Module code	SP-2206		
Module Title	Condensed Matter Physics		
Degree/Diploma	Bachelor of Science (Applied Physics)		
Type of Module	Major Option		
Modular Credits	4	**Total student Workload**	8 hours/week
		Contact hours	4 hours/week
Prerequisite	None		
Anti-requisite	SP-2306 Condensed Matter Physics		

Aims

To provide fundamental studies of the properties of crystalline and non- crystalline materials at the microscopic level and to relate these studies to the applications of materials in microelectronic, optoelectronic, and other industries.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order :	30%	- Identify crystal structures of solids, and explain electronic band structures. - Understand the theory on free electron model and models of heat capacity in solids.
Middle order :	60%	- Analyse X-ray diffraction patterns - Analyse the electron energy distribution in solids using the Fermi – Dirac function - Apply the principles of semiconductors to solid state devices
Higher order:	10%	- Evaluate the outcome of the analyses - Work in a group to relate theory with application, and communicate individually in the form of presentation or report.

Module Contents

- Crystal structures, bonding in solids, crystal diffraction
- Crystal dynamics, lattice heat capacity, concept of phonon, thermal conduction
- Free electron model, quantum theory of metals, Fermi distribution, electron transport
- Electron band structure, semiconductors, origin of band gap
- Solid state devices, p-n junction, transistors, diode, solar cells, etc.

Assessment	Formative assessment	Weekly Tutorial Sessions and Discussion
	Summative assessment	Examination: 60%
		Coursework: 40% - 2 Individual Written Assignments (20%) - 1 Class Test (10%) - 1 Group Presentation (10%)