Course Syllabus

CHEM 2123 & 2023 – ORGANIC CHEMISTRY LABORATORY I & **RECITATION**
Spring 2007 - All sections

Professor: Dr. Sergio Cortes
Phone: 972-883-6801
Email: scortes@utdallas.edu
Office: BE 3.330
Hours: TBA
Website: http://utdallas.edu/~scortes/ochem/index.htm

Course Pre-requisites

- General Chemistry I and II or equivalent (lecture and laboratory)

Course Description

This 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.

Student Learning Objectives/Outcomes

Upon completion of this course, students will:

- Be able to describe and utilize safety protocols associated with basic organic chemistry laboratory operations.
- Know how to keep written records, produce reports of experiments, interpret experimental data and draw relevant conclusions.
- Be able to prepare, purify, and characterize simple organic compounds.
- Know how to work and communicate effectively in small groups and teams.

Required Textbooks and Materials

TEXTBOOK: Pavia, Lampman, Kriz, and Engel. *Introduction to Organic Laboratory Techniques: A Microscale Approach*. **4th ed**. Thomson Brooks/Cole, 2007.

***Note**: We are not using the 3rd edition of the textbook. If you already own it here are some things to consider: (a) you can get by with the third edition, but some experiment numbers and most page numbers have changed. It would be your responsibility to keep track of those changes, (b) we will use the 4th edition in organic lab II, (c) some of the assigned readings from the new edition do not exist in the old one, and (d) you probably will not be able to sell the third edition after you complete the two courses. If you can afford to purchase the fourth edition you will use it for a year and save yourself some hassles.*

SUPPLIES: The list below is good for two semesters of organic lab. Supplies must be obtained by Check-in week (typically the second full week of class).

- 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.

- 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).

Class schedules and important deadlines

All assignments and lab reports are due one week 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 own time and observing the following schedules, therefore:

THERE ARE NO EXTENSIONS OR MAKEUPS FOR QUIZZES OR EXPERIMENTS

Numbers in parenthesis indicate experiment numbers in the third edition of the textbook

RECITATION SCHEDULE	
Jan. 9	Introduction, Safety assignments
Jan. 16	Record keeping, Experiment 9 (7)
Jan. 23	Experiment 3 Part A
Jan. 30	Experiment 4 Parts A,B
Feb. 6	Experiment 5 Parts A,B
Feb. 13	Experiment 16 (15)
Feb. 20	Experiment 13 (12) Part A
Feb. 27	IR Spectroscopy
March. 6	***Spring Break***
March 13	Experiment 23 (21) Parts A, C
March 20	Experiment 25 (23) Part A
March 27	Experiment 49 (47) Part B, and final announcements

EXPERIMENT SCHEDULE	
Jan. 9 - 19	NO LABS
Jan. 23 - 26	Check-in Experiment 9 (7)
Jan. 30 – Feb. 2	Experiment 3 Part A
Feb. 6 - 9	Experiment 4 Parts A,B
Feb. 13 - 16	Experiment 5 Parts A,B
Feb. 20 - 23	Experiment 16 (15)
Feb. 27 – Mar. 2	Experiment 13 (12) Part A
March 6 - 9	***Spring Break***
March 13 - 16	IR Spectroscopy exercise
March 20 - 23	Experiment 23 (21) Parts A, C
March 27 - 30	Experiment 25 (23) Part A
Apr. 3 - 6	Experiment 49 (47) Part B
Apr. 10 - 13	FINAL EXAM and CHECK OUT

Numbers in parenthesis indicate experiment numbers in the third edition of the textbook

QUIZ SCHEDULE	
Jan. 16 – 22	Quiz 1 on safety, Quiz 2 on exp. 9 (7)
Jan. 23 – 29	Quiz 3 on writing lab reports Quiz 4 on exp. 3
Jan. 30 – Feb. 5	Quiz 5 on exp. 4
Feb. 6 – 12	Quiz 6 on exp. 5
Feb. 13 – 19	Quiz 7 on exp. 16 (15)
Feb. 20 – 26	Quiz 8 on exp. 13 (12)
Feb. 27 – March 12	Quiz 9 on IR spectroscopy
March 13 - 19	Quiz 10 on exp. 23 (21)
March 20 - 26	Quiz 11 on exp. 25 (23)
March 27 – Apr. 2	Quiz 12 on exp. 49 (47)
Apr. 3 – 9	All quiz review (*not graded*).
Note: The all quiz review CANNOT be available while there are sections taking the final exam. Do not ask for extensions.	

NOTE: *All quizzes* ***start at 12:00 am*** *on the beginning date, and* ***end at 11:55 pm*** *on the ending date.*

TOPIC DESCRIPTIONS

INTRODUCTION, SAFETY – Safety in the organic lab, material safety data sheets, using the internet for research.

