

Spring 2006

Instructor: Dr. George Weeks; Office 411B, Phone 762-6626

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Office Hours: pm MW and TTh

(or make an appointment by e-mail)

Laboratory: BL 425, 432, 12:30-5:20 T (class will initially meet in BL 3XX for discussion at 12:30)

DEPARTMENT: Chemistry

COURSE NUMBER: CHE 325-01

CREDIT HOURS: 3

I. Title: Organic Chemistry Lab I

II. Catalog Description: A continuation of CHE 315 involving more complicated syntheses, including polymers, and the identification of unknown compounds of a variety of classes, using instrumental (IR, GC/MS, FTNMR) techniques. Four and one-half hours of laboratory per week. Prerequisite: CHE 315. Corequisite: CHE 320 – Organic II lecture.

III. Course Purpose: To introduce the student to the theory and practice of organic chemistry in the laboratory, including both synthesis and analysis.

IV. Course Objectives: The student will become experienced in the manipulation and purification of organic compounds by recrystallization and distillation; quantitative and qualitative analysis by gas chromatography; the identification of organic compounds by chemical and spectroscopic means, including infrared, nuclear magnetic resonance, and mass spectroscopies. The student will also gain practical experience in organic synthesis, demonstrating typical reactions of selected functional groups.

V. Content Outline:

SAFETY: ALL STUDENTS ARE REQUIRED TO WEAR APPROVED SAFETY GOGGLES DURING LAB PERIODS.

Students are expected to work individually on each laboratory experiment, expect where noted below. All work to be turned in, including notebooks, should be exclusively the work of the individual.

Date **Schedule** (Note: We will follow the "Miniscale Technique.")
All dates below are tentative and subject to change
Additional homework will be assigned during lectures

<u>Week</u>	<u>Date</u>	<u>Laboratory Experiment(s) Performed</u>
1	1/19	Check into laboratory; <u>begin</u> : Multistep Synthesis of Sulfanilamide; <u>set-up</u> : Photochemical Synthesis of Benzopinacol
2	1/26	<u>continue</u> : Multi-step Synthesis of Sulfanilamide;
3	2/2	<u>conclude</u> : Multi-step Synthesis of Sulfanilamide;
4	2/9	<u>begin</u> : Grignard Synthesis of Triphenylmethanol
5	2/16	<u>conclude</u> : Microscale Grignard Synthesis of Triphenylmethanol; Conversion of Benzopinacolone into Benzopinacol
5	2/16	<u>begin</u> : Chromic Acid Oxidation of Cyclohexanone to Cyclohexanol; Preparation of its 2,4-DNP Derivative
6	2/23	<u>conclude</u> : Chromic Acid Oxidation of Cyclohexanone to Cyclohexanol; Preparation of its 2,4-DNP Derivative
	2/23	Exam on Laboratory Techniques
7	3/2	<u>begin</u> : Identification of an Unknown Alcohol, Aldehyde or Ketone; Derivative Preparation;
8	3/9	<u>conclude</u> : Identification of an Unknown Alcohol, Aldehyde or Ketone; Derivative Preparation; <u>begin</u> : Aldol Synthesis of Tetraphenylcyclopentadienone;
9	3/16	<u>conclude</u> : Diels-Alder Synthesis of Hexaphenylbenzene; <u>begin</u> : Identification of an Unknown Amine; Preparation of an Amine Derivative
	3/18 – 3/28	Spring Break
10	3/30	<u>conclude</u> : Identification of an Unknown Amine; GROUP PRESENTATION Preparation of an Amine UNKNOWN Derivative

11	4/6	Preparation and Chemiluminescence of the Heterocycle 5-Aminophthalazdione, "Luminol"
12	4/13	Reactions of Carbohydrates; Identification of an Unknown Sugar; (Phenyl-)Osazone Formation
13	4/20	Identification of a General Unknown from the Classes; Alcohol, Aldehyde, Amine, Carbohydrate, Carboxylic Acid, Ketone, and Phenol; Derivative Preparation
14	4/27	Identification of a General Unknown & GROUP Derivative Preparation; Check Out of Laboratory
		May 4 Thursday 11:30 FINAL EXAM – 1-2 hour exam

Check-Out: NOTE: A \$25.00 FEE WILL BE CHARGED TO STUDENTS WHO DO NOT CHECK OUT OF LAB.

VI. INSTRUCTIONAL ACTIVITIES: Lab

VII. FIELD, CLINICAL, AND/OR LABORATORY EXPERIENCES: Lab

VIII. RESOURCES: "BLACKBOARD" on MSU web

IX. Grading Procedure:

Lab Notebook: 30%

Lab Results: 20%

Hourly Exam: 15%

Final Exam: 25%

Evaluation of Lab Assistant and Professor: 10%

Letter grades will be assigned at the end of the semester on the basis of the sum of the above normalized scores as follows: A = 90-100; B = 80-89; C = 70-79; D 60-69; E = 59 or below.

X. Attendance Policy: Attendance is **required** in this course. Absences will be recorded and will be taken into account in the final grade. "Dry-labs" will not be tolerated. Make- up experiments create logistical problems, and may also present additional safety hazards when they are carried out while the class is doing scheduled experiments. **As a consequence, no make-ups will be allowed.** The student must complete all required experiments, turn in all lab reports and attempt all hour exams in order to receive a passing grade.

XI. Academic Honesty Policy: Academic Dishonesty: Cheating, plagiarism

(submitting another person's material as one's own), or doing work for another person which will receive academic credit are all impermissible. This includes the use of unauthorized books, notebooks or other sources in order to secure or give help during an examination, the unauthorized copying of examinations, assignments, reports, or term papers or the presentation of unacknowledged material as if it were the student's own work. Disciplinary action may be taken beyond the academic discipline administered by the faculty member who teaches the course in which the cheating took place.

XII. Text: 1) Gilbert and Martin, "Experimental Organic Chemistry, A Miniscale & Microscale Approach," third edition, and associated Pre-Lab Exercises.

Website: <http://www.chemfinder.com>.

2) Experiments for Organic Chemistry II Laboratory by David A. Owen

XIII. PREREQUISITES: CHE-310, 315

COREQUISITES: CHE 320

XIV. STATEMENT OF AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY: Murray State University does not discriminate on the basis of race, color, national origin, sex, religion, marital status, age, or disability in employment, admission, or the provision of services, educational programs and activities, and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities. For information regarding nondiscrimination policies contact the Office of Equal Opportunity, 270-762-3155.