

Module code	SP-2306		
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	None		
Aims			
Condensed matter physics involves fundamental studies of the properties of crystalline and non-crystalline materials at the microscopic level. The overall aims are: to relate these studies to the applications of materials in microelectronic, optoelectronic, and other industries, and to provide a sound foundation for research and innovation in the field of condensed matter.			
Learning Outcomes			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
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 - applying 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			
<ul style="list-style-type: none"> - 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	Problem-solving, group discussions and feedback	
	Summative assessment	Examination: 60% Coursework: 40% - 3 assignments (24%) - 1 test (8%) - 1 presentation or report (8%)	