

**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:** ~8<sup>th</sup> week (on-line)
- **Final Exam:** Finals week (on-line)

**Evaluation:**

	Value
Attendance	10%
Exercises	40%
Exam 1 (midterm)	25%
Exam 2 (final)	25%
Total	100%

**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:**

*Advanced Semiconductor Fundamentals 2<sup>nd</sup> Ed.*, Pierret, 2003, Prentice Hall

**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](#).