

# Chemistry 36

# Chemical Separations

## Syllabus, Summer 2006

Instructor: Dr. Christopher R. Moylan  
283 Mudd (office hours: F 10:00-11:30 a.m.)  
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Teaching assistants: To be determined

Lectures: Tuesdays, 1:15-2:05 p.m., Braun Lecture Hall

Labs: Wednesdays, 1:00-5:00

### Textbooks:

1. J.R. Mohrig, C.N. Hammond, P.F. Schatz, and T.C. Morrill, *Modern Projects and Experiments in Organic Chemistry: Miniscale and Standard Taper Microscale*, second edition, Freeman (2003). This book will also be used for Chem 130.
2. J. R. Mohrig, C.N. Hammond, and P.F. Schatz, *Techniques in Organic Chemistry*, second edition, Freeman (2006). This book will also be used for Chem 130.
3. Chemical Education Resources, *Organic Chemistry Laboratory Notebook* (1998).
4. D.L. Pavia, G.M. Lampman, G.S. Kriz, and R.G. Engel, special custom edition including portions of *Introduction to Organic Laboratory Techniques: A Microscale Approach*, third edition, Thomson Learning (1999), and *Introduction to Organic Laboratory Techniques: A Small Scale Approach*, Thomson Learning (2005), optional (on reserve in Swain Library).
5. J.W. Zubrick, *The Organic Chem Lab Survival Manual*, sixth edition, Wiley (2004), optional (on reserve in Swain Library).

The course schedule includes reading to be done before each lecture. Additional reading is assigned for each experiment. There is no course reader; the individual experiment handouts can be downloaded from CourseWork and brought to lab with you (we recommend that you not bring your textbooks into lab).

## Course Schedule

<b>Week</b>	<b>Lecture topic, Reading (<i>Techniques in Organic Chemistry</i>)</b>	<b>Experiment(s)</b>
1 6/27	Introduction, filtration, melting points Chapters 1-7	Acetanilide, part 1 filtration
2 7/5*	Recrystallization Chapter 9	Acetanilide, part 2: filtration, recrystallization Luminol: filtration, melting point
3 7/11	Extraction Chapters 8 and 10	Fluorenone: extraction Acetanilide, part 3: melting point
4 7/18	Infrared spectroscopy Chapter 18	Isoamyl acetate: extraction, infrared spectroscopy
5 7/25	Thin-layer chromatography Chapter 15	Drug testing by TLC Get unknowns for separation
6 8/1	Column chromatography Chapter 17, sections 1-8	Carotene and chlorophyll from spinach: column chromatography
7 8/8	Distillation, boiling points Chapter 11	2-methylcyclohexanol, part 1: distillation, extraction
8 8/15	Gas chromatography, HPLC Chapter 16 and section 17.9	Separation of unknowns: extraction, IR 2-methylcyclohexanol, part 2: GC
Sat. 8/19	Final Exam 12:15-3:15 p.m.	None

\*Lecture will be on Wednesday this week, and lab will be on Thursday, due to the holiday.

## Grading

At the beginning of each lab, you will be given a quiz on the relevant material. The quiz score will constitute 25% of your grade for that lab. The other 75% will be based on the lab reports that you hand in by 4:00 p.m. two days after your lab period (Friday). Lab reports are handed in by putting them in the wooden box labeled "Chem 36" near room 235 Mudd. Reports for the first seven experiments will simply be the carbon copy pages from your lab notebook. For the final experiment, a separate written report is to be prepared, as preparation for Chemistry 130 when all lab reports are to be written up separately. Each experiment is therefore worth 100 points. There are eight experiments. Together, these will comprise 60% of your grade.

Throughout the quarter, your TA will observe your behavior and technique in lab, and at the end of the course will report a lab performance grade for you. It will be a number between 0 and 200, with a median of 100. Those grades will be corrected for variations between TAs. Bonus points are earned by helping other students, operating in a safe manner, taking the trouble to purchase a lab coat, performing procedures skillfully, using the minimal amount of chemicals, and operating efficiently. Demerit points can be earned by unsafe actions, failing to clean up completely after each experiment, hindering other students, staying late, and performing procedures badly. The lab performance grade will comprise 20% of your course grade. It is a purely relative score, so it reflects how your TA evaluated your performance in lab relative to other students, including students in sections other than your own. Halfway through the course, you may ask your TA where your lab performance to date ranks among all of the TA's students.

There will be a final exam, given on Saturday, August 19 from 12:15-3:15 p.m., which will comprise the remaining 20% of your grade. The exam will be based completely on the lectures. Lecture notes will be uploaded to CourseWork after each lecture, and those notes should be used as the study material for the exam. The written test will not have a bigger standard deviation than the other components of the course; your grade will be primarily determined by your performance in lab.