

SYLLABUS
Chem 564
Spring 2016

Molecular Phenomena: Phenomena which yield information on structures, energy levels, and interactions of molecules in solid, liquid, and gaseous phases.

Lectures: MWF 11:10 in Fulmer 225.

Instructors: Prof. Ursula Mazur (N116A) 335-5822 umazur@wsu.edu. Office Hours by appointment.

Textbook: **Molecular Spectroscopy** by I. N. Levine. Additional material will be provided.

Credits: 3

Prerequisites: Undergraduate or basic graduate level Quantum Mechanics.

Goals: The overall goal of this course is to show how basic concepts of quantum mechanics can be utilized to quantitatively explain atomic and molecular spectra.

Learning Outcomes	Course Topics:	Evaluation of Outcome:
After completing this course, the students should have learned: <ul style="list-style-type: none"> • how atoms and molecules absorb and emit light and how this process can be affected by magnetic and electric fields, • how to describe the electronic state of atoms in terms of quantum numbers, • the complexity of atomic spectra due to spin-orbit coupling and the interpretation of term symbols, • the contributions of transitions between rotational, vibrational and electronic states to the spectra of diatomic molecules, vibrations and electronic structure of polyatomic molecules 	Quantum Mechanics and Electronic Structure	Homework and Exam 1
	Vibrational Spectroscopy	Homework and Exam 1
	Rotational Spectroscopy	Homework and Exam 2
	Rotational-Vibrational Spectroscopy	Homework and Exam 2
	Electronic Spectroscopy	Homework and Exam 3

Homework: Homework assignments will be posted almost every Wednesday and will usually be due the Friday of the following week (i.e., you will have about 10 days to complete each homework. The intent is allow you a bit of flexibility so that you can budget your time accordingly. **You are encouraged to work in groups.** I hope that you will use the group homeworks as a vehicle for cooperative teaching and learning as well as a time-saving device. However, I do not want to see ‘carbon copies’ of the homework.

Regarding the group homeworks—some students fall into a trap of letting other members of their group do the hard intellectual work and think that they can catch up in time to take the exams. Of course, this is not only a mistake and not an effective way to learn—it is also bad manners.

You will be allowed **one and only one** late homework. No exceptions.

Final Grade: The grade will be determined by:

Homework (25%):

You are allowed to turn in one homework up to a week late. Otherwise, homework is due in class on the assigned day with no exceptions except your one free late homework. Homework will tend to test problem solving ability.

Exam 1, 2, and 3 (75%)

Each exam is worth 25% of the final grade. All exams are take-home. Please do not become complacent that you can find solutions to the questions without actually having to learn the material. Take-home exams tend to be longer and more difficult than in class exams. Thermodynamics is a subject that must be digested slowly. Please try to keep up and work at a constant rate. Last minute studying for a spectroscopy exam is usually a recipe for poor performance.

Time Management: This is a 3 credit course. You are expected to spend 3 waking hours a week in lecture. You should be spending a minimum of eight hours a week reviewing lecture material, reading text book(s), doing homework, and studying for exams. My advice to you is that you spend at least 3 of those 8 hours reviewing lecture material each week—and that you set aside regular time to study.

Everything that will appear on the exams or the homeworks will be covered in the lectures and lecture notes. However, you will want to supplement the lecture notes with reading from the text or other sources on spectroscopy.

Outside Reading: You should be doing a couple hours a week of reading. You are all mature enough to find readings on your own that supplement parts of the lecture that are hard to understand. People tend to like the second book on spectroscopy that they use more than the first.

If you are having trouble finding outside reading for a particular - ask!

About Spectroscopy: Spectroscopy is a general methodology that can be adapted in many ways to extract the information you need (energies of electronic, vibrational, rotational states, structure and symmetry of molecules, dynamic information).

Additional Reference Material: Any additional material will placed in the Chem 564 folder on diamond3.

Academic Integrity: Cheating of any kind is unacceptable. This includes the inappropriate use of solution manuals for homework sets, as well as the usual forms of copying, etc. Cooperative learning is encouraged, but all work submitted for grading must be your own. All instances of cheating will be reported to Student Affairs and the Dean of Students. The assignment in question will receive no

credit. Students who violate WSU's Standards of Conduct for Students will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions." The standards of Conduct for Students can be found at <http://conduct.wsu.edu>.

Change in the rules for withdrawals: There are no longer uncontested withdrawals so students cannot drop classes on the last day of instruction unless they cancel their entire enrollment. Students still have a total of four withdrawals during their career. The regular withdrawal deadline has been extended from week 9 to week 13. A student can use any of their withdrawals up until the end of week 13.

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. **Please notify me during the first week of class of any accommodations needed for the course.** Late notification may cause the requested accommodations to be unavailable. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Admin Annex Bldg, Room 205). Please stop by or call 335-3417 to make an appointment with a disability specialist. Call 335-3417 or visit <http://accesscenter.wsu.edu>, Access.Center@wsu.edu if you have questions.

Safety on Campus: WSU has developed resources for the safety of students, faculty, staff and visitors. These are the Campus Safety Plan at <http://safetyplan.wsu.edu> and the university emergency management at <http://oem.wsu.edu/>. You should also become familiar with the WSU ALERT site at <http://alert.wsu.edu> for information about emergencies affecting WSU. It is recommended that you go to the zzusis portal at <http://zzusis.wsu.edu> and **register your emergency contact information** for the Crisis Communication System (CCS).