



University of Kerala

Discipline	CHEMISTRY				
Course Code	UK3DSECHE200				
Course Title	ENVIRONMENTAL CHEMISTRY I				
Type of Course	DSE				
Semester	3				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical Per week	Total Hours/Week
	4	4 hours	-		4
Pre-requisites	1. Fundamental concept of Environmental Chemistry 2. Terminology associated with Environment				
Course Summary	This course provides students with the knowledge of ecosystem and the different types of pollution caused by human activities. This course enlightens the students about the need to protect and conserve our environment for future generation. The course also highlights the green protocols and methodology being adopted for preserving the Environment.				

Detailed Syllabus:

Module	Unit	Content	Hours
		ENVIRONMENTAL CHEMISTRY I	
I	ENVIRONMENT AND ITS COMPONENTS		9
	1	Introduction, concepts and scope of environmental chemistry	2
	2	components of environment – biotic, abiotic and energy components	1
	3	Environmental segments- atmosphere, hydrosphere, lithosphere and biosphere-Structure and its composition	3
	4	General Concepts of biological cycles – carbon cycle, nitrogen cycle, and oxygen cycle	2
	5	Environmental perspectives, environment and society	1
II	ECOLOGY AND ECOSYSTEM		9
	6	Ecology-elementary idea. Food chain- grazer and detritus food chain. Food web. Ecological pyramid.	3
	7	Ecosystem- concept, components, function and classification	2
	8	Productivity in an ecosystem- primary and secondary productivity	1
	9	Biodiversity, sustainable ecosystem.	1
	10	Population and environment: Human population and distribution, urbanization	2
III	RESOURCES-TYPES AND CLASSIFICATION		9



	11	Natural Resources-classification, Water resources, Forest resources, Land resources, Mineral resources, Energy resources	2
	12	Renewable and non-Renewable energy resources. Renewable energy resources - bio fuel & biomass energy, hydro power, Solar energy Wave energy and Tidal Energy-Mention only	3
	13	Nonrenewable energy resources - nuclear fuels and fossil fuels	1
	14	Hydrogen as a next generation fuel	1
	15	Conservation of natural resources. Future energy resources. Sustainable use of resources	2
IV	ENVIRONMENTAL POLLUTION, ETHICS AND LAWS		18
	16	Pollution- definition and its classification. Pollutants, classification of pollutants based on source and physical state	4
	17	Causes, effect and control measures of thermal pollution, nuclear pollution, marine pollution and Industrial pollution- Cement, sugar, paper industry, thermal and nuclear power plants	5
	18	Environmental laws-Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Rio declaration, Montreal protocol, Kyoto Protocol-Principles	4
	19	Environmental ethics: Issues and possible solutions	1
	20	Environmental audit -Types Environmental management-objectives and components.	4
V	OPEN ENDED MODULE: Learning through problem solving, seminars, open discussions, assignment discussions, Quizzes, Open book exams etc		15
	21	Introduction to Environmental Components and segments	
	22	Concept of biological cycles and Food chain	
	23	Classification of Natural Energy Resources and its conservation	
	24	Classification of Pollutants and Types of Pollution	
	25	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.



Course outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO1	Help to understand concept of Environmental chemistry Environmental components, Environmental segments and various biogeochemical cycles and investigate the relationship of society with environment.	An	1,3
CO2	Help students to study the dynamics of ecosystem including food chains, explore the importance of biodiversity and their need to conserve the biodiversity	E	1,3
CO3	Develop an understanding of various resources and principles undertaken for the conservation of energy resources	C	1,2,3
CO4	Identifying the sources and types of environment pollution namely air pollution, water pollution, soil pollution Industrial pollution and discussed about Environmental Laws, Ethics and audit	An	1,3
CO5	Design sustainable solutions by integrating knowledge of environmental components, biological cycles, energy resource conservation, pollution control, and environmental legislation to address real-world ecological challenges.	C	1,2,3,5

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.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/ Tutorial (T)	Practical (P)
1	CO-1	PSO-1,3 PO-1,2	An	F, C	L	
2	CO-2	PSO-1,3 PO-1,2	E	C	L	
3	CO-3	PSO-3 PO-1,2	C	F, C	L	
4	CO-4	PSO-1,3 PO-1,2	An	F, C	L	
5	CO-5	PSO-1,3	C	F	T	



		PO-1,2				
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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	3	-	2	-	-	3	2	-	-	-	-	-	-
CO 2	2	-	3	-	-	2	2	-	-	-	-	-	-
CO 3	-	3	-	-	-	2	3	-	-	-	-	-	-
CO 4	3	-	2	-	-	2	2	-	-	-	-	-	-
CO 5	3	-	3	-	-	3	3	-	-	-	-	-	-

Correlation Levels:

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

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	✓	✓		✓
CO 2	✓			✓
CO 3	✓			✓
CO 4	✓			✓
CO 5		✓	✓	

