ORGANIC CHEMISTRY LAB II

COURSE OUTLINE
SPRING SEMESTER 2002

Bülent Terem

LAB MANUAL:
Pavia, Lampman, and Kniz, "Introduction to Organic Laboratory Techniques," Third Edition (1988)
Reading must be done PRIOR to coming to lab.

OTHER LITERATURE SOURCES:
Lab hand-outs;
Silverstein, Bassler, and Morrill, "Spectrometric Identification of Organic Compounds"

SOFTWARE:
"Introduction to Spectroscopy" interactive software for IR, NMR, MS -can be accessed through academic computing -excellent method to review organic spectroscopy and to be prepared for unknown analyses; student are expected to be able to use this software competently.
"NMR instrumental simulation" - can be accessed through academic computing.
"Proton NMR Spectrum Simulator" calculates and plots spectra of organic molecules constructed; for Macintosh computers -available in organic chemistry lab; student are expected to be able to use this software competently.
"ChemDraw" Cambridge Soft Corp. -chemical structure drawing software - can be accessed through academic computing.

Physical characteristics, safety and toxicological data about most of the compounds used during this lab session can be accessed through the following Web sites (among others):
http://chemfinder.camsoft.com http://www.fisher1.com/catalogs/index.html (and click on Acros Organics)

SAFETY REQUIREMENTS:
It is not only common sense to be safety conscious in the lab, but we are legally required to do so. Our labs are equipped with extensive safety features. However, lab safety starts with the individual: Eye protection (safety glasses or goggles) and adequate footwear must be worn at all times in the lab (whether actively working or not). Long hair must be tied at the back. Under no circumstances should an experiment be left unattended. Each student must buy a pair of rubber gloves and a roll of paper towels.

GRADING:

Students must provide a bound, hard cover laboratory note-book with numbered pages and have this book with them in the lab at all times. Experiments should be written up during the lab period. The following tasks will constitute the basis of the lab grade. All these tasks must be attempted in order to pass the lab course. No make-up labs will be given with the exception of extraordinary circumstances such as a verified medical excuse with written verification from an MD detailing student's inability to attend lab. Any student with more than one unexcused absence will not be able to pass the lab course. No lab reports or unknown identifications will be accepted after the last day of instruction (May 4, 2000).

Results of classification tests for functional groups:	5%
Identification of Unknown 1	10%
Identification of Unknown 2	10%
Identification of Unknown 3	10%
Lab note-book	15%
Lab quizzes	20%
Spectroscopic Analysis Reports	15%
Experimental competence and results	15%

SUBMITTING REPORTS:

Brief write-ups for each experiment and NMR reports should be sent as an MSWord attachment to the following mailbox: meanprof@yahoo.com

Please note that this mailbox is only for reports and assignment. For regular correspondence with me please continue to use terem@gold.chem.hawaii.edu

GENERAL COMMENTS:

During the first semester of the organic lab the emphasis was on acquiring experimental skills and learning experimental techniques. In the second semester, it is expected that these skills are utilized. Consequently, the experiments scheduled will require more competence, and at times, an ability to adapt procedures.

Several conventional functional group conversion experiments will reinforce the topics covered in the lecture course, highlighting special techniques in electrophilic aromatic substitution and popular carbonyl reactions. Qualitative analysis strategies will be introduced early on in the semester, to be utilized during classification tests for organic functional groups. Meanwhile, students will be expected to review and apply their spectroscopic skills using software developed for this purpose.

The last six weeks of the semester is scheduled for identification of three unknowns and for the preparation of a derivative for one of them. Each student is expected to work independently during this period at his/her own pace. Keeping the lab note-book adequately is particularly important at this stage, since procedures will vary depending on the unknown. After identifying an unknown, each student is expected to submit (on-line) a brief discussion of NMR spectra in report form before being allowed to go to the next unknown (further details on the format of this report is supplied).

Clearly, the students are expected to play a larger part, and at the same time learn more, in the second semester's well-structured, but fairly autonomous lab course. The first semester's well established and followed lab *etiquette* will be valid for this semester also. Maximum and efficient use of time spent in the lab will be especially relevant while working independently. It is hoped that the spring semester in the lab will be fun, and the skills accomplished at the end will give a sense of fulfillment.

LABSCHEDULE

1	1/15; 1/17	Introduction; Orientation; Check-in	
2	1/22; 1/24	Infra-red Spectroscopy	Spectroscopy Lecture Hand-out
3	1/29; 1/31	Physical Properties of Organic Compounds: Solubility Determination; Microscale Boiling Point Determination	PLK Experiment 56 Procedure 56A, pp.427 Technique 6.2, pp.552 Hand-outs
4	2/5; 2/7	Nitration of Methylbenzoate	PLK Experiment 31 .233-236
5	2/12; 2/14	Classification Tests for Organic Functional Groups: Lab 1	PLK Experiment 56 Procedures C-I pp.438-468 Hand-out
6	2/19; 2/21	Classification Tests for Organic Functional Groups: Lab 2 Determination of an Unknown Functional Group	PLK Experiment 56 Procedures C-I pp.438-468 Hand-out
7	2/26; 2/28	NMR Spectroscopy: Spectral and Instrumental Simulations	Hand-out
8	3/5; 3/7	Grignard Reaction: Preparation of triphenylmethanol from phenyl bromide and benzo henone	PLK Experiment 30 pp.223-232 Procedures .227-9
9	3/12; 3/14	Chemistry of Carbonyl Compounds: Aldol Condensation: Preparation of benzalacetone from anisaldehyde and acetone Preparation of Dilantin	PLK Experiment 48 pp.353-357 Hand-out
10	3/19; 3/21	ualitative Analysis of Unknown 1: Lab 1	PLK Experiment 56 (plus)
11		SPRING BREAK	
12	4/2; 4/4	Qualitative Analysis of Unknown 1: Lab 2	PLK Experiment 56 (plus)
13	4/9; 4/11	Qualitative Analysis of Unknown 2: Lab 1	PLK Experiment 56 (plus)
14	f1 6; 4(18	Qualitative Anal gis of Unknown 2: Lab 2	PLK Experiment 56 (plus)
15	4/23; 4/25	Qualitative Analysis of Unknown 3: Lab 1	PLK Experiment 56 lus
16	4/30; 5/2	Qualitative Analysis of Unknown 3: Lab 2	PLK Experiment 56 (plus)