

CHECKING EQUIPMENT IN AND OUT. You will receive a drawer with equipment that you will be responsible for during the semester. Any equipment missing from your drawer at checkout time will be charged to your student account.

If you quit attending or drop the course, you must check out as soon as possible to avoid unnecessary charges to your account.

DROP DEADLINES. It is your responsibility to observe drop deadlines. Stopping attendance without official withdrawal results in automatic failing grade.

INCOMPLETE GRADES. You can request an Incomplete only if you miss the final exam, and if a compelling and documented reason is provided. You cannot request an incomplete if you missed 3 or more experiments. In that case, you should drop the course, or you will get an automatic failing grade. Any incomplete grades that are not removed within one term turn into failing grades. The deadlines for graduate students are different and usually shorter.

Please consult your advisor if in doubt, or view the UTD catalog link for Grading Policy at

http://www.utdallas.edu/student/catalog/undergrad04/policies-grades.html

PREFERENTIAL TREATMENT occurs when a student is granted exceptional status based on bias, unsubstantiated claims, frivolous arguments, or tenuous evidence. The instructor will not honor requests for preferential treatment, so please do not ask!

DISHONEST CONDUCT. Engaging in questionable behavior or activities is a personal, albeit not a trivial choice. Offenders are subject to applicable policy and are accountable not only to the instructor, but to the university system as a whole, and ultimately to the people of the State of Texas.

BE INFORMED AND MAKE WISE DECISIONS!

Before deciding to engage in dishonest activities, view the UTD catalog link for Student Conduct and Discipline policy at http://www.utdallas.edu/student/catalog/undergrad04/app1.html

CHEATING IS THE FEEBLEST APPROACH TO THE CHALLENGES THAT
COLLEGE AND LIFE WILL POSE TO YOUR CHARACTER.
RECITATION, EXPERIMENTS, AND QUIZ SCHEDULES

These schedules are subject to revision as needed.

Students have one week to turn in assignments and lab reports from the original date of the assignment
or completion of the experiment. Late materials will receive a 10 point deduction per day.

As a college student you are responsible for managing your time efficiently. You are responsible for
managing the following three schedules as you see fit. Any oversights on your part that result in
missed quizzes or experiments are your responsibility, and not the instructor's. Accordingly,

THERE ARE NO MAKEUPS FOR QUIZZES OR EXPERIMENTS.

RECITATION SCHEDULE
Jan. 10
Introduction and
Safety Assignments
Jan. 17
Record Keeping,
Experiment 7
Jan. 24 Experiment 3
Jan. 31 Experiment 4
Feb. 7 Experiment 5
Feb. 14 Experiment 15
Feb. 21 Experiment 12
Feb. 28 IR Spectroscopy
Mar. 14 Experiment 21
Mar. 21 Experiment 23
Mar. 28
Experiment 47 and
Final announcements

EXPERIMENT SCHEDULE
Jan. 9 – 13 NO LABS
Jan. 17 – 20 Check-in
Jan. 24 – 27 Experiment 7
Jan. 31 – Feb. 3 Experiment 3
Feb. 7 – 10 Experiment 4
Feb. 14 – 17 Experiment 5
Feb. 21 – 24 Experiment 15
Feb. 28 – Mar. 3 Experiment 12
Mar. 14 – 17 IR Interpretation Exercise
Mar. 21 – 24 Experiment 21
Mar. 28 – 31 Experiment 23
Apr. 4 – 7 Experiment 47
Apr. 11 – 14
FINAL EXAM
and CHECK OUT
QUIZ SCHEDULE
Jan. 10 – 16 Quiz 1 on Safety
Jan. 17 – 23
Quiz 1 on Safety,

Quiz 2 on exp. 7
Jan. 24 – 30 Quiz 3 on exp. 3
Jan. 31 – Feb. 6 Quiz 4 on exp. 4
Feb. 7 – 13 Quiz 5 on exp. 5
Feb. 14 – 20 Quiz 6 on exp. 15
Feb. 21 – 27 Quiz 7 on exp. 12
Feb. 28 – Mar. 13
Quiz 8 on IR
spectroscopy
Mar. 14 – 20 Quiz 9 on exp. 21
Mar. 21 – 27 Quiz 10 on exp. 23
Mar. 28 – Apr. 3 Quiz 11 on exp. 47
Apr. 4 – 10 All quiz review

NOTE: All quizzes start at 12:00 am on the beginning date, and end at 11:55 pm on the ending date.
All quizzes are available for one week, except for quiz # 1, which is available for two weeks.

