EE 334K – Theory of Engineering Materials

Spring 2010

Instructor: Prof. Emanuel Tutuc, 1.606 MER, ENS 520A, E-mail: etutuc@mer.utexas.edu.

Class hours: Tue-Thu 12:30-2:00pm, ENS109; Office hours: ENS 520A, Tue 11am-12pm, 2pm-3pm.

Objectives:

- Introduction to quantum mechanics (QM)
- Application of QM to the physics of atoms and molecules.
- Application of QM to the physics of the solid state, with an emphasis on semiconductor physics.

Prerequisites: tentatively the same as for EE 339

M 427K (e.g., integral calculus, differential equations, Fourier series, vectors, vector calculus, gradients), and PHY 303L & 103N (primary laws of motion, wave phenomena, electricity and magnetism, optics) with a grade of at least C in each.

Course topics:

- Experimental Basis for Quantum Mechanics; Wave Particle Duality and Uncertainty Principle. (ER Chpt. 1-3, McK Chpt. 4)
- Schrodinger Formulation of Quantum Mechanics; One Dimensional Examples. (ER Chpt. 5, 6)
- Schrodinger Equation: Three Dimensions. (ER Chpt. 7-9)
- Atoms and Molecules. (ER Chpt. 9,12)
- Statistical Mechanics and Applications. (ER Chpt. 11, McK Chpt. 5, 6)
- Quantum Theory of Solids. (ER Chpt. 13, McK Chpt. 8)
- Semiconductors. (ER Chpt. 13, McK Chpt. 9)

Textbook:

- Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles, R. Eisberg and R. Resnick, John Wiley, Ed TBD. (ER)
- Solid State Physics for Engineering and Materials Science, J. P. McKelvey, Krieger 1993. (McK)

Grading:

20% Homework, 20% First exam, 20% Second exam, 40% Final exam.

Late homework will be accepted at instructor's discretion.

Collaboration on homework questions is allowed. Please be sure to submit your own independent homework solution.

Course notes:

Course notes will be provided for most lectures. The web-based course management system "Blackboard" will be used to post course notes, homework assignments and solutions.

College Drop/Add Policy:

An engineering student must have Dean's approval to add/drop after the fourth class day of the semester.

Academic dishonesty:

Plagiarism or any form of academic dishonesty (cheating includes, but is not limited to, copying another student's work, bringing notes into a test and copying material directly from a book, article or web site without including appropriate references, falsifying data, doing someone's work) is a violation of University rules. Penalties for scholastic dishonesty are severe and can include, but are not limited to, a written reprimand, a zero on the assignment/exam, re-taking the exam in question, an F in the course, or expulsion from the University.

For University policies see:
http://www.utexas.edu/opa/news/04newsreleases/nr_200404/nr_honor040429.html

Class Web sites and student privacy:

Web-based, password-protected class sites are associated with all academic courses taught at The University. Syllabi, handouts, assignments and other resources are types of information that may be available within these sites. Site activities could include exchanging e-mail, engaging in class discussions and chats, and exchanging files. In addition electronic class rosters will be a component of the sites. Students do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1.

Students with Disabilities:

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY or the College of Engineering Director of Students with Disabilities at 471-4382.