University of Kerala

Discipline	**PHYSICS**				
Course Code	**UK1MDCPHY101**				
Course Title	**ENVIRONMENTAL PHYSICS**				
Type of Course	**MDC**				
Semester	**I**				
Academic Level	**100 - 199**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	3	3 Hrs	-	-	3 Hrs
Pre-requisites					
Course Summary	Foster environmental consciousness among students by fostering an understanding of environmental issues and the interconnectedness of humanity and the environment, advocating for nature preservation and conservation, and promoting awareness of environmental laws and policies.				

BOOKS FOR STUDY:

1. Foundations of Environmental Physics : Understanding Energy Use and Human Impacts : Kyle Forinash, Island Press; 1st edition (2010)
2. Handbook of Electronic Waste Management: International Best Practices and Case Studies: Edited by Majeti Narasimha Vara Prasad, Sri Jayewardenepura, and Anwesha Borthakur, Butterworth-Heinemann 2020
3. Atmosphere, Weather and Climate:R.G. Barry, R. J. Chorley ;Routledge 8th edition (2003)
4. Climate Change: What The Science Tells Us: C. Fletcher; Wiley 1st edition
5. A textbook of Environmental Studies- E Bharucha - University Grants Commission, 2004

BOOKS FOR REFERENCE:

1. Environmental Science: Principles and Practice- R.C. Das and D.K. Behera - PHI Learning Pvt. Ltd (2008)
2. A textbook of Environmental Studies- S.Satyanarayan, S.Zade, S.Sitre and P.Meshram - Allied Publishers, New Delhi, 2009
3. The Physics of Monsoon: R. N. Kesavamoorthy and N. Sankar Rao, Allied Publications (1992)
4. The Physics of Atmosphere: J. T. Houghton, Cambridge University, 3rd Edition (2002)

DETAILED SYLLABUS: THEORY

Module	Unit	Content	Hrs	CO No
I	**ENVIRONMENT: A BASIC INTRODUCTION (Book 1 Chapter 1, 4; Book 2, Chapter 1)**		**9**	
	1	Overview of Environment	3	1
	2	Impact of Population on Environment- Water, Food, Waste, Pollution, Ozone Layer	3	1,2,3
	3	Radioactive Waste, Types of Contaminants in Electronic Waste.	3	1,3
II	**PHYSICS OF CLIMATE CHANGE (Book 3 Chapter 1, 13; Book 4, Chapter 1)**		**9**	
	4	Composition of the Atmosphere- Primary Gases - Greenhouse Gases- Reactive Gas Species-Aerosols	2	3
	5	Weather and Climate- Layers of the Atmosphere	1	3
	6	Global Circulation of the Atmosphere-Ocean Currents	2	3
	7	Global Warming and the Ocean- Warming Oceans- Phytoplankton- Acidifying Oceans	2	2,3
	8	The Global Energy Balance- The Greenhouse Effect	1	2,3
	9	Environmental Impacts of Climate Change- Sea Level- Snow and Ice	1	2,3
III	**ENVIRONMENTAL POLLUTION (Book 5 Unit 5)**		**9**	
	10	Pollution	1	1

	11	Air Pollution-Types and Sources of Air Pollution-Pollutants in the Atmosphere-Effects of Air Pollution on Living Organisms-Effects of Air Pollution on the Stratosphere-Ozone Depletion and its Effects	2	1,2,3
	12	Air Pollution in India-Air Quality Monitoring	1	1
	13	Water Pollution-Water Availability on the Planet-Point Sources of Pollution-Causes of Water Pollution-Groundwater Pollution	3	1,3
	14	Noise Pollution-Effects of Noise Pollution on Physical Health-Effects of Noise Pollution on Mental Health-Noise Control Techniques	2	1,3
IV	**ENVIRONMENTAL DEGRADATION (Book 5 Unit 4, 5)**		9	
	15	Soil Pollution-Causes of Soil Degradation-Problems with Pesticide Use-Excess Salts and Water	2	1,4
	16	Thermal Pollution-Sources-Effects	1	1
	17	Biodiversity-Genetic Diversity-Species Diversity-Ecosystem Diversity-Biogeographic Classification of India	3	4,3
	18	Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts	1	4
	19	Conservation of Biodiversity	2	4
V*	**WASTE MANAGEMENT AND ENVIRONMENTAL ACTS (Book 5 Unit 5, 6; Book 2 Chapter 1)**		**9**	
	20	Solid Waste Management: Causes, Effects, and Control Measures of Urban and Industrial Waste - Incineration-Vermi - Composting	2	5
	21	Treatment Strategies of E-waste – Recycling - Landfill Disposal - Biological Treatment - Advanced Methods	2	5
	22	Role of an Individual in Prevention of Pollution	1	5

	23	Environmental Laws and Constitutional Provisions to Control Pollutions in India-The Environment (Protection) Act- The Air (prevention and Control of Pollution) act- The Water (Prevention and Control of Pollution) Act- The Wildlife Protection Act- The Forest Conservation Act of 1980	4	5

COURSE OUTCOMES

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Discuss an overview of the environment and the effect of population on it.	U	PSO-4
CO-2	Summarize the composition of the atmosphere and the effect of climatic change due to global variation in temperature.	U	PSO-3,4
CO-3	Describe different types of pollution and its effects on environment	U	PSO-1,2,3,4
CO-4	Understand biodiversity and examine major environmental degradation and propose control and prevention measures	R, U	PSO-4
CO-5	Understand various waste management methods and aware of policies and standards related to waste management and environmental protection	R,U	PSO-2,4,7

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

Name of the Course: ENVIRONMENTAL PHYSICS

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

CO No.	CO	PO / PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
CO-1	Discuss an overview of the environment and the	PO-1,8/ PSO-2,4	R, U	F, C	L	-

	effect of population on it.					
CO-2	Summarize the composition of the atmosphere and the effect of climatic change due to global variation in temperature.	PO-1,8/ PSO-3,4	U	F	L	-
CO-3	Describe different types of pollution and its effects on environment	PO-1,2,8/ PSO-1,2,3, 4	U	F,C	L	-
CO-4	Understand biodiversity and examine major environmental degradation and propose control and prevention measures	PO-1,8/ PSO-1,2,4,7	R, U	F,C	L	-
CO-5	Understand various waste management methods and aware of policies and standards related to waste management and environmental protection	PO-1,2,3,6, 8/ PSO-2,4,7	R,U	F	L	-

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	-	1	-	1	-	-	-	1	-	-	-	-	-	-	1
CO-2	-	-	2	2	-	-	-	1	-	-	-	-	-	-	2
CO-3	1	2	2	2	-	-	-	1	1	-	-	-	-	-	1
CO-4	1	1	-	2	-	-	1	1	-	-	-	-	-	-	1
CO-5	1	1	-	2	-	1	3	2	2	1	-	-		-	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	✓	✓	-	-