MSE241: Semiconductor Physics
MWF 12:50-1:50
HSC116
Dr. Craig L. Caylor    Hoyt 124    Ext.-7202
office hours: MWF 10:30-11:30, T 11:00-12:30
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Pre-requisite: PHY152, MTH152

Course Plan: We plan to cover Ch 1-10,12, and 14. Depending on how the semester progresses, this is subject to modification.

Outcomes:
1. Students will be able to describe structures of crystalline solids.
2. Students will be able to determine the behavior of simple quantum mechanical systems by solving the Schrödinger equation and interpreting the meaning of the solutions.
3. Students will be able to apply quantum mechanics and statistical mechanics ideas to models of solids to explain the basics of band theory.
4. Students will be able to describe and compute the properties of semiconductor materials in equilibrium and in the presence of applied electric fields.
5. Students will be able to describe and compute the rates of charge carrier transport in semiconductor materials.
6. Students will be able to explain the processes that occur at the $pn$ junction and compute the characteristics of the junction.
7. Students will be able to explain the behaviors of diodes, transistors, and photodiodes, as well as their functions in simple circuits.
8. Students will be able to compute the relevant parameters involved in the operation of diodes, transistors, and photodiodes.

Assessment:

Students will complete regularly assigned homework problems.
Students will take 3-4 in-class closed-book exams.
Open-book take-home exams may be assigned as appropriate.

Grading: Grades will be assigned based on student performance on the assessment categories listed above.

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<td>Homework</td>
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<td>Exams</td>
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Assignment details:

Homework problems will be assigned for each chapter. Your diligent efforts toward answering assigned questions are essential for understanding each chapter’s materials and for developing and practicing problem-solving skills. Quantitative homework solutions should be more than just a string of equations. Describe what’s going on.

There will be several exams, in-class and possibly take-home. You should expect exams to feature mostly quantitative problems to solve. Your grade for exam problems will depend on your application of correct principles, your use of correct mathematical processes, and the clarity and completeness of your solutions/answers. The last exam will be scheduled during our normal final exam period and will be cumulative only to the extent that later material relies on earlier material.

Students are encouraged to meet with me about homework to obtain guidance. Students should feel free to consult with each other on homework problems. Students should not feel free to copy work from each other. If you work with others on a homework assignment, include “I worked with…” and their names at the top of the homework assignment. Exams, both in-class and take-home, are solo efforts.

Students are not permitted to consult other sources (e.g. instructors’ solution manuals or online answer repositories) in working on any assignments. Students are not permitted to consult other sources to “check” their work. Submitting others’ work as your own (including work from online sources) is a violation of Westminster College’s Academic Integrity Policy and will, if discovered, lead to a letter to the Dean and a failing grade for the course. To review Westminster’s policy, see the current WC catalog, available online at https://my.westminster.edu/ICS/Campus_Life/Campus_Groups/Student_Affairs/