

Introductory Quantum Mechanics (Spring 2006)

April 14, 2006

Day	Date	Topics	Reading	Homework Due
Thu	19 Jan	<i>Quantum Physics</i> versus <i>Quantum Mechanics</i> ; Measuring spin	§1.1 and 1.2	—————
Mon	23 Jan	The quantum state vector; Analyzing spin measurements	§1.3 thru 1.6	—————
Thu	26 Jan	Guest lecture: Measurement theory and quantum mechanics		1.2, 1.3, 1.5
Mon	30 Jan	Kets, bras, and operators	§2.1 thru 2.3	—————
Thu	2 Feb	Operators and matrices; Photon polarization	§2.4 thru 2.8	1.7, 2.2, 2.3, 2.4
Mon	6 Feb	Rotations, commutation, and angular momentum	§3.1 thru 3.4	—————
Thu	9 Feb	Uncertainty relations; Spin-1/2 and spin-1	§3.5 thru 3.8	3.2, 3.5, 3.7, 3.8
Mon	13 Feb	Dynamics: Time translation and the Hamiltonian	§4.1 and 4.2	3.9
Thu	16 Feb	Midterm Exam #1 (Through Chapter 3)		
Tue	21 Feb	Precession of spin-1/2; Magnetic resonance	§4.3 and 4.4	—————
Thu	23 Feb	Dynamics of two-state systems; Energy & time uncertainty	§4.5 thru 4.7	4.3, 4.4, 4.11
Mon	27 Feb	Two distinguishable spin-1/2 particles	§5.1 thru 5.3	—————
Thu	2 Mar	Adding angular momenta; The EPR paradox	§5.4 thru 5.6	4.15, 5.1, 5.6
Mon	6 Mar	Wave mechanics from quantum mechanics; The Dirac delta function	§6.1 thru 6.3; App.C	—————
Thu	9 Mar	Momentum space; Free particles; One-dimensional problems	§6.4 thru 6.11	5.5, 6.3, 6.6
13-17 Mar Spring Break				
Mon	20 Mar	The harmonic oscillator; Raising and lowering operators	§7.1 thru 7.4	—————
Thu	23 Mar	Wave functions in position space; Generating functions	§7.5 thru 7.11	6.16, 7.1, 7.2, 7.4
Mon	27 Mar	Wave mechanics in three dimensions; Angular momentum	§9.1 thru 9.5	7.6
Thu	30 Mar	Midterm Exam #2 (Through Chapter 7)		
Mon	3 Apr	Central Potentials and Conservation of Angular Momentum	§9.6 thru §10.4	—————
Thu	6 Apr	The radial equation; Square well, H -atom, and harmonic oscillators	§10.5 and §10.6	9.1, 9.6, 9.13, 10.2
Mon	10 Apr	Time-independent perturbation theory; Examples	§11.1 and 11.2	—————
Thu	13 Apr	Degenerate perturbation theory; The Stark Effect	§11.3 and 11.4	10.14, 11.1, 11.6
Mon	17 Apr	Realistic one-electron atoms; The Zeeman Effect	§11.6 thru 11.9	—————
Thu	20 Apr	Identical particles; The helium atom;	§12.1 and 12.2	11.7, 11.9, 11.14
Mon	24 Apr	Introduction to scattering theory; The Born approximation	§13.1 thru 13.3	12.5
Thu	27 Apr	Midterm Exam #3 (Through Chapter 12, except Chapter 8)		
Mon	1 May	Path integrals, classical mechanics, and quantum field theory	Chap.8 and beyond	13.7