

CHEMISTRY 260L (01, 02)

(CHE 260L)

ORGANIC CHEMISTRY I / LABORATORY

"Welcome to What You Love Experimenting: CHEMISTRY!!!"

Summer 2006 / Session A / May 30 – June 30

1:00 PM - 5:00 PM (01) Tuesday & Thursday

5:30 PM - 9:20 PM (02) Tuesday & Thursday

Jennings Hall 325 (JE 325)

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COURSE OBJECTIVE AND DESCRIPTION

YOU CANNOT SERIOUSLY CONSIDER LEARNING ABOUT SCIENCE WITHOUT **PRACTICING** IT. Well, if there is **A** SCIENCE that especially requires practicing it in order to seriously consider learning about it, this is **CHEMISTRY** for sure! Also, if there is **A** SCIENCE that is **AN** EXPERIMENTAL SCIENCE, this is **CHEMISTRY** for sure!

Well, still need to be convinced about the necessity of a 100% experimentally-oriented laboratory course such as CHEMISTRY 260L?????

The main objective of CHEMISTRY 260L is to 1) "consolidate", and 2) expand your knowledge of Organic Chemistry acquired in the "Organic Chemistry I" lectures *via* the **PRACTICE** of Organic Chemistry; especially the **PRACTICE of Synthetic Organic Chemistry**.

The primary focus of CHEMISTRY 260L is on the **development** of basic experimental techniques that are important to the **synthetic organic chemist** toward the preparation, isolation, purification, and analysis of the products of organic reactions.

Spectroscopy, a means to gather information about the structure of molecules by making physical measurements on compounds, will also be studied in the context of CHEMISTRY 260L.

OTHER REMARKS OF GENERAL INTEREST

Arrive at lab ready to do chemistry!!! Preparation for the laboratory includes reading the laboratory procedure (handout) and supporting material (if any), and preparing your notebook in advance.

Pre-lab discussions will be kept to "a minimum". Post-lab discussions will be *occasionally* conducted to ensure that the key points of the exercises (the experiments!) have been understood, to generalize the concepts beyond the specific examples used, and will *always* conclude with the post-laboratory question sheets.

Laboratory is scheduled for a ca. four (4) hour period. Realize that the time needed to complete the laboratory will depend on the actual experiment and your preparedness.

ATTENDANCE POLICY

PROMPT ATTENDANCE FOR LABORATORY SESSIONS IS REQUIRED.

Students arriving late to laboratory sessions will not be able to participate in the pre-lab discussion, and thus, will not be allowed to complete the exercise.

If you **must** miss a lab, you **must** be excused **by me, OJ-CN**. A legitimate excuse for missing a lab "can be" illness. Other situations may also be considered legitimate (by me, OJ-CN, and me only), but they better be rock-solid legitimate situations! If you **must** miss a lab, contact me **as soon as possible after the lab** (*within 24 hours*) or, if possible –actually, highly recommended!–, **let me know before the lab**. If you miss a lab and do not contact me *within 24 hours*, you will receive zero points for both the post-laboratory question sheet and the laboratory report. Under **NO** circumstances will you be allowed to miss more than one (1) lab. Hey, it's Summer Organic, there is **NO** time for missing lab work!

SAFETY CONSIDERATIONS

There is only one kind of laboratory –one that is safe, clean, well organized, and in an environment conducive to learning; and discovery! This is the kind of laboratory which must be run in this course. **Students not dressed properly or prepared properly will NOT be permitted into the laboratory.**

final course grade than does any single examination. The laboratory can offset a low examination grade in CHE 260. The laboratory work is dependent mostly on individual efforts and dedication of the students to writing good reports at their own convenience. Thus, the laboratory grade is dependent on effort as well as mastery of specific techniques. The **laboratory grade** is a cumulative average based on the **laboratory notebook** (20 Points), the **laboratory reports** (100 Points), the **post-laboratory question sheets** (30 Points), and the **spectroscopy worksheet** (60 Points) as indicated below.

With this being said, SCSU Chemistry Department policy requires that students taking courses which include lecture AND laboratory **MUST PASS THE LABORATORY** in that course in order to **PASS THE COURSE**, regardless of the average grade received in lecture. A **passing grade** for the **LABORATORY** in that course requires that you achieve **AT LEAST 60% of the lab points** in that course, *i.e.*, **a minimum of 126 Points** ($0.60 \times 210\text{pts}$) in the present case (CHE 260L); a piece of cake, believe me!

• **Laboratory Notebooks.** *20 Points (9% of Lab Points)*

Laboratory notebooks **will not be** systematically collected -and graded- at the end of each laboratory session. However, you will be required to maintain a "*research quality*" laboratory notebook. I will keep an eye on the "maintenance" of laboratory notebooks during the course of the laboratory sessions, but I may also collect laboratory notebooks once during the course of the Summer / Session A, and write some comments in them -if necessary!

Laboratory notebooks will be definitely collected on the **last week of laboratory** (week of **June 26, 2006**), and can be turned in, **AT THE VERY LATEST**, on the last day of lecture, *i.e.*, **June 29, 2006**. You may receive up to a total of 20 Points. They will be returned to you on the first day of class in CHEMISTRY 261, *i.e.*, July 3, 2006; otherwise, please stop by my office (JE 327), and pick them up.

The "minimum required information" -that would come to anybody's mind- to "**CLEARLY & CLEANLY**" include in your laboratory notebook is:

- A Table of Contents.
- Title of the experiment.
- Date.
- Reference to the experimental procedure.
(cite "handout" [affix the handout into your notebook], or any other distributed information)
- Chemical reaction to be performed (write it when any),
or A brief statement of objective if no reaction is involved.

