

ADVANCE CHEMISTRY-I (ENVIRONMENTAL CHEMISTRY)

CREDIT HOURS: 3

COURSE OBJECTIVES:

From this course, the students should be able to:

- Understand the fundamental principles of environmental chemistry.
- Apply these principles in pollution related subjects.
- Demonstrate the understanding of environmental chemistry principles via experimental exercises in the laboratory.
- Various sources and types of environmental pollution
- Health hazards caused by environmental pollution
- Global warming and climate changes

COURSE CONTENTS:

1. Atmospheric Chemiser

Meteorology ,composition of air around us, atmospheric temperature and pressure profile, Temperature inversion and photochemical smog, particulate matter in the atmosphere, Industrial pollutants, radioactivity, atmospheric aerosols, Acid rain –major sources, mechanism, control measures and effects on buildings and vegetation, Global warming – major green house gases, mechanism, control measures and global impact, The stratospheric ozone – the ozone hole, CFCs, ozone protection, biological consequences of ozone depletion.

2. Water Pollution and Water Treatment –

sources of water pollution-industrial sources and agricultural sources, heavy metals contamination of water, Eutrophication, detergents and phosphates in water, water quality criteria, Water purification – primary, secondary and advanced treatment, Removal of nitrogen and phosphorous compounds from polluted water, organic matter in water and its decomposition.

3. Soil Pollution

soil and mineral resources, general principles of metal extraction, Heavy metals contamination of soil, toxicity of heavy metals, bio-accumulation of heavy metals, Organic matter in soil, Macro and micro-nutrients in soil, ion-exchange in soil, soil pH and nutrients availability.

4. Green Revolution –pest control, pesticides, toxicity of pesticides, integrated pests management.

5. Energy Production and Environment –
liquid and gaseous fuel, hydrogen economy.

6. Renewable Energy – nuclear energy, solar energy, geothermal and tidal energy.

Evaluation Criteria

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

Recommended Text Books

1. Latest editions of the following books:
2. 1. Collin Baird, Environmental Chemistry, W. H. Freeman and company, New York, 1995.
3. 2. John W. Moore and Elizabeth A. Moore, Environmental Chemistry, Academic Press Inc., New York, 1976.
4. 3. Anil Kumar De, Environmental Chemistry, Wiley Eastern Ltd. New Delhi, 1989.
5. 4. R. W. Raiswell, P. Brimblecombe, D. L. Dent and P. S. Liss, Edward Arnold Ltd., London, 1980.
6. 5. Staneley E. Manahan, Environmental Chemistry, Brooks, California.

ADVANCE CHEMISTRY LAB-I (ENVIRONMENTAL CHEMISTRY)

CREDIT HOURS: 1

Practicals

- Qualitative and quantitative analysis of irrigation water
- Qualitative and quantitative analysis of drinking water
- Determination of BOD and COD in waste water
- Estimation of heavy metals in soil / plants and wastewater
- Determination of viscosity
- Determination of surface tension
- Determination of pH

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Recommended Reference Books

Latest editions of the following books:

1. Peter O. Neill, Environmental Chemistry, Chapman and Hall, London, 1993.
2. Derek M. Elsom, Atmospheric Pollution, Blackwell Publishers, Oxford, 1992.
3. Geoffrey Lean and Don Hinrichsen, Atlas of the Environment, Helicon Publishing Ltd., Oxford, 1992.

Recommended Journals/Periodicals Journals related to:

1. Atmospheric Chemistry.
2. Air Pollution.
3. Water Pollution.
4. Soil Pollution/Soil sciences.
5. Environmental Technology.

Recommended World Web: Web Sites related to:

1. Global Warming/Green House Effect.
2. Ozone depletion.
3. Acid Rain
4. Environmental Pollution
5. Energy Conservation