

# Chemistry 30475 – Organic Chemistry Laboratory – Fall 2008 (Section 600, Call #17948)

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Dr. Earley's Schedule				
	M	T	W	R
9:30-12:20pm		Org. Lab		
12:00-1:00pm	Office Hrs.		Office Hrs.	
1:00-1:50pm	Intro. Organic	Office Hrs.	Intro. Organic	Office Hrs.
2:00-2:50pm	Basic Organic	Basic Organic	Basic Organic	Basic Organic
3:00-4:00pm	Office Hrs.	Office Hrs.	Office Hrs.	
4:00-5:00pm				
5:00-5:30pm	Office Hrs.		Office Hrs.	
5:30-6:45pm	Chem. World		Chem. World	
7:00-9:50pm	Chem. World Lab			

*Additional office hours available by appointment*

Class Schedule		
9:30-12:20pm	Tuesday	208 East Wing

## Required Materials

- Required: *Course Pack (handouts), Organic Laboratory Notebook, Safety Goggles*

## Prerequisites

Students are expected to have successfully completed the equivalent of one year of college-level General Chemistry, which will typically be CHEM 10060 and 10061. In addition, students must either have successfully completed or concurrently be enrolled in either Basic Organic Chemistry (CHEM 20481), Organic Chemistry (CHEM 30481), or an equivalent course.

## Course Description

**Catalog Description:** *Practical experience in synthetic methods and separation techniques. Spectroscopy applied to organic chemical problems. Multistep synthesis.*

This course provides an introduction to basic laboratory techniques and synthetic procedures of use to practicing organic chemists. Both theoretical and practical applications of spectroscopic (IR, NMR, and UV/Vis) and chromatographic (TLC, column chromatography, and HPLC) techniques will be included.

## Attendance

Attendance in laboratory is required. You may not turn in a laboratory report if you were not present to complete that experiment. While a small amount of flexibility is possible to allow makeup experiments, this should only be used for extraordinary situations. Safety goggles are required and must be worn at all times while in the laboratory. If you are unable to attend laboratory during the regularly scheduled time, you must contact Dr. Earley BEFORE lab. Excused absences will only be given for legitimate, documented excuses.

## Grading

Grades for this course will be based on laboratory reports, quizzes, and an exam. Specific guidelines for each of the laboratory reports are given below. Point values and due dates for each of these laboratory reports are given in the "Tentative Schedule" section near the end of this syllabus. Late laboratory reports will be accepted, but will be penalized 1 point per weekday (Mon-Fri) late.

Copies of relevant laboratory notebook pages must be turned in at the end of each laboratory period and will be considered part of each report. These notebooks are not expected to be models of neatness and beauty, but must be legible and include all data obtained in lab (quantities of reagents, yields, mp, etc.).

In addition to the laboratory reports, four (4) unannounced prelab quizzes worth 5 points each and one examination worth 25 points each will be given. These quizzes will focus on basic information relevant to that day's experiment that students should know before coming to lab. The lowest quiz score will be dropped. Dates for all laboratory experiments and the exam are given in the lecture outline below.

Grades will be based on the scale shown below and will not be curved or arbitrarily adjusted in any manner. Extra credit will not be given.

Grading Scale		
Laboratory Reports		195 pts
Best 3 Prelab Quizzes	3 x 5 pts	15 pts
Laboratory Exam	20 pts	20 pts
<b>Total</b>		<b>230 pts</b>

Grade	A	B+	B	B-	C+	C	C-	D	F
%	90-100%	88-89%	82-88%	80-81%	78-79%	72-78%	70-71%	60-70%	<60%
Points	207-230	202-206	189-201	184-188	179-183	166-178	161-165	138-160	<138

## Laboratory Procedures

Bound laboratory notebooks containing carbonless, removable pages are required and can be purchased from the bookstore. To encourage the most efficient use of lab time, students are generally required to write complete procedures in these notebooks before attending lab. Near the beginning of each lab period, I will check to verify that these procedures have been written out, and this information will become part of the laboratory report grade. Copies of these notebook pages must be turned in at the end of each laboratory period.

## Quizzes and Exams

Quizzes and the exam will be designed primarily to test understanding of the chemical reactions performed in lab. These will not focus on experimental procedures (*How many milliliters of dichloromethane were used to extract caffeine from tea leaves?*), but rather will emphasize general principles (*Why was dichloromethane used to extract the caffeine?*).

