

Chemistry 2370B: Organic and Inorganic Structure Elucidation 2024–25 Course Outline

Instructor: [REDACTED]

Office: [REDACTED]

Office Hours: By appointment; e-mail for an appointment. Students must use their Western (@uwo.ca) email addresses when contacting Prof. Wisner. Please use Chem 2370b in email subject line.

E-mail: [REDACTED]

Lectures and Tutorials

Section	Day	Time	Room
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

The class notes will be posted to OWL at least 24 hours prior to the lectures.

Prerequisites

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Prerequisites for Chem 2370B: Either Chemistry 2213A/B or Chemistry 2273A and Chemistry 2211A/B or Chemistry 2271A.

Course Description

Calendar description: Structure determination using common spectroscopic methods including vibrational and nuclear magnetic resonance spectroscopy as well as mass spectrometry.

Course Topics

Class Topic
Administration, Introduction to Spectroscopy
Chapter 1: Molecular Formulas
Chapter 3: Mass Spectrometry <ul style="list-style-type: none">instrumentation; molecular weight determination; exact mass; isotopic clusters
Chapter 2: Infrared Spectroscopy <ul style="list-style-type: none">brief review of theory and important functional group frequencies and trends; interpretation of spectra
Chapters 5-9: NMR Spectroscopy <ul style="list-style-type: none">properties of magnetic nuclei and basic instrumentation; essential features of ^1H nmr spectra chemical shifts; ^{13}C and other heteronuclei nmr spectra; spin-spin couplings, magnitude of J; analysis of first order spectra, complex multiplets; chemical and magnetic equivalence and second order effects; OH/NH and dynamic processes; correlation spectroscopy

Course Materials

Introduction to Spectroscopy, 5th Edition, Pavia/Lampman/Kriz/Vyvyan The text will be used extensively. It is a source of numerous problems to integrate the theory behind the spectroscopic techniques and practical experience. Note the useful appendices at the back of the book listing important spectral parameters. Also note questions with an asterisk (*) have answers provided at the back of the text. (\$74.95 for the e-text from Cengage.ca or from the bookstore for a hard copy when available).

Students should check OWL Brightspace course page (<https://westernu.brightspace.com>) on a regular basis for news and updates. This and email announcements are the primary methods by which information will be disseminated to all students in the class. Students are responsible for checking Brightspace on a regular basis. All course material will be posted to OWL Brightspace.

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

There are many spectroscopy websites, and these are particularly useful:

General Spec: www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/Spectrpy/spectro.htm#contnt

Reich's NMR site: www.chem.wisc.edu/areas/reich/chem605/index.htm

Notre Dame spectral problems: www.nd.edu/~smithgrp/structure/workbook.html

Learning Outcomes

The course also has an emphasis on the development of skills such critical-thinking, analysis, and qualitative reasoning; these professional skills are essential to success in not just chemistry but also in other courses and many occupations.

Course-Specific Outcomes

- Recognize the importance of spectroscopy in underpinning chemistry and the physical sciences.
 - Think critically about, explain, integrate, and apply spectroscopic principles and theories.
 - Recognize the diagnostic features of a variety of spectroscopic techniques.
 - Elucidate the structure of a compound using a variety of spectroscopic techniques.
 - Identify advantages and shortcomings in spectroscopic techniques.
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Course Evaluation

The overall course grade will be calculated as listed below:

Component	Notes	Value
Problem Sets	5 at 5% each (Approximate due dates: Feb 12, Feb 26, Mar 5, Mar 19, Apr 2 2025)	25
Midterm tests	In-class, Friday, February 14 2025	15
	Friday, March 14, 2025	15
Final Exam	In-person, Cumulative; 3 hours; Scheduled by the Registrar in the April Exam Period	45

Missed tests and built-in assessment flexibility. Should you miss a Midterm test for any reason, there is no need to request academic consideration, provide documentation of any kind, or even contact the instructor. The weight of the missed midterm will be automatically transferred to the final exam. There are no make-up midterm tests. Students must achieve a minimum of 37.5/75 on the aggregate of the midterm tests and final exam grades to pass the course.

Students are expected to submit each of the problem sets by the deadline listed. Should extenuating circumstances arise, students do not need to request Academic Consideration and they are permitted to submit their problem set up to 48 hours past the deadline without a late penalty. Problem sets submitted after this period will be assigned a grade of zero and will not be counted toward the total number of assessments completed unless Academic Consideration is received for that problem set submission.

Students must complete 3 of 5 problem sets to pass the course (see above section regarding Course Evaluation). Students who do not complete the required number of assessments but have been accommodated for the missing assessments will be given an INC and will be allowed to complete them at the next offering of the course.

Policies

Fair evaluation. All students will be treated equally and evaluated using the same criteria described in this course outline. Private requests for reweighting of marks, additional assessments, special arrangements, etc. will be left without response.

Missed final exam. When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination. See the Academic Calendar for details (under Special Examinations).

Use of electronic devices. During tests and exams, only basic electronic calculators are allowed; all other devices (cell phones, tablets, cameras, or iPod, etc.) are prohibited.

Accommodation policies. Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing at https://academicsupport.uwo.ca/accessible_education/index.html

Scholastic offences. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Website: https://www.uwo.ca/univsec/academic_policies/rights_responsibilities.html