

1.	Title of the course	Environmental Chemistry
2.	Course number	CE521L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CE5111/8
6.	To be offered by	Department of Civil and Environmental Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	Course Objective(s): The course is designed to introduce the basic concepts in environmental chemistry and the role of chemistry in understanding the earth environment. The course would give a solid foundation to engineering students in the area of aqueous chemistry. The course also covers fundamentals of atmospheric chemistry, and also present the application of standard chemical processes in environmental remediation.	
10.	Course Content: The unique properties and structure of water; Basic concepts in aquatic chemistry: Chemical equations and reactions; Chemical equilibrium; Fundamentals of acid-base equilibria, Acidity; Alkalinity; Carbonic acid system; Buffering in water systems; Chemical thermodynamics; Concept of activity and activity coefficient; Solubility equilibria, Oxidation-reduction equilibria; Stability diagram; Electrochemical aspects of corrosion; Fundamentals of surface and colloidal chemistry. Water softening and water stabilization; Langelier saturation index; Caldwell Lawrence diagrams; Solubility diagram; Complexation and Chelation. Atmospheric Chemistry: Chemical equilibria and kinetics; Photo-dissociation and free radical reactions; Chemistry of precipitation; Acid rain, acidification of lakes. Application of various chemical processes in environmental remediation.	
11.	Textbook(s): 1. Sawyer C N, McCarty P L and Parkin G F, Chemistry for environmental engineering and science, McGraw-Hill Education, New York (2003). 2. Benefield L D, Judkins J F and Weand B L, <i>Process chemistry for water and wastewater treatment</i> , Prentice Hall (1982).	
12.	Reference(s): 1. Manahan S, Environmental chemistry, CRC Press (2017). 2. Faust S D and Aly O M, <i>Chemistry for water treatment</i> , CRC Press (1998). 3. VanLoon G W and Duffy S J, <i>Environmental chemistry: A global perspective</i> , Oxford University Press, UK (2017). 4. Connell D W, Basic concepts of environmental chemistry, CRC Press (2005).	