**School of Chemical Sciences**

**Devi Ahilya Vishwavidyalaya, Indore**

**M.Sc. Chemistry**

**SEMESTER IV**

**MCH-402: ENVIRONMENTAL CHEMISTRY**

**Credits 4**

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| **Unit-I** | **Environment**  Introduction. Composition of atmosphere, vertical temperature, temperature inversion, heat budget of the earth, atmospheric system, vertical stability atmosphere, Biochemical cycles of C, N, P, S and O. Biodistribution of elements.  **Hydrosphere**  Chemical composition of water bodies-lakes, streams, rivers and wet lands etc. Hydrological cycle  Aquatic pollution – Inorganic,organic, pesticide, agriculture, industrial and sewage,  detergents, oil spills and oil pollutants. Water quality parameters – dissolved oxygen, biochemical oxygen demand, solids, metals, content of chloride, sulphate, phosphate, nitrate and microorganisms. Water quality standards.  Analytical methods of measuring BOD, DO, COD, F, Oils, metals (As, Cd, Cr, Hg, Pb, Se etc.),residual chloride and chlorine demand.  Purification and treatment of water. |
| **Unit-II** | **Soils**  Composition, micro and macro nutrients, pollution – fertilizers, pesticides, plastics and metals. Waste treatment.  **Atmosphere**  Chemical composition of atmosphere – particles, ions and radicals and their formation. Chemical and photochemical reactions in atmosphere, smog formation, oxides of N, C, S, O and their effect, pollution by chemicals, petroleum, minerals, chlorofluorohydrocarbons.  Green house effect, acid rain, air pollution controls and their chemistry.  Analytical methods for measuring air pollutants. Continuous monitoring instruments.  Urban Air Pollution Exhaust emissions, damaging effects of carbon monoxide. Monitoring of CO. Control strategies. |
| **Unit-III** | **Industrial Pollution**  Cement, sugar, distillery, drug, paper and pulp, thermal power plants, nuclear power plants, metallurgy. Polymers, drugs etc.  Environmental disasters – Cherbonyl, Three mile island, Seveso and minamata disasters, Japan tsunami |
| **Unit-IV** | **Environmental Toxicology**  Toxic heavy metals **:** Mercury, lead, arsenic and cadmium. Causes of toxicity. Bioaccumulation, sources of heavy metals. Chemical speciation of Hg, Pb, As, and Cd. Biochemical and damaging effects.  Toxic Organic Compound **:** Pesticides, classification, properties and uses of organochlorine and ionospheres pesticides detection and damaging effects. |