



Environmental chemistry

Course Code	Course Num.	Course Name	Credit Hours	Lec	Lab	Tut	Prerequisites
CHM	434	Environmental chemistry	3	2	2	0	CHM 333

Objectives:

- To provide student with an understanding of the fundamental chemical processes that are central to important environmental problems.
- To encourage student to utilize this knowledge in making critical evaluations of these problems.

Syllabus:

Definition of the environment and its components, properties and sources of water, Nature and types of water pollutants, Water treatment and water use, treatment of water for industrial use,

Atmosphere - chemistry of atmosphere - importance of atmosphere - physical characteristics of atmosphere - inversions and air pollution - chemical and photochemical reactions in the atmosphere - acid base reaction in the atmosphere - reactions of atmospheric oxygen - reactions of atmospheric nitrogen.

Inorganic air pollutants: Carbon dioxide - sulfur dioxide sources and sulfur cycle - nitrogen oxides in atmosphere - acid rain - fluorine chlorine and their gaseous compounds, Organic air pollutants and photochemical smog Pollutant hydrocarbons - photochemical smog - smog-forming automotive emission - smog-forming reactions of organic compounds in the atmosphere - mechanism of smog formation

Soil environmental chemistry: Nature and composition of soil - acid-base and ion exchange reactions in soils - nitrogen, phosphorus and potassium in soils - fertilizers - waste and pollutants in soil - preparation of waste for disposal.

Introduction to toxicology and toxicological chemistry - dose-response relationship - toxic elements and elemental forms - toxic inorganic compounds - toxicological chemistry of organic compounds - application of nanomaterials for toxins removal from water.

Metal resource and ecology - world energy resource - energy conservation - petroleum, coal and natural gas - nuclear fission and fusion - the sun energy and energy from biomass Environmental analysis (chapter 26)

Introduction of environmental chemical analysis - analysis of water samples - classical methods of water analysis - instrumental methods of water analysis - analysis of waste and solids - atmospheric monitoring - environmental hazards assessment

Textbook:

Environmental Chemistry, Stanley A. Manahan, 7th edition , Boca Raton: CRC Press LLC, 2000

References:

1. Elements of environmental chemistry, Donald and Hites, John Wiley & sons, Inc. New York, ISBN 978-0-471-99815-0 ISBN 978-0-471-99815-0
2. Environmental soil and water chemistry, principles and applications, V. P. Evangelou, John Wiley & Sons, Inc. New York Homogeneous and heterogeneous catalysis

