Schedule for Phys3220, Fa08

Updated as the semester goes on.

Readings for a given lecture are to be completed *before* the lecture. For a complement to the readings, check out the lecture notes.

WEEK	**Dates**	**Topics**	**Reading** for the week.
1	Aug 25-29	1. Intro 2. Postulates of QM - framing this course . 3. Probability and statistics - discrete and continuous variables, average (expectation value) and sigma.	Griffiths Ch 1.1-1.3 See also our lecture notes, Ch 1 part 1
2	Sep 1-5 (Mon=Holiday)	1. (Holiday) 2. Review complex #'s, classical waves and superposition, discuss "linear operators" 3. History of QM, (re) intro to Schrodinger Eq. Normalization (and more on operators)	See lectures notes for Chapter 1, parts 2-3. Griffiths 1.4 and 1.5
3	Sep 8-12	1. Operators and Eigenvalues, expectation values, sigma 2. Separation of variables 3. Infinite Square well eigenstates	Griffiths 1.6, 2.1, and 2.2 See lecture notes for Ch 2, parts 1 and 2.
4	Sep 15-19	1. More on infinite square well states: completenes, Fourier's trick, sketching 2. Interpretation of c_n (terms in Fourier expansion of e-state) (square => probability for measuring energy E_n) 3. Harmonic oscillator - 3 methods!	Griffiths 2.2 and 2.3 Lecture notes Chapter 2 , parts 2a and 2b.
5	Sep 22-26	1. Harmonic oscillator by "operator methods" (and intro to commutator) 2. (Prof DeWolfe) Wrap up operator method for HO, start free particle. 3. Free particle and Fourier Transforms	Griffiths 2.3 and 2.4 Notes Ch 2 part 2b, and part 3
6	Sep 29-Oct 3 (1st exam)	1. More on free particle, Fourier, and connection to Heisenberg uncertainty. Delta function and "orthonormality" for plane waves 2. Wrapping up free particle: interpreting phi(p) as "momentum space wave function". (Exam Thursday evening) 3. Wrap up Fourier transforms (focus on time dependence), Probability current, Intro to "scattering", reflection and transmission.	Griffiths 2.4 Griffiths 2.5 - we will not do the "delta function potential", but WILL cover reflection and Transmission coeffoicients, page 75 Lectures are noew changing the order around from the lecture notes just a bit, but we will be finishing lecture notes for Chapter 2 over the next week.
7	Oct 6-10	1. Interpreting J (current) for plane waves, Reflection and Transmission (R,T), starting Piecewise constants potentials ("step"). 2. More with piecewise constant potentials ("steps", bumps", tunneling) 3. Tunneling, and intro to finite square well	Griffiths 2.6
8	Oct 13-17	1. Finite square well (and qualititative wave function features 2. Wave functions as vectors, Hilbert space, intro to Dirac Notation 3. Operators, Hermitian operators, the first 2 postulates of QM in detail (1) State is |psi>, 2) observables correspond to Hermitian operators).	Wrapping up Chapter 2, starting Chapter 3. (Read 3.1-3.3, and first half of the online notes for Chapter 3)
9	Oct 20-25	1. Determinate states, more about Hermitian operators, 3rd postulate (if measure Q, get one of the e-values) 2.4th postulate (Probability of measuring e-value q is |<f_q| psi>|^2, where f_q is the corresponding e-vector, and 5th postulate (when measure q, you collapse to state f_q) 3. Continuous eigenvalues (x and p eigenvectors) and the 6th postulate (Schrodinger!)	Continuing in Chapter 3
10.	Oct 27-31	1. generalized uncertainty principle, 2. Compatible observables, Time dependence of expectation values (and energy-time uncertainty) Basically, wrapping up Chapter 3 3. Starting on 3-D!	Wrapping up Chapter 3, starting Chapter 4!
11	Nov 3 - Nov7	1. Central potentials, separation of variables in r, theta, phi. Y_lm functions. 2. Computing and Visualizing Y_lm's , intro to radial equation and "effective 1-D like TISE" for u(r) = r R(r) 3. Angular momentum operators and commutation relations.	Ch 4.1 , then 4.3

12	Nov 10 - Nov 14	1. Angular momentum uncertainty, connecting angular momentum to angular equation in TISE: complete set of commuting observables, psi_n,l,m, (where n tells about energy, l about lLl, m about Lz) 2. Angular momentum operator methods. (Midterm Thursday!) 3. (Prof. Pollock resumes) Review of angular momentum and 3D wavefunctions.	Ch 4.3 and 4.2
13	Nov 17 - Nov 21	1. Hydrogen radial wavefunctions. 2. Hydrogen wavefunctions, energies and spectrum. 3. Introduction to matrix mechanics	4.2 and 3.6
	Nov 24 - Nov 28		*Thanksgiving Holiday*
14	Dec 1 - Dec 5	1. Angular momentum in matrix mechanics 2. Motivation for spin and Stern-Gerlach experiment 3. Spin eigenvectors and eigenvalues, probabilities and expectation values	4.4
15	Dec 8 - Dec 12	1. Reviewing spin 2. Post test	

Physics 3220 home page.