- A table of Reagents and Solvents (when any) with **actual** amounts (g, mg, L, mL) and **calculated** numbers of moles (mol) or millimoles (mmol), including their physical properties (when indicated in handout).
- Record of any pertinent observations.
- Record of all collected, required data.

- **Laboratory Reports.**

100 Points (48% of Lab Points)

The **laboratory reports** will serve as the place to **1)** state the goal(s) of the experiment, **2)** indicate the source of the procedure that you used, **3)** turn-in your experimental results, **4)** discuss your results and some collected –or given– analytical data, and **5)** draw some conclusions. **These laboratory reports should ONLY contain the information that is requested on the laboratory report sheet that will be handed for each experiment.** However, they should be **clearly written and presented** (*i.e.*, word processed). **NEATNESS COUNTS!!!**

There should be five (5) laboratory reports for a total of five (5) laboratory experiments (wet labs).

Each laboratory report will be worth *20 Points*.

Proper scientific language and English usage and content are mandatory in all reports. Do not repeat word for word the theory or any other information given in the handouts or supporting material. This is **PLAGIARISM**, and anyways I know what is said in these materials!

Proper reports must be based on the **actual** data obtained in the experiment. No report however well written will be accepted, if the appropriate data is not used. Scrupulous honesty in reporting results is crucial in any scientific investigation no matter how apparently insignificant the study may be. Part of the training in chemistry is the reporting of all results honestly.

ATTENTION!!!: Laboratory reports are due BEFORE or BY THE DEADLINE which is indicated on the laboratory report sheet that will be handed for each experiment. Late or missed laboratory reports will receive a grade of zero except in the case of substantiated illness (a physician's note is required). Hey, it's Summer Organic, there is NO time for late work! And I mean it!

- **Post-Laboratory Question Sheets.**

30 Points (14% of Lab Points)

The **post-laboratory question sheets** will serve as the place to –hopefully!– show your –hopefully!– true-enough understanding of the experiment of the day.

There should be six (6) post-laboratory question sheets for a total of five (5) laboratory experiments (wet labs).

Each post-laboratory question sheet will be worth *5 Points*.

- **Spectroscopy Worksheet.** *60 Points (29% of Lab Points)*

Spectroscopy, a means to gather information about the structure of molecules by making physical measurements on compounds, will be studied in the context of the laboratory. A total of three (3) laboratory sessions (dry labs) will allow us to cover NMR, UV-Visible, and IR spectroscopies, and also mass spectrometry (MS), and practice them.

A spectroscopy worksheet will be distributed on the week of **June 12, 2006**, for the sake of practicing this important aspect of analytical organic chemistry, and it will be due **NO LATER THAN June 30, 2006, 5:00PM**.

The spectroscopy worksheet will be worth *60 Points*.

- **Important Remarks about Laboratory Reports and Post-laboratory Question Sheets.**

You should know the **names** and **structures** of most of the compounds you worked with (unless told otherwise), know all the **reactions** carried out (if any) along with their **mechanism**, know the **reagents** needed (if any), and –of course!– know how to use the analytical tools that we will have covered (IR, MS, NMR, GC, and TLC). You are also expected to know **WHY** various procedures were followed, **WHY** certain side products were or were not formed. This listing is not meant to be all inclusive, but is given to provide a basis for your studying, ...and your understanding of what "takes place" in JE 325!

ACADEMIC IMPROPRIETY

This polished euphemism needs to be brought up. 'Cheating' (and I hate to use this term, especially at this august institution) of any kind will not be tolerated, because it degrades the principle of meritocracy. Specific application to this course will largely cover the **writing of laboratory reports**. Identically written lab reports are unacceptable, and if you are caught **plagiarizing**, it will be reflected in the grade.

LABORATORY SCHEDULE

| Day of . . . | Experiment |
|--------------|---|
| May 30th | HELLO! GENERAL COMMENTS, SAFETY, & CHECK-IN |

#1 – Recrystallization & Melting Point Determination

Lab Report Due No Later Than: June 6th

June 1st

#2/Part I – MACROscale Fractional Distillation

June 6th

#2/Part II – Gas Chromatography (GC)

Lab Report Due No Later Than: June 13th

June 8th

#3 – MICRO- and MACROscale Liquid-Liquid Extraction

Lab Report Due No Later Than: June 20th

June 13th

Spectroscopy Lecture: NMR (Chap. 11)

June 15th

#4 – Thin-Layer Chromatography (TLC)

Lab Report Due No Later Than: June 27th

June 20th

Spectroscopy Lecture: UV-Vis (Chap. 12: 12.1) & IR (Chap. 12: 12.2)

June 22nd

Spectroscopy Lecture: IR (Chap. 12: 12.2) & MS (Chap. 12: 12.3)

June 27th

#5 – Separation by Gas Chromatography (GC)

Lab Report Due No Later Than: June 29th

June 29th

CHECK-OUT; GOODBYE! HAPPY 4th of JULY!

SEE YOU NEXT WEEK!

AND LAST, BUT NOT LEAST

CELLULAR PHONES

All cellular phones and paggers and beepers and other devices of this type are **STRICTLY FORBIDDEN in the teaching laboratory (JE 325), ...unless **TURNED OFF** and **KEPT AWAY**.**

Under NO circumstances are telephones to be answered or used to make a call in the laboratory.

Students who ignore this policy will be asked to leave the laboratory **PROMPTLY**, and will receive a grade of **ZERO** for **ALL** evaluations to be carried out during that time.

If you are on call for work related emergencies or personal reasons, switch all devices to a mode that will not disturb the laboratory (*i.e.*, vibrate mode), and inform the instructor prior to class.

There will be a ZERO tolerance in this course with regard to the use of telecommunication devices, and the rules stated above will be **STRICTLY ENFORCED**.