TOPIC DESCRIPTIONS

INTRODUCTION, SAFETY, RECORD KEEPING, & BASIC INFORMATION SOURCES –
Safety in the organic lab, material safety data sheets, using the internet for research, how to write lab
reports and use of basic information sources.

The first quiz will contain questions from this material, including the assignments given below.

• Readings: p. 2-27 in textbook.
• Assignments (due the second week of class during lab period (check-in day):
a. Read the Safety Manual from the UTD Chemistry website (see p.2 of this syllabus).
b. Obtain an MSDS for a chemical of your choice using the internet. Print it out, highlight any
information that strikes you as important, and turn it in to your instructor with your name and
date. This is your first report (100 pts).
Save paper and ink by copying text from web pages into a word processor. Adjust font size, line
spacing, and margins before printing. Change boldface fonts to regular fonts and print in B&W.

Check-in takes place the second full week of class during lab time. Report to BE 2.330 at the
designated time for your section.
Exp. 7. ANALGESIC DRUGS AND ISOLATION OF ACTIVE INGREDIENT. Solid-liquid extraction, filtration, and melting point determination.

• Readings: p. 96-99, 105-109, and “required readings” indicated on p. 97.
• Assigned questions from exp. 7: # 1-5. Please include with your lab report.
LAB REPORTS ARE DUE A WEEK AFTER COMPLETION OF THE CORRESPONDING EXPERIMENT

Exp. 3 a & b. CRYSTALLIZATION. Basic technique and uses, vacuum filtration.

• Readings: p. 60-67, questions on p. 70, and readings indicated on p. 63.
• Assigned questions from the textbook: # 1. Please include with your lab report.
Exp. 4 a & b. EXTRACTION. Liquid-liquid extraction, miscibility & solubility issues, distribution
coefficient.

• Readings: p. 71-79, 595-605, 607-611, and 119-123.

• Assigned questions from the textbook: # 1. Please include with your lab report.
Exp. 5 a & b. THIN LAYER CHROMATOGRAPHY (TLC). Basic theory and practice of chromatographic separations.

• Readings: p. 80-83, 697-699, and 702-710.
• Assigned questions from the textbook: # 3. Please include with your lab report.
Exp. 15 a – c. ISOLATION OF PIGMENTS FROM SPINACH. Combined use of column chromatography and TLC to isolate and identify natural products.

• Readings: p. 158-164, 669-680, and 684-688.
• Assigned questions from the textbook: # 1. 3, 4. Please include with your lab report.

Exp. 12. CHEMICAL SYNTHESIS: PREPARATION OF ISOPENTYL ACETATE.
Esterification, reflux, simple distillation, boiling point determination, driving equilibrium reactions.
• Readings: p. 128-133, 135, 585-586, 589-590, 617-627.
• Assigned questions from the textbook: 3-7 and 9. Please include with your lab report.

INFRARED SPECTROSCOPY. Introduction to organic spectroscopy and structure determination.
• Readings: Appendix 3, p. A14-A32.
• Assignment: IR interpretation exercise. Obtain this exercise from the instructor's website.
Counts as a report (100 pts), and it's due on the next lab period.
Exp. 21 a & c. SYNTHESIS OF ALKYL HALIDES AND NUCLEOPHILIC SUBSTITUTIONS.
Illustration of Sn1 and Sn2 reactions applied to the synthesis of alkyl halides.

• Readings: p. 208-211, 213-215.
• Assigned questions from the textbook: For n-Butyl bromide: 1 and 3-5. For t-Butyl chloride: 3, 5.

Exp. 23 a. ELIMINATION REACTIONS: DEHYDRATION OF 4-METHYLCYCLOHEXANOL.
Illustration of acid-catalyzed E1 reaction, alkene synthesis, tests for unsaturation, IR analysis.

• Readings: p. 222-225, 226-227.
• Assigned questions from the textbook: 1, 2(a-d), and 3. Please include with your lab report.
Exp. 47 b. PREPARATION OF NYLON. Polymerizations and types of polymers.
• Readings: p. 385-398.
• Assigned questions: # 2, 5.
FINAL EXAM and CHECKOUT – Takes place during lab time. No checkout is allowed prior to this date unless you withdraw from the course. All lab reports are due on this date.