

BACHELORS WITH ENVIRONMENTAL SCIENCE AS MINOR (CT-1)

3rd SEMESTER

EVS324N ENVIRONMENTAL SCIENCE_ ENVIRONMENTAL CHEMISTRY

CREDITS: THEORY-4, PRACTICAL -2

COURSE LEARNING OUTCOME: *This course introduces the students to basic analytical chemistry relevant to the course and is designed to equip the students to handle the analytical instruments. Emphasis is laid to have an understanding of the chemistry of atmosphere, water and soil. The students will also learn basic principles of various chemical processes occurring in the different components of the environment.*

THEORY (4 CREDITS: 60 HOURS)

UNIT I: ANALYTICAL CHEMISTRY (15 HOURS)

Stoichiometry, titrimetry and gravimetry, Spectrophotometry: UV-Visible, Flame photometry and AAS
Chromatography: Paper and TLC

UNIT II: ATMOSPHERIC CHEMISTRY (15 HOURS)

Evolution of Earth's atmosphere, Ions and radicals in the atmosphere, 1.3. Inorganic and organic particulate matter, Photochemical reactions in the atmosphere, Thermochemical reactions in the atmosphere

UNIT III: WATER CHEMISTRY (15 HOURS)

Physico-chemical properties of water, Solubility of gases in water, Biochemical oxygen demand and chemical oxygen demand, Carbonate-bicarbonate system, Nutrients in water: Phosphorus and nitrogen

UNIT IV: SOIL CHEMISTRY (15 HOURS)

Pedogenesis, Soil profile, Inorganic and organic components of soil, Physical, chemical and biological properties of soils, Soil classification and types

PRACTICALS: (2 CREDITS) (60 HOURS)

1. Standardization of reagents – titrants (acids, bases)
2. Experimental verification of Beer-Lambert's law
3. Measurement of ozone gas concentration by ozone sensor
4. Estimation of dry deposition from the atmosphere
5. Determine suspended solids and TDS in different water samples
6. Determination of chloride and alkalinity in water samples
7. Determination of soil texture of different ecosystems
8. Determination of chloride and alkalinity in soil samples

SUGGESTED READINGS:

1. Environmental Chemistry, A. K De. 2003. New Age International Limited.
2. Fundamental Science of Environmental Chemistry, G S Sodhi. 2006. Narosa Publishing House.
3. Introduction To Environmental Engineering and Science, Gilbert M .2007. Masters Pearson.
4. Environmental Chemistry, C Baird. 2000. W H Freeman and Company Usa.
5. Soil And Water Chemistry: An Integrative Approach, E Michael Essington. 2003. CRC Press.
6. Nature And Properties of Soil, C. N Brady. 1974. Mcmillian & Co.
7. Environmental Analysis and Instrumentation, Neelima Rajvaidya Aph Pub Co.2005. Ansari Road Daryaganj, N. Delhi.
8. Atmospheric Chemistry Fundamental and Experimental Techniques, Finlayson-Pitt.1986. John Wiley and Sons, New Delhi.
9. Analytical Chemistry, Christian G.D. 2000. John Willey and Sons.