

Chemistry 29b Organic Chemistry Laboratory II

Summer 2018 Syllabus

Brandeis University

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Course description

The CHEM 29b course provides continuing experience in laboratory techniques of synthesis, isolation and purification of organic compounds. Experimental procedures reported in current literature are adapted in the lab to prepare molecules of biological significance. Modern methods such as microwave-accelerated organic synthesis are introduced. Spectroscopic methods are used to analyze compound identity and purity. CHEM 29B is a continuation of CHEM 29A.

Prerequisite: A satisfactory grade (C- or better) in Chem 29a or the equivalent. Co-requisite: Chem 25b. Dropping Chem 25b necessitates written permission from the lab instructor to continue with the lab. May yield half-course credit toward rate of work and graduation. Two semester hour credits.

Learning goals and objectives

- Understand organic chemistry in context of scientific literature
- Connect textbook reactions with practical laboratory techniques
- Read, follow and adapt literature procedures for a reaction goal
- Complete reaction sequence to a target molecule with research applications
- Develop scientific writing skills through lab reports

Class times and attendance

- **Lab sections: Tues, Thurs, 1:00 – 5:20 pm in Shapiro Science Center 00-08.**
- Attendance at all labs is mandatory!
- A brief prelab lecture will be given by your TA at the beginning of each lab.
- You are expected to arrive on time to each lab section so that the prelab lecture and experiment can begin promptly. If you are more than five minutes late to lab, both your prelab and lab report will be considered late and you will lose 5 points on each.
- Medically excused absences or emergencies communicated *prior* to the absence will be dealt with on a case-by-case basis. Due to the accelerated pace of the summer course, a make-up lab is not guaranteed.

Office Hours

Office hours: Mon, Tues, Thurs, Fri 11:00 am – 12:00 pm in SSC 00-08B.

Your lab TA will hold office hours at a time determined during your first lab section.

Required materials

- *Laboratory Techniques in Organic Chemistry*, 4th ed. by Mohrig, Alberg, Hofmeister, Schatz, Hammond, W. H. Freeman, 2014. ISBN 978-1-4641-3422-7.
- Duplicate page spiral bound laboratory notebook.
- Safety goggles – You may continue using your safety goggles from Chem 29a, or purchase the required goggles at the Brandeis University bookstore or at www.amazon.com (search for “Uvex S3960C Stealth Safety Goggles”).

Online resources

- LATTE course website: <http://latte.brandeis.edu>. All course handouts will be available on LATTE.
- Compound structures, physical data, spectra, etc. can be found at <http://sigmaaldrich.com>.
- ChemDraw and Chem3D software: <https://kb.brandeis.edu/display/SCI/ChemDraw+Professional> (see “Installation of Personal Copies” section).

Preparation for lab

Prepared students make for a safer and more efficient lab experience. Lab preparation includes familiarizing yourself with techniques relevant to the experiment (chapter readings and any handouts), attending the lab lecture, and completing the prelab. There is a grade penalty for incomplete prelabs and you will not be allowed to begin the experiment until the prelab is completed.

Laboratory safety

You will not be allowed to begin a lab without acceptable attire. No skin should be exposed, except for face and hands. Open-toed shoes, shorts, short skirts, and sleeveless or midriff-baring shirts are not proper laboratory attire. **Safety goggles are to be worn at all times while in the lab.** Eating, drinking, smoking and chewing gum are strictly forbidden in lab. Long hair should be tied back. At Check-In, you will be asked to read and sign a Laboratory Safety handout.

Grading

Grades will be distributed as follows:

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|---|-----|--|
| – Weekly laboratory reports | 35% | |
| – Metalloprotease project final reports | 20% | |
| – Lab performance | 10% | (evaluated by your TA) |
| – Final examination | 35% | (during Summer Session II Final Exam period) |

Course grades will be determined based on the class average and student distributions around the average.

Laboratory reports

Each experiment will require a preliminary laboratory report (prelab) and a weekly laboratory report. Download the appropriate lab report file from LATTE, and **do not modify any formatting**. Chemdraw software is available for drawing structures if desired (see online resources above). Each section of the prelab/weekly report is limited to one page. *Information presented on the wrong page or exceeding the 1-page section limit will not receive any credit.*

Prelabs: See the Report Information handout for prelab requirements. Your TA will check your prelab at the beginning of the lab before you begin the experiment. You will lose 5 points if your prelab is incomplete, and you will not be allowed to begin the experiment until the prelab is completed.

During lab: A duplicate page notebook is required to record your lab procedure, observations, and data. The carbon copy pages must be turned in with the final lab report.

Weekly laboratory reports: See the Report Information handout for report requirements. Your prelab and carbon copy notebook pages are part of your weekly report. You may revise prelab information as needed, but only submit one version for grading. Reports are due by the beginning of the lab period following experiment completion. Late reports lose 10 points per day (24-hr period). Graded reports will be returned by your TA at the lab following the session when the report was due. Lab reports are graded out of 50 points. The point distribution is as follows:

Prelab	15
Notebook pages: procedure, observations, etc.	25
Results (including wt, yield, mp, etc.), discussion, conclusions	10

There are no prelab or report questions for the weekly reports.

Final reports: A two-part final report will be required for the metalloprotease inhibitor research project.

Regrades

If you suspect errors in grading, first discuss it with your TA, then with the instructor as needed. Please note that your TA cannot adjust grades once the graded document has been returned. Any regrades must be submitted to Dr. Mascall with a note explaining the nature of the grading dispute *no later than two days after the document is returned*. The entire document will be regraded.

Use of electronics

The use of electronic devices (cellular phones, laptops, tablets, etc.) is strictly prohibited in labs and exams. If you require special accommodations for electronic use, please see me.

Disabilities

If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please present your letter of accommodation to Dr. Mascall as soon as possible. Please note that accommodations cannot be granted retroactively.

Academic Integrity

You are expected to be familiar with, and to follow, the University's policies on academic integrity. Please consult the Brandeis University Handbook on Rights and Responsibilities for all policies and procedures (pay particular attention to section 4). Any work submitted by a student for academic credit will be the student's own work. Allegations of alleged academic dishonesty will be reported to the Brandeis Student Rights and Community Standards Office. A first offense may result in zero assignment credit for all involved, and a repeat offense may result in suspension or dismissal from the University.

Course schedule

	Mon	Tues	Wed	Thurs	Fri	Experiment Schedule*
July	9	10 Lab 1	11	12 Lab 2	13	Lab 1: Rxn 1 – μ wave Diels–Alder cycloaddition Lab 2: Rxn 2 – Electrophilic aromatic substitution
	16	17 Lab 3	18	19 Lab 4	20	Lab 3: Rxn 3 – Amine protection Lab 4: Rxn 4 – μ wave nucleophilic aromatic substitution Rxn 5 setup – Peptide bond formation
	23	24 Lab 5	25	26 Lab 6	27	Lab 5: Rxn 5 workup and purification Lab 6: Rxn 6 – Boc deprotection <i>Metalloprotease project final report Part I due at lab 6</i>
	30	31 Lab 7	1	2 Lab 8	3	Lab 7: Rxn 7 – Carboxylic acid protection Lab 8: Rxn 8 – Peptide bond formation
Aug	6	7 Lab 9	8	9 Summer Session II Final exam period	10	Lab 9: Rxn 9 – Hydroxamic acid synthesis <i>Metalloprotease project final report Part II due at final exam</i>

*The experiment schedule is a tentative outline and is subject to change.