

**PHYS 617, Physics of the Solid State      Fall, 2007 Syllabus      Texas A&M University**

**Lectures:** MWF, 12:40-1:30, room 006 Civil Engineering Building

**Instructor:** J. H. Ross, Email: ross@physics.tamu.edu

course web-page: faculty.physics.tamu.edu/ross/617page.html

office: 422 ENPH (845-3842) ; lab: B03 ENPH (845-7823)

office hours: MW 1:30-2:30, or most anytime (try my lab if I am not in the office)

**Text:** Efthimios Kaxiras, *Atomic and Electronic Structure of Solids*, 2003.

Additional materials will be handed out in class as supplement.

Also see the course website for some useful references and links.

**Prerequisites:** PHYS 408 or 607 (Thermo./Stat. Mech.) and 412 or 606 (Quantum Mechanics) or their equivalents. (You need not have had a previous Solid State Physics course.)

<b>Grading:</b>	Homework (approx. 10 sets)	20%
	Exam 1	25%
	Exam 2	25%
	Final Exam	30%

**Tentative schedule** with corresponding chapters in Kaxiras text. **Exams:** these may be moved to an evening close to the indicated date if schedules allow.

week 1	8-27 to 8-31	Overview; Infinite crystals, bonding; Electrons. Ch. 1-2, Appx. D
week 2	9-3 to 9-7	Electron gas continued; Hartree-Fock. Ch. 2
week 3	9-10 to 9-14	Crystal symmetry, Bloch theorem, Brillouin zones. Ch. 3
week 4	9-17 to 9-21	Intro to band theory, tight binding, other methods. Ch. 4
week 5	9-24 to 9-28	Band theory continued; density of states, optical response. Ch. 4-5
week 6	10-1 to 10-5	Electronic properties continued; transport. Ch. 5

**Exam 1: Weds. October 3**

week 7	10-8 to 10-12	Lattice vibrations and phonons. Ch. 6
week 8	10-15 to 10-19	Phonons, specific heat, scattering. Ch. 6
week 9	10-22 to 10-26	Topics in magnetism. Ch. 7
week 10	10-29 to 11-2	Magnetism, de Haas van Alphen; Superconductivity. Ch. 7,8
week 11	11-5 to 11-9	Superconductors continued. Ch. 8
week 12	11-12 to 11-16	Semiconductors. Ch. 9

**Exam 2: Weds. November 14**

week 13	11-19, 11-21	Semiconductors continued. Ch. 9
	<i>Thanksgiving holiday, 11-22 to 23</i>	
week 14	11-26 to 11-30	Surface properties (Ch. 11) and/or other topics tbd.
week 15	12-3	Continuation, review.

**Final Exam Monday Dec. 10, 10:30 AM**

**Important Further Information:** The American with Disability Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, Room Room B118 of Cain Hall, 979-845-1637.

You should also know the Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.” and consult the Honor Council Rules and Procedures on the web, <http://www.tamu.edu/aggiehonor>.

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