

Department of Electrical and Computer Engineering  
520.407 Introduction to the Physics of Electronic Devices

2004-05 Catalog: This course is designed to develop and enhance the understanding of the basic physical processes taking place in the electronic and optical devices and to prepare students for taking classes in semiconductor devices and circuits, optics, lasers, and microwaves devices, as well as graduate courses. Both classical and quantum approaches are used. Specific topics include theory of molecular bonding; basics of solid state theory; mechanical, transport, magnetic, and optical properties of the metals; semiconductors; and dielectrics. (3 credit hours/Elective)

Prerequisite(s): 171.101 – 102 General Physics for Physical Science Majors  
520.219 Fields, Matter & Waves

Textbook: Solymar and Walsh, Electrical Properties of Materials, Oxford 7<sup>th</sup> edition

Course Objectives: To prepare the students for the advanced courses in optics and electronics,

Topics Covered: Classical theory of electrical, magnetic and optical properties of materials. Basics of quantum theory of atoms and molecules. Electronic bands in solid state. Theory of transport in metals and semiconductors. Basics of light emission and lasers.

Class Schedule: two – one and one-half hour classes/weekly

Contribution of Course to Meeting the Professional Component (credit hours):

<b>Engineering Science</b>	<b>Engineering Science and Design</b>
3	

Relationship of Course to Program Educational Outcomes (✓ those that apply):

x	Apply mathematics, probability and statistics, basic science, and computer science
	Design and conduct experiments, analyze and interpret data
x	Identify, formulate and solve electrical engineering problems
x	Use technical skills and modern engineering tools to design to meet needs
	Communicate effectively and work on multidisciplinary teams
	Contemporary issues, ethical responsibilities, environmental, health, safety issues
x	Engage in life-long learning

Prepared June 1, 2005 by:      Jacob Khurgin