



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Fundamentals of Semiconductor Devices

ECE 6531

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

An overview of the physics, design, and engineering of semiconductor electronic and optoelectronic devices. Applications of silicon, compound semiconductor, and nanotechnology will be covered.

Prerequisites and Co-requisites:

Prereq: 5530 (730), or permission of instructor.

Course Goals / Objectives:

- Learn advanced semiconductor device physics.
 - Learn to design semiconductor devices.
 - Learn performance limits of state-of-the-art semiconductor devices and approaches for overcoming them.
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Course Topics:

- Device applications of semiconductors
 - Transport in heterojunctions
 - Photodiodes and optoelectronic integrated circuits
 - Solar cells - an introduction
 - Light emitting diodes
 - Laser diodes - an introduction
 - Heterojunction FET - HEMT
 - Long-channel MOSFET models
 - Sub-micron MOSFET - threshold volt, sub-threshold current, scaling, hot carriers
 - Bipolar junction transistors
 - Heterojunction bipolar transistors
 - Tunnel diodes, resonant tunneling diodes
 - Wide-bandgap semiconductors - transport physics and optical properties
 - High-frequency and high power wide-bandgap electronics
 - Optical devices based on wide-bandgap semiconductors
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Designation:

Elective