

PRE-REQUISITE: ENSC-105**LEARNING OUTCOMES**

Upon successful completion of the course the student will be able to:

- Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water, and soil.
- Recognize different types of toxic substances & responses and analyze toxicological information.
- Apply basic chemical concepts to analyze chemical processes involved in different environmental problems (air, water & soil)

CONTENTS:**Unit-1: Chemistry of Troposphere**

- 1.1. Toxic gases
- 1.2. Oxides of Carbon their sources and effect
- 1.3. Oxides of sulfur their sources and effect
- 1.4. Oxides of Nitrogen their sources and effect
- 1.5. Tropospheric ozone
- 1.6. Smog and its types
- 1.7. Sulfurous smog
- 1.8. Photochemical smog
- 1.9. Acid Rain and its impact on different ecosystems
- 1.10. Particulate Matter

Unit-II: Stratospheric chemistry

- 2.1. Introduction to stratosphere
- 2.2. Ozone layer and its chemical depletion
- 2.3. Polar stratospheric clouds and Polar vortex.

Unit-III: Green House Effect and Global warming

- 1.1. The Greenhouse Effect and Global Warming
- 1.2. Greenhouse gases,
- 1.3. Earth energy emission and greenhouse effect.
- 1.4. Chemical reactions
- 1.5. Atmospheric residence time.

Unit-IV: Chemistry of water bodies

- 4.1. Dissolved Oxygen
- 4.2. Biological oxygen Demand
- 4.3. Chemical Oxygen demand

Unit-V: Indoor Pollutants

- 5.1. Radon Gas
- 5.2. Volatile organic compounds
- 5.3. Tabaco smoke
- 5.4. Pesticides
- 5.5. Biological indoor pollutants

TEACHING – LEARNING STRATEGIES

- Lecture based examination
- Presentation/seminars
- Class discussion
- Quizzes

ASSIGNMENTS – TYPE AND NUMBER WITH CALENDAR

It is continuous assessment. The weightage of Assignments will be 25% before and after midterm assessment. It includes:

- classroom participation,
- attendance, assignments and presentation,
- homework
- attitude and behavior,
- hands-on-activities,
- short tests, quizzes etc.

RECOMMENDED TEXT BOOKS / SUGGESTED READINGS

1. Overway, K.S. (2017). *Environmental Chemistry*. An Analytical approach. John Wiley and Sons.
2. Sonwani, S. and Shukla, A. (2021). *Air borne Particulate Matter, Source, Chemistry and Health*. Springer Singapore
3. Colin B. and Michael C. (2012). *Environmental Chemistry*, Fifth edition. W. H. Freeman & Company.
4. Stanley M. (2017). *Environmental Chemistry*. CRC Press
5. Bhatti, N.H., and Noreen, S. (2017). *Principles of Environmental Chemistry*. The Carwan Book House, Lahore

Further Reading: As suggested by the Instructor.