

SYLLABUS

Course: CH 394 **Special Topics: Modern Spectroscopy**

Semester: Spring, 2016

Professor: Carl Salter CHS 221
phone 610-625-7920

Optional Text: P. W. Atkins, *Physical Chemistry*, 6th Ed.
Saunders Publishing Co., 1994

Course Objectives: This special topics course will cover the modern theories and techniques of spectroscopy that are applied to many areas of chemical research. The wide variety of spectroscopic techniques used to analyze molecules and chemical systems will be examined, with particular focus on electronic and vibrational spectroscopy. The operation of lasers and modern laser spectroscopy will also be discussed.

Topics: Pure & Applied Spectroscopy
Sources: Lasers and Laser Operation
Detectors: Charge-Coupled Devices
Rotational Spectroscopy: Microwave
Vibrational Spectroscopy: Infrared
Raman
Electronic Spectroscopy: Absorption
Luminescence and Fluorescence
Photoelectron Spectroscopy
Physics of NMR

Materials:	Electronic Spectroscopy	Chapter 17	1,2,3,4,5,8,12
	Lasers	Handout, JMU laser workshop	
	Rotational and Vibrational Spec	Chapter 16	4,6,8,9,11,12
	Magnetic Resonance	Chapter 18	1,2,3,4,5,6,7

Spectroscopy Experimental Demonstrations:
Polarized Absorption
Helium atomic spectroscopy
IR spectra of polymers
Raman spectra of CCl₄, CHCl₃, and CDCl₃

Assignments and Evaluation:

Experimental Summaries	20%
Chapter Homework from Atkins	10%
Public presentation on topic of "interest"	15%

Exams:

Mid-term	25%
Final	30%