



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Nanofabrication and Nanoscale Devices

ECE 6532

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Fundamentals of nanostructures and devices; engineering and physics of new devices, confined structures in low dimensions and their effects on traditional devices; nanofabrication and nanomanufacturing.

Prerequisites and Co-requisites:

Prereq: 6531, 5531, or 730, or Grad standing in Engineering, Biological Sciences, or Math and Physical Sciences.

Course Goals / Objectives:

- Be able to appreciate and understand from a conceptual point of view semiconductor-based nanostructures, devices and systems
 - Learn the fundamentals of nano-fabrication and manufacturing technologies
 - Be exposed to the instrumentation and equipment for nanoscale device processing and characterization
 - Develop basic understanding of integration of nanoscale devices and systems, and nanobiotechnologies
-

Course Topics:

- Nanoscale devices and nanobiotechnology
 - Fundamentals of reduced dimensional structures
 - Advanced nanoscale MOSFETs (FinFETs and double-gate MOSFETs)
 - Single electron transistors
 - Carbon-based nanomaterials and devices and nanowire FETs
 - Quantum-dot optoelectronic devices
 - Biosensors
 - Nano-Electro-Mechanical-Systems (NEMS)
 - X-ray lithography and LIGA
 - Bulk and surface micromachining techniques for the fabrication of master molds
 - Scanning probe microscopy
 - Nanoimprinting and dip-pen lithography
 - Near-field optical techniques for nanoscale fabrication and characterization
 - Self-assembly and self-organization
 - Polymer processing for biomedical device applications
 - Integration of nanoscale biomedical devices and systems
-

Designation:

Elective