

Syllabus for PHY362K

Unique #59620, Fall 2009

This syllabus represents my current plans and objectives. As we advance through the semester these plans may need to change to enhance the class learning opportunity. Such changes will be communicated clearly, are not unusual and should be expected.

Class	Date	Topic	Homework Assigned
1	8/26	Introduction	
2	8/28	Identical Particles. Bosons and Fermions	
3	8/31	The Exclusion Principle	
4	9/02	Exchange Forces and Helium Atom	1
5	9/04	Multi-electron Atoms. Mean Field Approximation	
6	9/07	Labor Day	
7	9/09	Quantum Statistical Mechanics	2
8	9/11	Thermal, Electric and Magnetic Properties of Solids	
9	9/14	Free-electron Metal and Band Theory	
10	9/16	Free-electron Metal and Band Theory	3
11	9/18	Non-degenerate Time-independent Perturbation Theory	
12	9/21	Degenerate Time-independent Perturbation Theory	
13	9/23	Fine-Structure of Hydrogen	
14	9/25	Hyperfine Splitting	
15	9/28	Zeeman Effect	
16	9/30	Review	4
17	10/02	Quiz 1	
18	10/05	Zeeman Effect	
19	10/07	Stark Effect	5
20	10/09	The Variational Principle	
21	10/12	Hartree-Fock equation. Helium Atom Revisited.	
22	10/14	WKB Approximation. Tunneling	6
23	10/16	Time-Dependent Perturbation Theory I	
24	10/19	Time-Dependent Perturbation Theory II	
25	10/21	Interaction of an Atom with an EM wave	
26	10/23	Fermi Golden Rule	
27	10/26	The Adiabatic Theorem	
28	10/28	Review	7
29	10/30	Quiz 2	

Class	Date	Topic	Homework Assigned
30	11/02	Concept of Differential Cross-Section	
31	11/04	Quantum Scattering Theory	8
32	11/06	Elastic vs. Inelastic Scattering	
33	11/09	Partial Wave Analysis	
34	11/11	Phase Shifts	9
35	11/13	The Born Approximation	
36	11/16	The EPR Paradox	
37	11/18	Bell's Theorem	10
38	11/20	The no-clone theorem	
39	11/23	Superconductivity	
40	11/25	Superconductivity	
41	11/27	Thanksgiving Holiday	
42	11/30	Review	
43	12/02	Quiz 3	
44	12/04	Review	

Final Exam: Friday, December 11, 2:00-5:00 pm.