

# EEMF/MSEN 6320 Course Syllabus

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## Course Information

Fundamentals of Semiconductor Devices (3 semester credit hours)  
Fall 2016  
ECSN 2.112  
Tuesday and Thursday  
4:00 pm – 5:15 pm

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## Professor Contact Information

James J. Coleman  
Office: ECN 3.504  
Email: james.coleman@utdallas.edu  
Telephone: 972-883-4381  
Office Hours: By arrangement (email)

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## Course Pre-requisites, Co-requisites, and/or Other Restrictions

Prerequisite: EE3310 or equivalent  
Co-requisite: EEGR/MSEN 6319 or equivalent.

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## Course Description

Semiconductor material properties, band structure, equilibrium carrier distributions, non-equilibrium current-transport processes, and recombination-generation processes.

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## Student Learning Objectives/Outcomes

The student will be able to explain the fundamental solid-state physics of semiconductor materials and devices, and apply this knowledge to solve theoretical and practical problems in the following areas:

1. Energy bands and density of states in semiconductors.
  2. Equilibrium carrier statistics and densities in semiconductors.
  3. Motion, production and loss of carriers.
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## Textbooks and Materials

No required textbook. Suggestions for reference materials will be provided in class

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## Course Topical Outline

1. Course Introduction
2. Crystal Lattices
3. Quantum Mechanics
4. Energy Bands
5. Lattice Vibrations
6. Carriers in Semiconductors
7. Excess Carriers
8. pn Junctions
9. Junction Diodes
10. Metal-Semiconductor Junctions
11. Metal-Insulator-Semiconductor Structures

Midterm Exam: October 18  
Final Exam: December 9-15

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**Grading Policy**

20% Assigned Homework.  
40% Midterm Exam  
40% Final Exam

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**Course & Instructor Policies**

Make-up exams: You must have written permission from Prof. Coleman to take an exam at an alternate time and you must have that permission at least 1 hour in advance of the regularly scheduled exam time

Late Work: Homework is due at the beginning of class on the due date. Each student must turn in individual work. All assigned work will be collected. Late HW will be reduced in credit by 20% per day late.

Extra Credit: None.

Special Assignments: None

Class Attendance: Highly Recommended. Each student is expected to add to discussion.

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**Off-campus Instruction and Course Activities**

None

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**Comet Creed**

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same: "As a Comet, I pledge honesty, integrity, and service in all that I do."

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**UT Dallas Syllabus Policies and Procedures**

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

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The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.