

CHM 6580 ADVANCE SPECTROSCOPY

Spring Semester 2014

The goal of this class is to learn time dependent quantum mechanics and its application to spectroscopy with emphasis on condensed phase examples. We will look into correlation functions, relaxation, nonlinear spectroscopy and a general perspective on light-matter interactions.

INSTRUCTOR: Professor Valeria Kleiman. 311B CLB (Chemistry Laboratory Building), e-mail: kleiman@chem.ufl.edu, phone: 392-4656

CLASS SCHEDULE: January 7th – May 3th
T Period 3-4 (9:35 – 11:30 am) and R Period 3 (9:35 – 10:25 am)@ CLB 313
Office hours by appointment.

PREREQUISITES: The course requires a graduate level Quantum Mechanics course. The theoretical framework presented in this course is common to most modern spectroscopies (including electronic, vibrational and nuclear methods). Numerical methods to simulate spectra will be introduced in homework assignments.

TEXTBOOK: Some (but not all) of the class will cover topics presented in
Nitzan A. Chemical Dynamics in Condensed Phases.
ISBN: 9780198529798.
Schatz G. and Ratner M. "Quantum Mechanics in Chemistry"
ISBN: 9780486420035
Tannor D. "Introduction to Quantum Mechanics: A time dependent perspective"
ISBN 9781891389238
S. Mukamel, Principles of Nonlinear Optical Spectroscopy. (Oxford University Press, New York, 1995)

In addition, we'll make extensive use of lecture notes.

HOMEWORK & ASSIGNMENTS: The class will have a combination of homework and project assignments. This is a graduate course and the expectation is that you'll learn to study and to work independently. As a PhD student, and for the rest of your scientific career, you will do experiments for which the answers are not known. ***It is critical that you learn to assess the correctness of your results on your own.*** How do you do that? You compare to previous work, establish a correct method, check for similar problems, compare with the work of others and test your results. In this course we will attempt a step on

this direction by working on homework assignments for which answers will not be provided. I'll be available to consult and help with any homework problem, but only to guide you through the process.

The assignments will include a small amount of programming.

CLASS PARTICIPATION: This includes following the lecture material in a responsible way (as opposed to just taking notes), asking questions, and solving day to day problems and derivation that I might request from time to time.

PRESENTATION: Students will work on teams to present a recent paper that utilizes the concepts learned in this class.

COURSE GRADING: A tentative grading includes a combination of exams (35%), final project (35%) and class participation (30%).

HONOR CODE: The student honor code can be found at <http://www.registrar.ufl.edu/catalog/policies/students.html>
The students, instructor and TAs are honor bound to comply with the Honors Pledge:
We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

STUDENTS WITH DISABILITIES:

Students requiring special accommodations need to register at the Dean of Student Offices and bring the documentation to the instructor.

Counseling services are available at <http://www.counsel.ufl.edu/> or call (352)-392-1575 during regular service hours (8am-5pm). For other hours or weekends call the Alachua County Crisis Center (264-6789). Students may also call the clinician on-call at Student Mental Health for phone callback and consultation at (352)-392-1171.