Bachelors with Environmental Science as Major
3rd Semester

EVS322J: Environmental Science: Environmental Chemistry

CREDITS: (Theory-4, Practical -2)

Maximum Marks:100 **Minimum Marks: 36**

Course learningoutcome: This course introduces the students to basic analytical chemistry relevant to the course and is designed to 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)**

1.1. Stoichiometry
1.2. Titrimetry and Gravimetry
1.3. Spectrophotometry: UV-Visible
1.4. Flame photometry and AAS
1.5. Chromatography: Paper and TLC

Unit II: Atmospheric Chemistry **(15 hours)**

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

Unit III: Water Chemistry **(15 hours)**

1.1. Physico-chemical properties of water
1.2. Solubility of gases in water
1.3. Biochemical oxygen demand and chemical oxygen demand
1.4. Carbonate-bicarbonate system
1.5. Nutrients in water: Phosphorus and nitrogen

Unit IV: Soil chemistry **(15 hours)**

1.1. Pedogenesis
1.2. Soil profile
1.3. Inorganic and organic components of soil
1.4. Physical, chemical and biological properties of soils
1.5. Soil classification and types

PRACTICALS: (2 credits) **(30 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 pH and conductivity of water samples
6. Determination of dissolved oxygen content in water samples
7. Determination of soil texture
8. Determination of pH and conductivity of soil samples