

PHY5018 Semiconductor Optoelectronics

Course Code	PHY5018	Semester	
Course Title	<i>Semiconductor Optoelectronics</i>		
Credits	3	Type	Elective

Course Outcome

The overall aim of this course is to give fundamental knowledge of various properties of semiconducting materials and optoelectronic devices in order to be able to understand present and future technologies for applications in optical communications, energy conversion etc. This course will also aim to improve the skill of students for the fabrication of various high efficient optoelectronics devices.

Course Structure

Contents: Semiconductor physics: Crystal structure, growth and properties of common semiconductors, superlattices, quantum wells, wires and dots. Strain and lattice mismatch. Bloch theorem and theory of band structure calculation of semiconductors. Band structure modifications. PN junction, diode equation. Photon emission and absorption. Excitons. Solar cells. Light emitting diodes and semiconductor lasers. Optoelectronic circuits. Recent advances in the field.

Suggested Books

1. Jasprit Singh, Electronic and Optoelectronic Properties of Semiconductor Structures, Cambridge (2007)
2. Adrian Klitai, Principles of Solar Cells, LEDs and Diodes, Wiley (2011)
3. J. Piprek, Semiconductor Optoelectronic Devices, CBSPD (2004)