

# University of Kerala

Discipline CHEMISTRY							
Course Code	UK3DSECHE200						
Course Title	ENVIRONMENTAL CHEMISTRY I						
Type of Course	DSE	DSE					
Semester	3			X	S		
Academic Level	200 - 299				Y T		
Course Details	Credit	Lecture	Tutorial	Practical	Total		
		per week	per week	Per week	Hours/Week		
	4	4 hours	-	S	4		
Pre-requisites	1. Fundame	ental concept of I	Environment	al Chemistry			
	2. Termino	logy associated w	with Environ	nent			
Course Summary	This course pr	rovides students v	with the know	vledge of eco	osystem and the		
	different type	es of pollution ca	aused by hur	nan activitie	es. This course		
	enlightens the	e students about	the need to	protect and	d conserve our		
	environment f	for future generat	ion. The cou	rse also high	lights the green		
	protocols and methodology being adopted for preserving the						
Environment.							
<b>Detailed Syllabus:</b>	Detailed Syllabus:						

# **Detailed Syllabus:**

Module	Unit	Content	Hrs				
		ENVIRONMENTAL CHEMISTRY I	60				
Ι	ENVIE	RONMENT AND ITS COMPONENTS	9				
	1.1	Introduction, components of environment – biotic, abiotic and energy components	1				
	1.2	environmental segments- atmosphere, hydrosphere, lithosphere and biosphere	1				
	1.3 Biodistribution of elements.						
	1.4	General Concepts of biological cycles – carbon cycle, nitrogen cycle, phosphorous cycle, Sulphur cycle and oxygen cycle	4				
	1.5	Concepts and scope of environmental chemistry	1				
	1.6	Environmental perspectives, environment and society	1				
II	ECOL	OGY AND ECOSYSTEM	9				
	2.1	Ecology-elementary idea. Food chain- grazer and detritus food chain.					
	2.1	Food web. Ecological pyramid.	2				
	2.2	Ecosystem- concept, components, function and classification	2				
	2.3	Productivity in an ecosystem- primary and secondary productivity	1				
	2.4	Wetlands- elementary idea	1				
	2.5	Biodiversity, sustainable ecosystem.	1				

	2.6	Population and environment: Human population and distribution,	2				
TTT	ENIED		0				
111	ENEK	GY RESOURCES	9				
	2.1	Natural Resources-classification, Water resources, Forest resources,					
	3.1	wood as a direct fuel, Land resources, Mineral resources, Energy	2				
		resources					
		Renewable and non-Renewable energy resources. Renewable energy					
	3.2	resources - bio fuel & biomass energy, tidal energy, hydro power, wind	3				
		energy wave energy, solar energy	$\checkmark$				
	3.3	Hydrogen as a next generation fuel	1				
	3.4	Nonrenewable energy resources - nuclear fuels and fossil fuels	1				
	25	Conservation of natural resources. Future energy resources. Sustainable	2				
	5.5	use of resources	2				
IV	ENVIRONMENTAL POLLUTION, ETHICS AND LAWS						
	4.1	Pollution- definition and its classification. Pollutants, classification of	2				
	4.1	pollutants based on source and physical state	3				
		Causes, effect and control measures of thermal pollution, nuclear					
	4.0	pollution, noise pollution, marine pollution and Industrial pollution-	~				
	4.2	Cement, textile, sugar, paper industry, fertilizer, leather, thermal and	Э				
		nuclear power plants					
		Environmental ethics: Issues and possible solutions Environment					
	4.0	Protection Act, Air (Prevention and Control of Pollution) Act, Water	_				
4.3		(Prevention and control of Pollution) Act, Wildlife Protection Act, Forest	5				
		Conservation Act					
		Rio declaration, Montreal protocol, Kyoto protocol Environmental					
	4.4	management-objectives and components. National conservative	5				
		strategies. Environmental audit -Types					
V	OPE	N ENDED MODULE: Learning through problem solving, seminars,					
	oper	n discussions, assignment discussions, Quizzes, Open book exams etc	12				
	1	Introduction to Environmental Components and segments					
	2	Concept of biological cycles and Food chain					
	3 Classification of Natural Energy Resources and its conservation						
	4	Classification of Pollutants and Types of Pollution					
	5	Introduction to environmental laws and legislation					

# **References**

- 1 Introduction to Environmental Chemistry, Seventh Edition, New Age International Publishers
- 2 Gray W. van Loon & Stephen J. Duffy, *Environmental Chemistry*: A Global Perspective, Oxford University Press
- 3 H. Kaur, Environmental Chemistry, Pragati Prakashan
- 4 V.K Ahluwalia, Environmental Chemistry, Second Edition, Ane Books Pvt. Ltd.
- 5 Ronald A. Bailey, Herbert M. Clark, James P. Ferris, Sonja Krause, Robert L. Strong, *Chemistry of the Environment*, Second Edition, Academic Press

- 6 Asim K. Das, Environmental Chemistry with Green Chemistry, Books and Allied (P) Ltd.
- 7 G S Sodhi, *Fundamentals Environmental Chemistry*, Second Edition, Narosa Publishing House.

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO1	Help to understand Environmental components, Environmental segments and various biogeochemical cycles	U	1,3
CO2	Understand the scope of environmental chemistry and investigate the relationship of society with environment	U	1,3
CO3	Help students to learn the dynamics of ecosystem including food chains, explore the importance of biodiversity and their need to conserve the biodiversity	S U	1,3
CO4	Develop an understanding of various Energy resources and principles undertaken for the conservation of energy resources	U, R	1,3
CO5	Identifying the sources and types of environment pollution such as air pollution, water pollution, soil pollution Industrial pollution and exploring the relationship between Population and Environment	U, A	1,3
CO-6	Exploring the environmental laws and policy frameworks for protecting the environment and will reflect on ethical principles, values, and philosophies related to human interactions with the environment.	U	1,2,3

## **Course outcomes**

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

# Name of the Course: ENVIRONMENTAL CHEMISTRY I

# Credits: 4:0:0 (Lecture:Tutorial:Practical)

CO No.	со	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	<b>CO-1</b>	1,3	U	F, C	L	
2	CO-2	1,3	U	С	L	
3	CO-3	1,3	U	F, C	L	
4	CO-4	1,3	U, R	F, C	L	
5	CO-5	1,3	U, A	F	L	

6 CO-6 1,2,3 U F, C L	6
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F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

## Mapping of COs with PSOs and POs:

NO:	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	1	-	1	-	-	1	1	-	-	-	-	-	$\sum$
CO 2	1	-	1	-	-	1	1	-	-	-	-	Ś	1
CO 3	1	-	1	-	-	1	1	-	-	-	-		-
<b>CO 4</b>	1	-	1	I	-	1	1	I	-	-	i	-	-
CO 5	1	-	1	-	-	1	1	-	1	Ţ		-	-
CO 6	1	1	1	_	1	1	1	-	i (	Ď	-	-	1

#### **Correlation Levels:**

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

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## **Assessment Rubrics:**

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

## Mapping of COs to Assessment Rubrics:

		Internal Exam	Assignment	Project Evaluation	End Semester Examinations
(	CO 1		$\checkmark$		$\checkmark$
C	CO 2	$\checkmark$			$\checkmark$
C	CO 3	$\checkmark$			$\checkmark$
C	CO 4	$\checkmark$			$\checkmark$
(	CO 5	$\checkmark$	$\checkmark$		$\checkmark$
(	CO 6	$\checkmark$			$\checkmark$