**ECEN 4345 Introduction to Solid State**

*Department of Electrical and Computer Engineering*
*University of Colorado at Boulder*
*Spring 2008*

**Objective**
This course introduces fundamental concepts of solid state materials and their applications in electronic, optical and magnetic devices. Topics to be discussed include classical theory of electrical and thermal conduction and its limitations, introductory quantum physics, modern theory of solid, semiconductors, dielectric materials, magnetic properties and superconductivity and optical properties.

**Instructor**
Won Park  
**Office**
Engineering Center, EE 248  
**Phone**
303-735-3601  
**Email**
won.park@colorado.edu  
**Lecture Hours**
1:00-1:50pm MWF, ECCR 110  
**Office Hours**
10:00am-noon Tuesdays or by appointment

**Homework**
6 sets of homework will be given out during the Semester. Solutions will be available after homework is collected and graded.

**Exams**
A mid-term exam plus a final exam.

**Grading**
40% · Homework, 30% · Mid-Term, 30% · Final Exam

**Website**
http://ece.colorado.edu/~wpark/  
Class notes, homeworks, homework solutions and exam solutions will be posted here.

**Prerequisite**
Electromagnetic fields and waves (ECEN 3400 or equivalent) or instructor consent.

**Textbook**
Textbook will be placed on reserve at the Engineering Library.

**References**
| **Disability** | If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and [www.Colorado.EDU/disabilityservices](http://www.Colorado.EDU/disabilityservices) |
| **Religious Observance** | Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, students with religious obligations that may cause conflicts with the course proceeding are requested to talk to the instructor within the first two weeks of the semester. See full details at [http://www.colorado.edu/policies/fac_relig.html](http://www.colorado.edu/policies/fac_relig.html) |
| **Classroom Behavior** | Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which they and their students express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at [http://www.colorado.edu/policies/classbehavior.html](http://www.colorado.edu/policies/classbehavior.html) and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html) #student_code |
**ECEN 4345 Introduction to Solid State**

| Honor Code | All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at [http://www.colorado.edu/policies/honor.html](http://www.colorado.edu/policies/honor.html) and at [http://www.colorado.edu/academics/honorcode/](http://www.colorado.edu/academics/honorcode/). |
| Discrimination & Sexual Harassment | The University of Colorado at Boulder policy on Discrimination and Harassment ([http://www.colorado.edu/policies/discrimination.html](http://www.colorado.edu/policies/discrimination.html)), the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships applies to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at [http://www.colorado.edu/odh](http://www.colorado.edu/odh). |
ECEN 4345 Introduction to Solid State

Tentative Schedule

Week 1 – 2.
- Overview of Course and Expectations
- Classical Theory of Thermal and Electrical Conduction

Week 2 – 4.
- Introductory Quantum Physics

Week 5 – 7.
- Modern Theory of Solid

Week 8.
- Review and Discussion (Mar. 3)
- Mid-Term Exam (Mar. 5)

Week 9 – 10.
- Semiconductors

Week 11.
- No Classes (Spring Break)

Week 12 – 14.
- Dielectric Properties and Insulators

Week 14 – 16.
- Magnetic Properties and Superconductivity
- Review and Discussion (Apr. 30)

Final Exam (Tue., May 6, 4:30 – 7:00pm)