

Date	Topic(s)	Leggett Lectures	Reading	Homework	Remarks
Jan. 6 Jan. 8	<i>2nd quantization</i> Intro <i>2nd quantization; free Fermi & Bose gases</i>	.	Leggett1, pp. 307-317 PJH notes		
Jan. 13 Jan. 14 Jan. 15 Jan. 16 Jan. 17	<i>Bose-Einstein Condensation</i> Bose-Einstein condensation Laser cooling and trapping Effective potential	1. The idea of a “quantum liquid” 2. Ultracold alkali gases	Leggett1, pp. 317-336	HW1	Hand out Jan. 17 Hand in Jan 30
Jan. 20 Jan. 21 Jan. 22 Jan. 23 Jan. 24	-----MLK day-no lecture----- Gross-Pitaevskii equations Superfluidity	3. BEC in a multiple-species system. 4. Liquid ⁴ He	Leggett2/ Marder Sec. 15-5 PJH notes		PH gone Jan. 23
Jan. 27 Jan. 28 Jan. 29 Jan. 30 Jan. 31	Vortices Interference of 2 Condensates <i>Superconductivity</i> Intro to superconductivity	5. Classical Superconductivity 6. Superfluid Liquid ³ He	“	HW1 solns	
Feb. 3 Feb. 4 Feb. 5 Feb. 6 Feb. 7	Cooper Problem BCS Theory 1 BCS Theory 2	7. Cuprate Superconductivity 8. BEC in optical lattices	Marder Ch. 27, A&M Ch. 34 PJH notes Addendum: Josephson	HW2	Hand out Feb. 4 Hand in Feb. 17
Feb. 10 Feb. 11 Feb. 12 Feb. 13 Feb. 14	Ginzburg-Landau Theory Magnetic properties of SC Josephson effects	9. Optional topics 10. Overview	“	HW2 solns	
Feb. 17 Feb. 19 Feb. 21	<i>Electron-electron interactions</i> Failures of band theory Screening in electron gas Impurity in a metal		Marder Sec. 17-5 A&M Ch. 17 PJH notes	HW3 HW3 solns	Hand out Feb. 17 Hand in Feb. 24
Feb. 24 Feb. 26	<i>Magnetism</i> Single ion magnetism Origin of magnetic exchange		Marder Chs. 24-26 A&M Chs. 31,32 PJH notes	HW4 HW4 solns	Hand out Feb. 24 Hand in Mar 17

Feb. 28	Magnetic ordering				
Mar. 3-7	-----APS March meeting -----				
Mar. 10-14	-----Spring break -----				
Mar. 17	Magnons			HW5	Hand out Mar. 17
Mar. 19	Magnetic neutron scattering		“		Hand in Mar. 28
Mar. 21	Itinerant magnetism/ Hubbard model				
Mar. 24	Magnetic impurities/ Kondo problem		“	HW5 solns	
Mar. 26	Dilute magnetic semiconductors I				
Mar. 28	Dilute magnetic semiconductors II				
Apr. 1*	<i>Quantum Transport</i>		Marder Chs. 17,18,20	HW6	Hand out Mar. 31
Apr. 2	Boltzmann equation		A&M Ch. 13		Hand in Apr. 14
Apr. 4	Transport properties of metals		PJH notes		
Apr. 7	Optical properties of metals		“	HW6 solns	
Apr. 9	“				
Apr. 11	Optical properties of semiconductors				
Apr. 14	Localization		“	Final exam	Final exam handed out
Apr. 16	“				
Apr. 18	Quantum Hall effect				
Apr. 21	“		“	Final ex solns	
Apr. 23	“				
Apr. 25					
Apr. 28					Final exam due

[Leggett1] A.J. Leggett, Rev. Mod. Phys. 73, 307 (2001)

[Leggett2] A. J. Leggett, Rev. Mod. Phys. 71, S318 (1999)

* Indicates lecture time to be scheduled