Syllabus - Physics 461 - 2008

Instructor: Gary Farlow
271 Fawcett Hall
775 – 3340
Office hours Wednesday 2:30-4:30, or by appointment

Text: Omar: **Elementary Solid State Physics**. 2nd edition

Supplements: Myers, **Introductory Solid State Physics**
Hook and Hall, **Solid State Physics**, 2nd edition
Kittel, **Introduction to Solid State Physics**, 8th edition.
Ashecroft and Mermin, **Solid State Physics**

Grades: Midterm - 25%
Final - 25% This will be a paper on a modern solid state topic of interest to you. The topic and scope will need to be arranged by the 2nd week of the quarter
Homework -25% Due Tuesday of each week!
Lab - 25%

Labs: Begin first week. Need one hour introductory session for each lab then you are on your own to get them done. Allow two weeks and 7 hours per lab. Labs will be set out in RM 219 Fawcett

Debye-Sherer - X-ray crystallography
Laue - X-ray crystallography
Hall measurements
Debye temperature measurements
Optical absorption measurements

Homework:	Classwork:
Crystallography 1: 2,4,10,11,14, also find the compresibility in problem 14	1: 1,3,5,6,8,11,13
X-ray diffraction 2: 2,4,13,20,25	2: 3,9,14,15,17,21

Point defects 11: 1,3,6,7 (look at question 5), a)Use defect distribution generated by TRIM for 1MeV AR on 1 micron film of AgBr to calculate the average number of number of Frenkel pairs (b)The formation energy and migration energies for AgBr are given at the right. Compute the Ionic cond. in AgBr at 100C both with and without the radiation damage of the previous problem.	11: 4,5,19 Formation energy for AgCl H_F= 1.134 eV S_F = 6.55 k_b Migration energies H_{vac} = 0.325 eV s_{vac} = 1.16 k_b H_i = 0.043 eV s_i = -3.18 k_b H_{stlcy} = 0.278 eV s_{stlcy} = 1.35 k_b Aboage & Friauf Phys. Rev. B, 11, 1654 (1975).
Vibrational/thermal properties 3: 1,4(at high temp.),6,13,16	3: 5,8,15,lagrange method
Free electron metals 4: 1,7,10,12 (use log-log plots),15	4: 3,4,6,11,13
EXAM chapters 1-4,11	Take home due Feb 14 at 9:00 am
Real metals/band structure 5: 7,9,14,17,21 (it is the current density transverse to the field that must be zero)	5: 11,12,15,18,19
Semiconductors (2 weeks) 6: 2,4,5,6,9 6: 14,16,17,19,20	6: 3,7,10,11,13,15,18,
Magnetism 9: 4,6,11,12,19	9: 5,13,14,16,17
Superconductivity (if we get there) 10:1, 3, 5, 8, 9,	10: 2,4,6,7,
Final Exam – paper on special topic.	Due at the time of the scheduled exam.