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

- **Readings**: p. 542-554 and 558 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, available at *http://www.utdallas.edu/chemistry/resources/safety.html*

  b. **Obtain an MSDS** for a chemical of your choice using the internet. Print it out, highlight physical constants, and 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.

RECORD KEEPING, BASIC INFORMATION SOURCES – How to write lab reports and use scientific sources to obtain physical constants and safety information.

- **Readings**: p. 566-576 and 579-580 in textbook.

Exp. 9. ANALGESIC DRUGS AND ISOLATION OF ACTIVE INGREDIENT. Solid-liquid extraction, filtration, and melting point determination.

- **Check-in takes place this week**. Report to BE 2.330 at the designated time for your section.
- **Readings**: p. 71-74, 618-624, and 627-633
- **Assigned questions from exp. 9**: # 1-5 on p. 74. Please include with your lab report.

LAB REPORTS ARE DUE A WEEK AFTER COMPLETION OF THE CORRESPONDING EXPERIMENT

Exp. 3A. CRYSTALLIZATION. Basic technique and uses, vacuum filtration.

- **Readings**: p. 22-25, 637-646, 647-656, and table on p. 659.
- **Assigned questions from the textbook**: # 1 on p. 32. Please include with your lab report.

Exp. 4 A & B. EXTRACTION. Liquid-liquid extraction, miscibility & solubility issues, distribution coefficient.

- **Readings**: p. 32-37, 669-677, and 679-685.
- **Assigned questions from the textbook**: # 1 on p. 42. Please include with your lab report.

Exp. 5 A & B. THIN LAYER CHROMATOGRAPHY (TLC). Basic theory and practice of chromatographic separations.

- **Readings**: p. 42-46, 777-779, and 782-788.
- **Assigned questions from the textbook**: problems # 1 – 4 on p. 791. Please include with your lab report.

Exp. 16 A-C. ISOLATION OF PIGMENTS FROM SPINACH. Combined use of column chromatography and TLC to isolate and identify natural products.

- **Readings**: p. 136-142, and 758-763.
- **Assigned questions from the textbook**: # 1. 3, 4 on p. 142. Please include with your lab report.

Exp. 13A. CHEMICAL SYNTHESIS: PREPARATION OF ISOPENTYL ACETATE. Esterification, reflux, simple distillation, boiling point determination, driving equilibrium reactions.

- **Readings**: p. 99-108, 600-603, 694-696, and 702-710.
- **Assigned questions from the textbook**: 3-7 on p. 107-108. Please include with your lab report.

INFRARED SPECTROSCOPY. Introduction to organic spectroscopy and structure determination.

- **Readings**: p. 847-867 and notes online.
- **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. 23 A & C. SYNTHESIS OF ALKYL HALIDES AND NUCLEOPHILIC SUBSTITUTIONS. Illustration of Sn1 and Sn2 reactions applied to the synthesis of alkyl halides.

- **Readings**: p. 195-203.
- **Assigned questions from the textbook**: For *n*-Butyl bromide: 1 and 3-5.
  For *t*-Butyl chloride: 3, 5. Both sets are on p. 203.

Exp. 25 A. ELIMINATION REACTIONS: PREPARATION OF 4-METHYLCYCLOHEXENE. Illustration of acid-catalyzed E1 reaction, alkene synthesis, tests for unsaturation, IR analysis.

- **Readings**: p. 211-216.
- **Assigned questions from the textbook**: 1, 2(a-d), and 3 on p. 216. Please include with your lab report.

Exp. 49 B. PREPARATION OF NYLON. Polymerizations and types of polymers.

- **Readings**: p. 397-405, 409-410, and 413.
- Assigned questions: None.

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**.

Grading Policy

- Recitation attendance 10%
- Online quizzes 20%
- Reports & Assignments 50%
- 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 = **A-**	70 – 74 = **B-**	55 – 59 = **C-**	40 – 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.

ONLINE QUIZZES. Quizzes are available for several days prior to the experiment to which they refer (see schedule on p. 4 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 reports**. Assignments are typically completed outside the lab and handed in using a specified format. Experiment reports 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. 3 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**.

Course Policies

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/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 s*upplies.*
- **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.

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 & OTHER IMPORTANT POINTS

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.

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.

Likewise, stopping attendance without official withdrawal results in automatic failing grade.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3*, and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and

regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter

called “the respondent”). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent’s School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean’s decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester’s end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student’s responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of

the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

Off-Campus Instruction and Course Activities

Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at the website address given below. Additional information is available from the office of the school dean. (http://www.utdallas.edu/Business Affairs/Travel_Risk_Activities.htm)

These descriptions and timelines are subject to change at the discretion of the Professor.