

CH 795T Molecular Spectroscopy Fall Session 2007

Class Time: M,W,F 11:20 - 12:10
Room: 623 Dabney

Instructor: Dr. Stefan Franzen, Partner III 363D
Office Hours: By Appointment

Text: Molecular Spectroscopy, Jeanne McHale, Prentice Hall
Recommended supplementary Texts: Quantum Chemistry, Levine, Allyn and Bacon Inc.
Physical Chemistry, Simon and McQuarrie, Science Publishing

Website: chsfpc5.chem.ncsu.edu/sf.html

Examinations: There will be one mid-term and a final.
Homework: There will be 5 problem sets.

Date	Topic	Read
Aug 22	Overview of Spectroscopy	Appendix A.1, A.2, Chap. 1.1, 1.2
Aug 24	Review of Particle in a box	1.3, 1.3.1, 1.4
Aug 27	Statistical Mechanics	1.3.2
Aug 29	Review of Vibrations	1.3.3
Aug 31	Review of Rotations	1.5, 1.6
Sept 5	Electromagnetic radiation	2.1, 2.2, 2.4
Sept 7	Reflection and refraction	2.3
Sept 10	Fresnel's equations	Website
Sept 12	Electrical properties of molecules	3.1, 3.2
Sept 14	The theory of polarization	3.3
Sept 17	Time-dependent quantum mechanics 1	4.1
Sept 19	Time-dependent quantum mechanics 2	
Sept 21	Spectral Lineshapes	
Sept 24	Fermi golden rule	4.2
Sept 26	Gaussians, Lorentzians and Other	
Sept 28	Einstein Coefficients	
Oct 1	Molecular polarizability	4.3 - 4.6
Oct 3	Connection with experiment	6.1 - 6.4
Oct 5	Atomic spectroscopy	7.1 - 7.4
Oct 8	Time-correlation function method	5.1 - 5.4
Oct 10	Time-correlation function applications	5.5 - 5.7
Oct 15	Mid-term	
Oct 17	Lasers and Experimental Apparati	6.5, 7.5 - 7.6
Oct 19	Rotational spectra	Chapter 8
Oct 22	Spectral lineshapes and moments	5.8 - 5.9, 6.6
Oct 24	Diatomics	Chapter 9
Oct 26	Normal modes of polyatomic molecules	Chapter 10
Oct 29	Molecular Vibrations	Chapter 10
Oct 31	Electronic spectroscopy	11.1 - 11.2
Nov 2	Frank-Condon factors	11.3 - 11.4
Nov 5	Computational methods	
Nov 7	Born-Oppenheimer Breakdown	11.5 - 11.6
Nov 9	Vibronic coupling	
Nov 12	Solvent effects on spectra	11.7 - 11.10
Nov 14	Resonance Raman spectroscopy	12.1 - 12.4
Nov 16	Raman excitation profiles	12.3 - 12.8
Nov 19	Calculation of Raman Spectra	12.3 - 12.8
Nov 26	Special Topics	

Nov 28 Special topics
Nov 30 Special Topics
Dec 3 Special topics
Dec 5 Special Topics
Dec 7 Special topics

Grades will be based as follows:

Problem sets	30%
Mid-Term Exam	30%
Final Exam	40%

There will be +/- grading.