



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Electronic Properties

MATSCEN 3271

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

Introduction to structure, property, and applications of electronic materials. Includes electronically and ionically conducting materials, dielectrics, and optical and magnetic materials.

Prerequisites and Co-requisites:

Prereq: 2010; and Math 1151 or 1161; and Physics 1251 or 1261; and enrollment as MatScEn-BS student; or permission of instructor.

Course Goals / Objectives:

- Learn the physical principles of electronically and ionically conducting materials, dielectrics, optical and magnetic materials
 - Learn the influences of composition, structure and microstructure on conducting, dielectric, optical and magnetic materials
 - Learn about applications of conducting, dielectric, optical and magnetic materials
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Course Topics:

- Electrical conduction in metals: microstructure and temperature dependence.
 - Elementary quantum physics, wave properties and band structures.
 - Electrical conduction in semiconductors. N- and p- type doping. Temperature dependence. Photoexcitation of carriers.
 - Semiconductor devices.
 - Ionic conductivity in materials and applications.
 - Low, medium and high permittivity dielectric and applications.
 - Optical materials and applications.
 - Magnetic materials and applications.
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Designation:

Required