

CHE 233-002
ORGANIC CHEMISTRY LABORATORY--QUALITATIVE ANALYSIS
Spring 2005
SYLLABUS

This class meets from 11:00 AM - 1:50 PM each Tuesday and Thursday. On scheduled lecture and exam days you should come to room 320 at 11:00 AM. All other class days you should go to the lab (room 301, 303, 336 or 340) directly. Regular attendance and being present on time for lectures, exams and lab work is required.

Each section will have its own teaching assistant. The faculty supervisor for this course is Dr. A. Cammers. His office is room 349 (phone: 323-8977; e-mail: a.cammers@uky.edu). He can be reached by scheduling an appointment. The laboratory supervisor for all sections is Dr. M. A. Patwardhan. Her office is room 327 (phone: 257-3659; e-mail: mapatw00@uky.edu). She can be reached in that vicinity Mondays and Wednesdays from noon to 3:00 PM, and Tuesdays, Thursdays from 8:00 AM to 3:00 PM, or you may schedule an appointment.

You will be given handouts for this class during the semester. You may also use computer program 'Identification of Organic Compounds' (IOC), available at network computers in Chemistry / Physics Building and W. T. Young Library. You must purchase the required (Hayden-McNeil) student laboratory notebook.

GRADING

Your final grade will be calculated based on the following:

IOC assignments	5%
Exams (2)	20%
Lab reports (10)	
Singles (3)	18%
Separations (3)	18%
Identification of separated compounds (4)	24%
Final examination	15%

Letter grades will be assigned using the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
E	≤ 59%

SAFETY AND RESPONSIBILITY

Failure to observe safety rules and / or failing to behave in a safe and responsible manner may result in a failing grade and permanent dismissal from the course.

CHEATING AND PLAGIARISM

The Department of Chemistry considers cheating a very serious offense. The minimum penalty for cheating or plagiarism is the assignment of a grade of E for the course, in accord with University Senate Rules. Attempts to claim another person's work as your own, in any form or under any guise, is forbidden. All the work that you do for this course, must be your own only. This includes, lab write-ups, reports, data, spectra, results, laboratory notebooks, exams, etc. Falsifying laboratory data or 'dry labbing', making up data is cheating.

Removing laboratory chemicals, reagents or any other items from the laboratory is forbidden. Such behavior may result in a failing grade and permanent dismissal from the course.

LABORATORY NOTEBOOK, DUE DATES AND MAKE-UP POLICY

You must be present in the lab, on time. On the days, when a lecture or an exam is scheduled, lab work will start immediately following the lecture or the exam. On all other days it will start at 11:00 AM.

During each laboratory period, all the data and comments must be entered in your duplicating notebook. Your notebook must be given to your teaching assistant to inspect and initial. The duplicate (copy) sheets with all information must be turned in to your teaching assistant before you leave.

All your other data such as IR spectra, GC printouts etc. must have your name and date when you recorded it. Before you leave, you must have your TA sign and date it. There will be a penalty for failure to do so. For the details about the departmental laboratory notebook policy, refer to:

<http://www.chem.uky.edu/courses/common/notebook.html>

Due dates for turning in lab reports are given along with the schedule. All the lab reports are due at the beginning of those lab days. Ask your teaching assistant for the details of how to write laboratory reports. The teaching assistant for your section will grade all your work, including all the exams. There will be a penalty for turning in lab reports late.

If you have any questions regarding grading of any assignment, you must contact your Teaching Assistant or Dr. Patwardhan within one week of the date on which the assignment was returned. We reserve the right to regrade the whole assignment. Any assignments returned for regrading after more than one week from the day the assignment was returned will not be considered for regrading.

On the days when exams are scheduled, you must be in the classroom by 11:00 AM. You must take assigned seats based on the seating chart. You must not leave the classroom until 11:10 AM, even if you finish the exam. You will not be allowed to take the exam if you arrive after 11:10 AM. Fifty-minutes are allowed for both exams.

Students who miss scheduled class or exam for an excused absence, please contact Dr. Patwardhan as soon as possible. If an exam is missed without an excused absence, a '0' will be recorded as the grade for that exam. If students with an excused absence can not take the missed exam within one week of the original exam time, their final exam will count proportionately more. The manual *Student Rights and Responsibility* describes what are excused absences.

UNKNOWN AND SEPARATION

You will be given three single unknowns. You will identify each single unknown. For each single unknown, you will perform several tests such as preliminary tests, solubility tests, recording of melting or boiling point, recording of Infra red spectrum, at least three classification tests, etc. which will help you in identifying the unknown. For each single unknown you will write up a lab report explaining both the experimental work and logic you used to identify the unknown. For any of these three unknowns, you may also prepare a solid derivative. Ask your TA to give you the procedure for preparation of derivative.

