Class Syllabus
ENMA460/PHYS431 – Introduction to the Physics of Solid Materials
Spring 2016

Class Hours:
Mondays and Wednesdays 3:30PM-4:45PM
Classroom: EGR 0108 (Engineering Building (Martin Hall))

Course Instructor: Prof. Ichiro Takeuchi
Department of Materials Science and Engineering
Office: Room 1242, Building 225 (Kim Engineering Building)
Extension: 56809, e-mail: takeuchi@umd.edu
Office Hours: Mondays and Wednesdays 2:30PM-3:30PM

Grading TA: TBA

Textbook: Introduction to Solid State Physics, Eighth Edition by Charles Kittel
(Available at the University Bookstore)

Supplemental reading materials will be made available from time to time. They will either be distributed or posted online.

Course Website: canvas

Grading Scheme:
Homework: 30%
Midterm: 35% **(around Spring break time TBA)**
Final: 35% **(date and time TBA)**

Homework:
Problem sets will be handed out on Mondays, and they are due the following Mondays.

Topics	**Approximate # of lectures**	**Chapter**
Crystal Structure	2	1
Crystal Diffraction	3	2
Crystal Binding and Cohesive Energy	3	3
Phonons I	3	4
Thermal Properties of Phonons	4	5
Metals and Free Electron Models	4	6
Energy Bands	3	7
Semiconductors	3	8
Superconductors, Magnetic Materials, Ferroelectric/Dielectric Materials, etc.	2	Others
Total number of lectures	27	

Course Objectives/Goals
The purpose of this course is to introduce students to the basics and fundamental concepts of properties of solid materials. The topics include crystal structures, diffraction techniques, formation of crystals, phonons, transport properties, and band gaps. Physical and mathematical basis for understanding the properties of solid materials will be presented. Some experimental techniques and contemporary topics will be covered.

Expected Outcome
After taking this course, students should have a good understanding of basic properties of solid materials. The course is designed to stimulate interests in modern topics in materials science and physics. The topics are laid out in such a way so that students can then go on to advanced topics in materials science such as electronic materials. The course will also serve as a good prerequisite to the graduate level solid state physics/electronics course taught in physics, electrical engineering and/or materials science departments.