## Pregnancy

There are very few studies on the potential hazards of most of the chemicals we use in the laboratory toward unborn children. Organic compounds, particularly volatile organic solvents, have the potential of causing harm. While you will be taught how to access material safety data sheets for all of the compounds we use in lab, in most cases this will yield little to no useful information for pregnant mothers. *The safest option is to not be in the laboratory if you are pregnant.* If you choose to stay in the laboratory, be aware that there are potential risks for your child.

## Student email accounts

All students enrolled in the Kent State University system are given a FlashLine account. FlashLine is the internet 'portal' that provides access to e-mail, Web for Students, WebCT/Vista, and a number of other resources. University policy states that email is a valid method of transmitting information to students, so it is important to check your e-mail periodically.

## Computers and Internet Usage

I will occasionally make reference to material that is available either locally or on the Internet throughout the semester. All of this material will be accessible using any modern Internet browser (Microsoft Internet Explorer, Netscape Navigator, Mozilla, Firefox, Opera, etc.) While it is not required that you take advantage of this information, some of this material can be quite helpful. The address for my Web site is:

<http://www.personal.kent.edu/~cearley>.

## Final Grades and Web for Students

Final grades for students are NOT mailed to students at the end of every semester. The ONLY way for students to find their grades is to look at Web-For-Students (<http://wfs.kent.edu> or through Flashline). I will not be able to give final course grades out over the phone, by e-mail, etc.

## Office Hours

Office hours are listed near the top of this syllabus. If you would like to meet with me outside of these normal times, see me before or after class (or call) and we can set up additional time to meet.

## Course Withdrawl

If you are considering withdrawing from this or any other course, you are encouraged to consult with a staff member in the Student Services Office, 134 Main Hall. Withdrawal from a course can affect financial aid, student status, or progress within your major. For withdrawal deadlines, please refer to [http://www.registrars.kent.edu/home/TermUpdate/sche\\_adj.htm](http://www.registrars.kent.edu/home/TermUpdate/sche_adj.htm).

## Academic Honesty

Use of the intellectual properties of others without attributing it to them is considered a serious academic offense. Cheating or plagiarism will result in a failing grade for the work or for the entire course. Repeat offenses result in dismissal from the University. University guidelines require that all infractions be reported to the Student Conduct Officer on our campus.

## Students with Disabilities

Kent State University recognizes its responsibility for creating an institution atmosphere in which students with disabilities can succeed. In accordance with University Policy Subpart E...104.44, if you have a documented disability, you may request accommodations to obtain equal access in this class. Please contact the disability coordinator on campus, Kelly Kulick in Student Accessibility Services, located in the Student Success Center, lower level of the Campus Center, phone (330)244-5047, or [kkulick@kent.edu](mailto:kkulick@kent.edu). After your eligibility for accommodations is determined, you will be given a letter which, when presented to instructors, will help us know best how to assist you.

## Campus Security

If you need to reach Campus Security, their phone number is 330-705-0430.

## Grievance

The "Kent State University Digest of Rules and Regulations" (available online at <http://www.kent.edu/regional/>) should be consulted for information on grievance procedures, statement of non-discrimination, and additional information on official policies.

## Classes Canceled - Campus Closings

Announcements of class cancellations and/or campus closings will be made on the campus home page. In the case of an emergency, weather-related or otherwise, please check the web page at [stark.kent.edu](http://stark.kent.edu) for information on the buildings and times of the closing. While information may be broadcast by radio and television, this should be confirmed by the web page, which is the official announcement of the campus and which will be the information used to determine issues related to student attendance, rescheduling of tests, and other concerns.

## Recycling

The KSU Stark Campus has made a commitment to recycling. Please take a few seconds to separate your trash. Aluminum cans and plastic and glass bottles may be placed in the blue recycling bins, and all types of paper may be placed in the blue recycling bins. All other waste may be placed in the black, brown or gray trash cans.

## General Information for Laboratory Reports

Laboratory reports will generally summarize a series of related laboratory experiments. These reports must be typed. In general, complete sentences must be used for all reports. Spelling, grammar, etc. will be taken into account when these are graded. Students having trouble are encouraged to make use of the Writing Center.

The format of these reports will vary considerably depending on the laboratory activities covered and the point in the semester. In general, laboratory reports will start out as fairly simple summaries, but should advance toward the goal of producing a formal report in a format suitable for submission to a scientific journal. Chapter 3 of your laboratory 'textbook' (pp 13-15) gives information on the format of scientific papers.

