University of Kerala

Discipline	**PHYSICS**				
Course Code	**UK3DSCPHY203**				
Course Title	**HEAT, MAGNETISM AND GEOPHYSICS**				
Type of Course	**DSC**				
Semester	**III**				
Academic Level	**200 - 299**				
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	Basic knowledge about physics of the earth, physics of atmosphere, magnetism of earth, transmission of heat and properties of magnetic materials.				

BOOKS FOR STUDY:

1. Fundamentals of Geophysics: William Lowrie, Cambridge University Press.
2. Modern Physics – R.Murugeshan, S.Chand & Co. Ltd

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I		**Terrestrial physics (Book 1)**	**9**	
	1	The solar system	1	1
	2	Earth's structure-earth's size and shape, gravitation, gravitational field and gravitational potential	3	1
	3	Gravitational field and potential due to solid sphere	2	1
	4	The tides-tidal effect of sun. (Elementary ideas only)	1	1
	5	Earth quakes and seismographs. (Elementary ideas only)	2	1

II	**Atmospheric physics (Book 1)**		**9**	
	6	Atmospheric structure and composition	2	2
	7	Atmospheric pressure, density and temperature	2	2
	8	Measurement of air temperature	2	2
	9	Ionosphere and magnetosphere	3	2
III	**Earth's magnetism (Book 1)**		**9**	
	10	Earth's magnetism	1	3
	11	Elements of earths magnetism	2	3
	12	Cause of earth's magnetism	2	3
	13	Magnetic maps and their uses	2	3
	14	Magnetographs	2	3
IV	**Transmission of Heat (Book 2)**			
	15	Thermal conductivity and thermometric conductivity	2	4
	16	Weidmann and Franz law	1	4
	17	Energy distribution in the spectrum of black body and results	2	4
	18	Wien's displacement law, Rayleigh-Jeans law, their failure and Planck's hypothesis, Planck's law	2	4
	19	solar constant, its determination, temperature of sun	2	4
V*	**Magnetism (Book 2)**		**9**	
	20	Magnetic properties of matter, Magnetic vectors B.M and H	1	5
	21	Magnetic susceptibility and permeability	1	5
	22	Diamagnetism, Para-magnetism and ferromagnetism	3	5
	23	Electron theory of magnetism	3	5
	24	Domain theory of ferromagnetism	1	5

DETAILED SYLLABUS: PRACTICALS

Part A – At least 5 Experiments to be performed		CO No
Sl No	**Name of Experiment**	
1	Specific heat-method of mixtures applying Barton's correction	6
2	Lee's disc- Thermal conductivity of cardboard	6
3	Deflection and vibration magnetometer- M and Bh	6
4	Circular coil- magnetization of a magnet	6
5	Thermo-emf-measurement of emf using digital multimeter.	6
6	Carey Foster's Bridge-Temperature coefficient of resistance	6
7	Circular coil-Study of earth's magnetic field using compass box.	6
8	Searle's vibration magnetometer-comparison of magnetic moments.	6
9	Phase transition-determination of M.P of wax.	6
10	Determination of thermal conductivity of rubber	6
Part B* – At least One Experiment to be performed		
11	Circular coil-Calibration of ammeter.	6
12	Potentiometer –Reduction factor of T.G	6

COURSE OUTCOMES

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Describe about solar system in general and describe earth in particular	R, U	PSO 1,2,3,4
CO-2	Describe and explain about earth's atmosphere	R, U	PSO 1,2,3,4
CO-3	Label and classify properties and causes of terrestrial magnetism	R, U	PSO 1,2,4

CO-4	Describe and explain the energy distribution in the spectrum of a black body and solve problems relating to it.	R, U, Ap	PSO 1,2
CO-5	List and classify paramagnetic, diamagnetic and ferromagnetic materials	R, U	PSO 1,2
CO-6	Describe and demonstrate simple experiments	U, Ap	PSO 7

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: HEAT, MAGNETISM AND GEOPHYSICS

Credits: 3:0:1 (Lecture: Tutorial: Practical)

CO No.	**CO**	**PO / PSO**	**Cognitive Level**	**Knowledge Category**	**Lecture (L)/ Tutorial (T)**	**Practical (P)**
CO-1	Describe about solar system in general and describe earth in particular	PO1,2,3, 4,5,6,8/ PSO 1,2,3,4	R, U	F,C	L	-
CO-2	Describe and explain about earth's atmosphere	PO1,2,3, 4,5,6,8/ PSO 1,2,3,4	R, U	F,C	L	-
CO-3	Label and classify properties and causes of terrestrial magnetism	PO1,3,4, 5,6,8/ PSO 1,2,4	R, U	F,C	L	-
CO-4	Describe and explain the energy distribution in the spectrum of a black body and solve problems relating to it.	PO1,3,4, 5,6,8/ PSO 1,2	R, U, Ap	F,C	L	-

CO-5	List and classify paramagnetic, diamagnetic and ferromagnetic materials	PO1,3,4, 5,6,8/ PSO 1,2	R, U	F,C	L	-
CO-6	Describe and demonstrate simple experiments	PO1,2,4, 5,8/ PSO 7	U, Ap	F,C	-	P

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs :

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO-1	2	1	3	2	-	-	-	2	2	3	2	2	2	-	2
CO-2	2	2	2	2	-	-	-	2	2	2	2	2	3	-	2
CO-3	2	1	-	2	-	-	-	2	-	2	2	2	2	-	2
CO-4	2	1	-	-	-	-	-	2	-	2	2	2	2	-	2
CO-5	2	2	-	-	-	-	-	2	-	2	2	2	2	-	2
CO-6	-	-	-	-	-	-	3	2	3	-	2	2	-	-	2

Correlation Levels:

Level	-	1	2	3
Correlation	Nil	Slightly / Low	Moderate / Medium	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

CO No	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO-1	✓	-	-	✓
CO-2	-	✓	-	✓
CO-3	-	✓	-	✓
CO-4	-	✓	-	✓
CO-5	✓	-	-	-
CO-6	✓	-	-	-