Course Outline

Week	Date (* indicate HW due)	Lecture	Text
		Fundamentals of Quantum Mechanics	
1	Jan. 23 (Mon)	Origins of quantum mechanics	Chapt. 7
	Jan. 25 (Wed)	Classical Mechanics (harmonic oscillator)	
	Jan. 27 (Fri)*[1]	Schrödinger equation, operators	
2	Jan. 30 (Mon)	Observables and expectation values	
	Feb. 1 (Wed)	Uncertainty principle	
	Feb. 3 (Fri)*[2]	Particle in a box	Chapt. 8
3	Feb. 6 (Mon)	2-D particle in a box, degeneracy, tunneling	
	Feb. 8 (Wed)	Vibrations, harmonic oscillator	
	Feb. 10 (Fri)*[3]	Particle on a ring and angular momentum	
4	Feb. 13 (Mon)	Particle on a sphere and angular momentum	
		Rotational and Vibrational Spectroscopy	
	Feb. 15 (Wed)	Spectroscopy, rotations of molecules	Chapt. 12
	Feb. 17 (Fri)*[4]	Rotational selection rules	
5	Feb. 20 (Mon)	Rotational spectra, vibrations of diatomic molecules	
	Feb. 22 (Wed)	Vibrational, rotational spectra of diatomic molecules	
	Feb. 24 (Fri)*[5]	Vibrations of polyatomic molecules	
		Quantum Mechanics of Atoms	
6	Feb. 27 (Mon)	Hydrogen atom	Chapt. 9
	Feb. 28 (*Tue*)	**Exam 1 – 7:15 pm – Room 1361 Chem**	
	Feb. 29 (Wed)	No Class	
	Mar. 2 (Fri)	Hydrogen atom wavefunctions and spectra	
7	Mar. 5 (Mon)	Multielectron atoms	
	Mar. 7 (Wed)*[6]	Aufbau, Pauli principle	
	Mar. 9 (Fri)	Singlets and triplets, perturbation calculation	
8			
		Chemical Bonds (Molecules)	
	Mar. 12 (Mon)	Born-Oppenheimer approx, valence bond theory	Chapt. 10
	Mar. 14 (Wed)*[7]	Molecular orbital theory	
	Mar. 16 (Fri)	Diatomic molecules	
9	Mar. 19 (Mon)	Diatomic molecules	
	Mar. 21 (Wed)*[8]	Heteronuclear diatomic molecules	
	Mar. 23 (Fri)	Polyatomic molecules	
10			
		Electronic Spectroscopy	
	Mar. 26 (Mon)	Excited states, Fluorescence, Fates of excited states	Chapt. 13
	Mar. 28 (Wed)*[9]	Review lecture	
	Mar. 29 (*Thur*)	**Exam 2 – 7:15 pm – Room 1361 Chem**	
	Mar. 30 (Fri)	No Class	
	Apr. 2-6	Spring Break	
11			
		Stastical Thermodynamics	
	Apr. 9 (Mon)	Counting, statistics, Boltzmann distribution	Chapt. 15
12	Apr. 11 (Wed)	Partition functions	
	Apr. 13 (Fri)	Translations	
	Apr. 16 (Mon)	Energy and Entropy	
13	Apr. 18 (Wed)	Canonical partition function	
	Apr. 20 (Fri)	Thermodynamic functions	Chapt. 16
	Apr. 23 (Mon)	Molecular energies	
14	Apr. 25 (Wed)*[10]	Heat capacities revisited !!	
	Apr. 27 (Fri)	Equilibrium	
		Molecular Reaction Dynamics	
	Apr. 30 (Mon)	Collision theory, rate constants	Handouts
15	May 2 (Wed)*[11]	Diffusion controlled reactions	
	May 4 (Fri)	Potential energy surfaces, Activated complex theory	
	May 7 (Mon)	Activated complex theory	
	May 9 (Wed)*[12]	Thermodynamic formulation	
16	May 11 (Fri)	Review Lecture	
	May 15 (Tue)	**Final Exam – 2:45 pm – Room TBA**	