Semiconductor Device Physics
EE5311, Spring 2023
University of Texas at El Paso

Instructor: David Zubia, Ph. D.
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Office Venue: A335 Engineering
Office Hours: T, Th: 3:00 – 4:00PM

Student Tasks:
- **Read**: Assigned textbook chapters
- **View**: View lecture presentations
- **Discuss**: Discuss concepts and methods from textbook and presentations
- **Complete**: Exercises
  - Study device parameter relationships using graphs
  - Submit on-line
- **Mid-Term Exam**: ~8th week (on-line)
- **Final Exam**: Finals week (on-line)

Evaluation:

<table>
<thead>
<tr>
<th>Task</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>10%</td>
</tr>
<tr>
<td>Exercises</td>
<td>40%</td>
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<tr>
<td>Exam 1 (midterm)</td>
<td>25%</td>
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<tr>
<td>Exam 2 (final)</td>
<td>25%</td>
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<td>Total</td>
<td>100%</td>
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Prerequisites:
EE 3329 Fundamentals of Semiconductor Devices

Catalog Description:
Advanced semiconductor principles and device building blocks, and their application to electronic devices. Topics include energy bands and gap, carrier statistics and transport, junctions, interfaces, and electronic devices.

Required Textbook:

Learning Objectives:
After completion of this course, students should be able to:

1. **Understand**: Understand advanced semiconductor physics such as quantum mechanics, energy band theory, equilibrium carrier statistics, recombination-generation, and carrier transport.
2. **Analyze and Model**: Apply advanced semiconductor physics to analyze and model the electronic behavior of devices including; resistors, capacitors, diodes, field-effect transistors, and bipolar junction transistor.
Topics Covered in Modules:

- Module 1: Classical Mechanics and Quantum Mechanics
- Module 2: Energy Band Theory
- Module 3: Equilibrium Carrier Statistics
- Module 4: Generation-Recombination
- Module 5: Carrier Transport

Grading and Policies:
A: 90%-100%
B: 80%-<90%
C: 70%-<80%
D: 60%-<70%
F: 0-<60%

Non-Compliance Policy:
Late Work: Late course work will not be accepted.
Make-up Work: No make-up work will be given.
Posting Netiquette: Postings that violate UTEP policy will be investigated and appropriate actions will be taken.
Attendance: Attendance in online activities is mandatory to receive course credit. Excessive nonattendance will result in loss of credit.
Participation: Participation in assignments and discussions is mandatory to receive credit. Lack of participation will result in loss of credit.

Syllabus Changes: Some of the content in the syllabus is subject to change for improvements or other factors. Any changes will be communicated.

Academic Dishonesty:
Incidents of academic dishonesty will be referred to the Director of Electrical Engineering and the Dean of Students. Link to Dean of Students.
The descriptions and definitions of academic dishonesty can be found at: Link to Academic Dishonesty Descriptions and Definitions. Look under Student Affairs and then Chapter one, section 1.3.1.

Classroom Accommodations:
If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to Link to CASS email, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at Link to CASS Website.