

CHEM*2070

Course Outline

Winter 2021

10 Jan 2021

Course name: Structure and Spectroscopy

A theoretical and practical introduction to molecular spectroscopy. Rotational, vibrational, electronic and magnetic resonance spectroscopies will be studied, including basic principles and instrumentation, theory and applications, and specific language used. The use of spectroscopic techniques in studying molecular structure and dynamics in chemical and biological systems will be illustrated.

After completing the course, the student is expected to understand (1) the underlying principles of spectroscopy, (2) what kind of information could be extracted from each of the main types of molecular spectroscopy, and (3) how to read and interpret simple spectroscopic data using acquired knowledge and reference book or database resources.

Credit weight: 0.5

Prerequisite: CHEM*2060 Structure and Bonding.

Websites: <http://www.chemistry.uoguelph.ca/soldatov/c2070> (Main Course Webpage)
<https://courselink.uoguelph.ca/d2l/home> (CourseLink)

Instructor: Prof. Dmitriy Soldatov E-mail: soldatov@uoguelph.ca
Assistant: Mehdi Esmaeili E-mail: esmaeili@uoguelph.ca
During the pandemic, the instructors are available through virtual tools only.

Lectures: Mon, Wed, Fri 11:30 - 12:20 Virtual Classroom

Tutorials: Fri 14:30 - 15:50 Virtual Classroom

Final exam: Mon, 26 Apr 19:00 - 21:00 TBA

Office hours: TBA TBA Virtual Classroom

For a detailed schedule of classes, assignment deadlines and exam dates/times see the Main Course Webpage.

Course Contents:

Introduction to Spectroscopy	A,B
Rotational Spectroscopy (Microwave & Raman)	C
Vibrational Spectroscopy (IR & Raman)	D
Electronic Spectroscopy (UV/Vis, PE)	E
Magnetic Resonance Spectroscopy (NMR & ESR)	F,G

For a detailed course description, see Lecture Notes.

Evaluation: [total marks 100]

Assignment / quiz 1	[10]	Parts A-C	(CourseLink, due Feb 10)*
Midterm 1	[20]	Parts A-C	(administered remotely, Feb 12, 14:30 - 15:50)
Assignment / quiz 2	[10]	Parts D-E	(CourseLink, due Mar 17)*
Midterm 2	[20]	Parts D-E	(administered remotely, Mar 19, 14:30 - 15:50)
Assignment / quiz 3	[10]	Part F	(CourseLink, due Apr 7)*
Final exam	[30]	All parts	(in-class**, room TBA, Apr 26, 19:00 – 21:00)

* Late assignments may be subject to 20% grade reduction per day.

** An in-person final exam has been scheduled, for which students must come to campus. In the event that an in-person final exam cannot proceed as scheduled due to COVID restrictions, the final exam will take place at the scheduled date and time, but will instead be administered remotely. Students will be informed of any such change via email, prior to the end of classes.

Required text: *CHEM*2070 Lecture Notes*, available from the Main Course Webpage.

Optional texts:

Modern Spectroscopy. (Wiley; 4th Ed. 2004)

Author: Hollas JM

Fundamentals of Molecular Spectroscopy. (McGraw-Hill; 4th Ed. 1994)

Authors: Banwell CN & McCash EM

Structure and Spectra of Molecules. (Wiley; 1985)

Author: Richards WG & Scott PR

Atkins' Physical Chemistry. 11th, 10th, 9th or 8th Ed.

(Oxford U Press / Freeman; 11th Ed: 2018; 10th Ed: 2014; 9th Ed: 2010; 8th Ed: 2006)

Authors: Atkins PW & others

General policies and regulations:

E-mail Communication: As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Drop Date: The last date to drop the course, without academic penalty, is the last day of classes (**12 April 2021**). The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Copies of out-of-class assignments: Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility: The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student. When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to make a booking at least 7 days in advance, and no later than March 1 (Winter semester). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. More information: www.uoguelph.ca/sas

Academic Misconduct: The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor. The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Recording of Materials: Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources: The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>