MSE-452 Electronic and Magnetic Materials

Credit Hours: 3-0

Pre-requisites: PHY-211Physics of Materials

Course Objectives

- The aim of this course is to learn the science and technology of electronic and magnetic-materials. The application of these materials to devices will also be undertaken.
- The importance of semiconducting and magnetic materials lies in their applications in a wide variety of electronic devices. All the modern electronic appliances use semiconductor devices for their operation. Most of these devices are based on the concept of PN junction.
- The aim of this course is to get familiar with the basics concepts of PN junction and their use under different condition. Similarly the magnetic materials are important due to their applications in house hold equipment to industry.

Course Contents

- Relationships between the performance of electrical, optical, and magnetic devices and the micro-structural characteristics of the materials from which they are constructed
- A device-motivated approach with emphasis on emerging technologies;
- Device applications of physical phenomena including electrical conductivity and doping
- Transistors, photodetectors and photovoltaics, luminescence
- Light emitting diodes
- Lasers, optical phenomena
- Photonics, ferromagnetism, and magnetoresistance

Course Outcome After completing this course, student will be able to:

- Student will become familiarize with basic properties like the electrical, optical and magnetic and applies these understanding for fabrication electric and magnetic devices.
- Magnetic parameters and the types of the magnetism will be understood. These will help to develop a 06 desired properties

Suggested Books

- Pradeep Fulay, Electronic, Magnetic and Optical Materials, Taylor & Francis Group, 2010.
- Allen Nussbaum, Electronic and Magnetic Properties of Materials, Prentice-Hall, 1967.
- Klaus Schroder, Electronic, Magnetic and Thermal Properties of Materials, M. Dekker, 1978.