Requirements for each of the individual reports are summarized below (following the Tentative Schedule). In some cases, more specific guidelines for reports will be provided in laboratory.

## Tentative Schedule

All dates listed below are tentative and are subject to change. The following dates should be noted:

- <sup>(S)</sup>Last day to receive any tuition refund is September 19.
- <sup>(W)</sup>Last day to withdraw from a course is November 1.

Date	Experiment
Aug. 26	Lab Safety, Scientific Literature <b>3.4</b> (lecture), MSDS <b>1.1</b> (lecture)
Sep. 2	Check-in, Melting Points <b>4.1</b> , Sublimation <b>4.2</b>
Sep. 9	Distillation <b>4.3</b>
Sep. 16 <sup>(S)</sup>	Crystallization <b>4.4</b>
Sep. 23	Isolation of Caffeine from Coffee <b>6.1</b>
Sep. 30	Gas and Column Chromatography <b>4.5</b>
Oct. 7	HPLC Determination of Caffeine <b>4.6</b> , UV/Visible Spec. <b>5.3</b>
Oct. 14	IR Spectroscopy <b>5.1</b>
Oct. 21	NMR <b>5.2</b>
Oct. 28 <sup>(W)</sup>	S <sub>N</sub> 2 Substitution Rxn. <b>6.2</b>
Nov. 4	Aldol Condensation <b>6.5</b>
Nov. 11	<b>Veteran's Day</b> - No Lab
Nov. 18	Aldol Condensation (cont.)
Nov. 25	Synthesis of Esters <b>6.3</b>
Dec. 2	Check-out, <b>Exam</b>

## Requirements for Laboratory Reports

**MSDS** (10 pts) - Requirements for the MSDS report are described in the lab textbook. *Due Sept. 2.*

**Sci. Literature** (10 pts) - Requirements for this reports are described in the lab textbook. *Due Sept. 2.*

**Melting Points/Sublimation** (15 pts) - Write a report modeled after the "Results and Discussion" section of a scientific paper using the guidelines in Chapter 3 of your lab textbook. (Do not include experimental procedures, introduction, etc.). Summarize all of the data requested (including the graph) in your lab notebook. Including tables to summarize data is appropriate in this section of a scientific paper. *Due Sept. 16.*

**Distillation** (15 pts) - Write a report modeled after the "Results and Discussion" section of a scientific paper. Summarize all of the data requested (including the graph) in your lab textbook. *Due Sept. 23.*

**Crystallization** (15 pts) - Write a report modeled after the "Results and Discussion" section of a scientific paper. *Due Sept. 30.*

**Isolation of Caffeine** (15 pts) - Write a report modeled after the "Experimental Section" of a scientific paper. Be sure to review section 3.1 of the lab textbook before writing this report. *Due Oct. 7.*

**Chromatography** (20 pts) - For the Gas, Column, and HPLC labs, write a report modeled after the "Results and Discussion" section of a scientific paper. For all of these, summarize the results obtained and comment on the convenience, accuracy, and limitations of these techniques. For the Column Chromatography experiment, comment on the purity of the dyes. Describe the relationship between these three techniques and the advantages/disadvantages of each. *Due Oct. 21.*

**UV/Vis** (10 pts) - For the Reichardt's Dye experiment, complete the table I will give you summarizing all student data. Discuss how this absorbance spectra relate to the observed colors of these samples. *Due Oct. 21.*

**IR** (15 pts) - For the experimental data, complete the table I will give you summarizing all student data. Answer the H.W. questions in your lab textbook (p. 51) and on the experimental data handout. *Due Oct. 28.*

**NMR** (15 pts) - Answer the H.W. questions in your lab textbook (p. 56) and analyze the  $^1\text{H}$  NMR spectra that will be handed out in class. *Due Nov. 4.*

**S<sub>N</sub>2** (15 pts) - Write a report modeled after the "Results and Discussion" section of a scientific paper. Summarize all of your data and answer the discussion questions found in your lab textbook. *Due Nov. 18.*

**Aldol Condensation** (25 pts) - This report is to be modeled after a full scientific paper, and must include a Title, Introduction, Experimental, and Results & Discussion sections. Your report should include all data obtained (yield, %yield, and melting points) and discuss characterization and purity of the products obtained. *Due Dec. 2.*

**Esters** (15 pts) - Write a report that includes the "Experimental" section of a scientific paper. Summarize all of your data (including the odor of the product you obtained). *Due Dec. 2.*