You will be given three unknown mixtures containing two compounds each. You will separate all three of these to get six pure compounds. The expected purity of each of the separated compounds should be 95% or more. After the separation, you will write up a lab report explaining the experimental work, proof of purity (as evident by melting and or boiling points, infra red spectra, GC data, TLC data etc.) and the logic used for separation.

You will continue to identify any four, of these six compounds, obtained after separations. You will write up lab reports explaining both the experimental work and logic you used to identify these. Additional credit will be given for identifying and writing lab reports for more than four compounds.

You may use up to two mass spectra to help you in any of these identifications.

You will be writing a minimum of ten lab reports.

Identification of Organic Compounds (IOC)

You will obtain background information relating to identification of unknowns by working with the computer program 'Identification of Organic Compounds' (IOC), which provides 143 unknown organic compounds for which you can carry out simulated lab work leading to identification. Please obtain the list of unknown numbers (total of 20) that you need to identify from your teaching assistant at the beginning of semester. You will hand in printout(s) of the 'laboratory notebook report' for every unknown that you successfully identified, showing all the necessary tests, the inference from each test, your name and the unknown number and the name of the unknown. For every IOC assignment, you must correctly identify the assigned five compounds. For full credit, you must successfully identify a total of twenty compounds in four assignments.

IOC assignment	Due date
#1	February 3
#2	February 17
#3	March 24
#4	April 7

EXAM COVERAGE

Exam	Topic
Exam 1	Safety, Solubility, Infrared spectroscopy, Classification Tests: Aldehydes and Ketones: (1) 2,4-DNP (Derivative) (2) Iodoform test (3) Tollen's test Alcohols: (1) Ceric nitrate (2) Chromic acid (3) Lucas test Phenols: (1) FeCl ₃ (2) Br ₂ /H ₂ O (Derivative) Aromatics: (1) Aluminum chloride and chloroform
Exam 2	All material from Exam 1, GC-MS, Classification Tests: Amides, Esters, Nitriles: (1) Ferric hydroxamate Alkenes and Alkynes: (1) Br ₂ /CH ₂ Cl ₂ Amines: (1) Hinsberg Test (Derivative) Nitro Compounds: (1) Ferrous hydroxide Derivatives: 2,4-DNP, Br ₂ /H ₂ O, Hinsberg Test (see above)

Final Exam Comprehensive

NOTE: You may bring a calculator to all exams. You will not be allowed to borrow one during the exam. You will not be allowed to use other devices such as cellular phones, personal digital assistants, etc.

SCHEDULE

DATES	LECTURE SCHEDULE	SUGGESTED SCHEDULE OF EXPERIMENTS
January 13	Introduction Laboratory Safety	Check-in
18	Introduction to IOC	Single 1
20	Lecture on solubility	Single 1
25	Lecture on infrared spectroscopy	Single 1
27	Lecture on some classification tests, derivatives	Single 1
Feb. 1	Lecture on more classification tests, derivatives	Single 2
3	Lecture on GC/MS Last day to turn in IOC assignment # 1	Single 2
8	Lecture on more classification tests, derivatives	Single 2
10	Exam 1	Single 3
15	Lecture on Separation, Last day to turn in lab report for 'Single 1'	Single 3
17	Last day to turn in IOC assignment # 2	Single 3
22		Separation 1
24		Separation 1
March 1		Separation 1
3		Identification of any one from Separation 1
8	Exam 2	Identification of any one from Separation 1
10	Last day to turn in lab reports for 'Single 2 and 3'	Separation 2
22		Separation 2
24	Last day to turn in IOC assignment # 3	Separation 2
29		Separation 2

DATES	LECTURE SCHEDULE	SUGGESTED SCHEDULE OF EXPERIMENTS
March 31	Last day to turn in lab report for 'Separation 1 and 2'	Identification of any one from Separation 2
April 5		Identification of any one from Separation 2
7	Last day to turn in IOC assignment # 4	Separation 3
12		Separation 3
14	Last day to turn in lab reports for any two identifications from Separation 1 and / or Separation 2	Separation 3
19		Remaining identifications
21		Remaining identifications
26	Last day to turn in lab report for 'Separation 3'	Remaining identifications
28	Review for the final exam. Absolute last day to turn in any of the remaining lab reports. <u>Attendance is required.</u>	Check-out (required)
May 5, 8:30 - 9:30 PM	Common Final Exam* (Room to be announced on April 28)	

***Please note the final will be 1 hour, not 2 hours.**