CLASS-XII

SUBJECT : ENVIRONMENTAL SCIENCE (EVSC)

SEMESTER-IV

FULL MARKS:35   **CONTACT HOURS :80 HOURS**

COURSE CODE : THEORY

Chapter	Subtopics	Contact Hours	Marks
10.Environmental pollution control and Green Technology	**10.1 Introduction to Environmental Pollution** • **Pollutants**: Definition and types. **10.2 Air Pollution** • **Pollutants**: Major primary and secondary pollutants. • **Effects**: Health impacts, photochemical smog, industrial smog, temperature inversions, greenhouse effect, and global warming. • **Control**: Gaseous absorption, adsorption, cyclone separators, ESP. • **Case Studies**: Black carbon aerosol in the Himalayas, Bhopal Gas Tragedy. • **NAAQS & AQI**: Standards and calculations. **10.3 Water Pollution** • **Sources**: Surface, ground, and ocean water pollution. • **Concepts**: DO, BOD, COD, Eutrophication. • **Health Impact**: Waterborne diseases (Diarrhea, Typhoid). • **Control**: Water quality standards, STP, ETP, WHO guidelines. • **Case Studies**: Ganga Action Plan (GAP), Minamata Disaster. **10.4 Soil Pollution** • **Causes and Effects**: Impact on environment, vegetation, and life forms. • **Control**: Soil reclamation and pollution control measures. **10.5 Noise Pollution** • **Sources & Effects**: Measurement, current situation in India, prevention, and control. **10.6 Radioactive Pollution** • **Types & Sources**: Hazards and disposal methods. • **Case Study**: Chernobyl disaster, 1986. **10.7 Analytical Methods with principles and application** • **Techniques**: UV-VIS Spectrophotometry, Atomic Absorption Spectrophotometry, Electrophoresis, Chromatography, and Microscopy—properties, types, and applications.	30	13

	10.8 Green Technologies with principles and application • **Technologies**: CFLs, motion detection lighting, programmable thermostats, carbon capture and storage (CCS), Flue Gas Desulfurization (FGD), and solvent recovery systems.		
11.EIA and Environmental management	**11.1 Concept of Environmental Management** • **Need for Environmental Management**: Importance of managing environmental resources for sustainable development. • **Environmental Aspects**: Social, economic, and moral approaches to environmental management. **11.2 Waste Management** • **Solid Waste**: Disposal, recycling, and treatment methods. • **Liquid Waste**: Management of wastewater, and treatment technologies. • **Biomedical Waste**: Proper disposal and treatment of healthcare-related waste. • **Hazardous Waste**: Handling, disposal, and risk mitigation. **11.3 3R Management**: • **Reduce, Reuse, Recycle** Key principles for waste minimization and resource efficiency. **11.4 Environmental Impact Assessment (EIA)** • **Introduction to EIA**: Definition, objectives, and significance of conducting EIA for development projects. • **Types of EIA**: o **Rapid EIA**: Quick assessment for urgent projects. o **Comprehensive EIA**: In-depth evaluation of large-scale projects. o **Strategic EIA**: Focused on policies, plans, and programs. • **Methodologies of EIA**: General procedures used to evaluate the environmental impacts of projects. • **Fundamentals of the Latest EIA Notification (Draft) 2020**: Overview of the new guidelines and changes in the draft notification. • **Case Studies of EIA**: o **Hydropower Projects**: Environmental concerns and EIA studies for hydroelectric plants. o **Thermal Power Projects**: Environmental impact assessment for coal and gas-fired power plants.	30	12
12.Environmental statistics	12.1• **Statistical Analysis Tools**: Brief principle of Sampling, probability theory, distributions (Normal, Lognormal, Binomial, Poisson, t, F). Basic concepts of mean, median ,mode, standard error, standard deviation, correlation, regression, hypothesis testing (t-test, Chi-square) with examples. 12.2 • **Data Presentation**: Basic concepts of Frequency, histograms, pie charts, and pictograms. 12.3 • **Environmental Modelling**: Principles of Linear simple and multiple regression models, validation, and forecasting.	20	10

	12.4 • **Air Pollution Dispersion**: Principles of Box model for air pollution modelling and prediction.		