

# Syllabus - Chem 6492 Spring

Understanding molecular spectra by applying time-dependent quantum mechanics.

## Topics

Introduction to Spectroscopy

Electromagnetic Waves *classical EM and photons*

1D and 2D NMR *density matrix, time-dependent perturbation theory (first order)*

Atomic Spectra *spherical symmetry and angular momentum, time-dependent perturbation theory (higher orders), Fermi's golden rule*

IR and Vibronic Spectra *molecular symmetry, Jahn-Teller effect*

Electronic Spectra *term symbols, selection rules, Jablonski diagrams*

Pump-Probe *time domain, two photon experiments*

Special Topics *quantum dots, 2D IR, SERS, etc.*

## Requirements and Grading Scheme

A > 90 % B > 70 % C > 50 %

Homework: 50% Test 1: 20% Test 2: 20% Test 3: 30% (one test is dropped)

Pass/Fail students need to take both tests and the final and receive an overall passing grade. Auditors are required to take both tests.