University of Kerala

Discipline	**PHYSICS**				
Course Code	**UK2DSCPHY103**				
Course Title	**MODERN PHYSICS**				
Type of Course	**DSC**				
Semester	**II**				
Academic Level	**100 - 199**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 Hrs	-	2 Hrs	5 Hrs
Pre-requisites	-				
Course Summary	Knowledge about basic ideas of quantum mechanics, number systems, logic gates, atom models nuclear properties, radioactivity and crystallography.				

BOOKS FOR STUDY:

1. Modern Physics – R.Murugeshan, S.Chand & Co. Ltd.
2. Principles of Electronics – V.K.Mehta

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I		**Quantum Mechanics (Book 1)**	**9**	
	1	Inadequacies of classical physics, experimental evidences	2	1
	2	Quantum theory Planck's hypothesis, foundation of quantum mechanics	3	1
	3	Wave function and probability density	2	1
	4	Schrödinger equation-time dependent and time independent	2	1

II	**Digital electronics (Book 2)**		**9**	
	5	Number systems – binary, octal and hexadecimal and their interconversions	3	2
	6	Binary arithmetic, 1's compliment and 2's compliment arithmetic	3	2
	7	Basic logic gates	2	2
	8	Universal logic gates	1	2
III	**Atom models (Book 1)**		**9**	
	9	Bohr atom model	3	3
	1o	Space quantization and spin of electrons	2	3
	11	Vector atom model	3	3
	12	Pauli's exclusion principle	1	3
IV	**Atomic nucleus (Book 1)**		**9**	
	13	Basic properties of nuclei	1	4
	14	Nuclear force	1	4
	15	Mass defect and binding energy	2	4
	16	Radioactivity and law of radioactive decay	2	4
	17	Half-life and mean life	1	4
	18	Measurement of radioactivity, radiocarbon dating	2	4
V*	**Crystallography (Book 1)**		**9**	
	19	Crystalline and amorphous solids, Crystal structure-crystal lattice and translation vectors	2	5
	20	Unit cell, symmetry operations	2	5
	21	Types of lattices, lattice directions and planes	2	5
	22	X-ray crystallography-diffraction of x -rays, Bragg's law, x-ray crystallography, powder diffraction method.	3	5

DETAILED SYLLABUS: PRACTICALS

Part A – At least 5 Experiments to be performed		CO No
Sl No	**Name of Experiment**	
1	Carey Foster's bridge - Resistivity	6
2	Potentiometer- Resistivity	6
3	Diode Characteristics (for Ge and Si diodes)	6
4	Half wave rectifier-Measurement of ripple factor with and without filter capacitor	6
5	Full wave rectifier- Measurement of ripple factor with and without filter capacitor	6
6	Logic gates- OR and AND-To verify the truth tables of OR and AND gates using diodes.	6
7	Logic gate- NOT-To verify the truth tables of NOT gate using a transistor	6
8	Conversion of galvanometer into ammeter and calibration using digital Multimeter	6
9	Conversion of galvanometer into voltmeter and calibration using digital Voltmeter.	6
10	Potentiometer-Calibration of ammeter	6
Part B* – At least One Experiment to be performed		
11	Program to convert hexadecimal to decimal number, decimal to hexadecimal number, binary to hexadecimal numbers and hexadecimal to binary numbers	6
12	Program to find the result of binary addition and subtraction.	6