

## **PEN6I102 SOLID & BIO-MEDICAL WASTE MANAGEMENT**

### **MODULE-I**

#### **Introduction:**

Definition. Composition and Properties of Municipal Solid Waste Management - Sources, nature and characteristics; quantitative and qualitative aspects; Engineering principles, assessment and management. Solid waste problems - Industrial, Mining, Agricultural, Domestic (urban) wastes, Biomedical waste, E-waste, Plastic Waste and Construction Waste, Management of lead acid battery.

### **MODULE-II**

#### **Collection transfer and transportation:**

Hydrological aspects of solid waste. Thermal Conversion Technologies, Combustion, Pyrolysis; and Gasification, storage of refuse, waste reduction and environmental control. BioChemical Transformation, Aerobic and Anaerobic Composting, Chemical transformation processes, personnel requirements, analysis & collection system, collection routes, types of transfer stations, transport means and methods, location and transfer stations.

### **MODULE-III**

#### **Disposal:**

Solid waste disposal - Landfill, Classifications, Types, and operation, Types of equipments, costs, landfill stabilization. Siting Considerations, Generation, movement and control of gases and leachates, layout and preliminary design of landfills. Disposal of industrial and mill tailings, Separation.

#### **Processing of Solid Waste:**

Resource and energy recovery; Waste minimization and utilization. Regulatory aspects of solid waste management. Transformation and Recycling of solid waste.

### **MODULE-IV**

#### **Biomedical waste management :**

Sources, Hazardous associated with bio-medical wastes, Biosafety, Storage of biomedical wastes, disposal and processing.

#### **TEXT BOOKS :-**

1. Environmental Engineering by G. Kiely McGraw Hill

#### **REFERENCE BOOKS:-**

1. George Tchobanoglous, Hilary Theisen and Samuel A. Vigil, Integrated Solid Waste Management: Engineering Principles and Management Issues (1993). TMH.
2. Bhide and Sundaresan (2000), Solid Waste Management in Developing countries, Indian National Scientific Documentation Centre. New Delhi.
3. CPHEEO Manual on Solid Waste Management.
4. Environmental Engineering by Arcadio P. Sincero & Gergoria A. Sincero- PHI Pub
5. A Versiland, Solid Waste Engineering, Thanson Books.

### **SOLID & BIO-MEDICAL WASTE MANAGEMENT(PRACTICAL)**

Sample preparation; sampling techniques; coning and quartering method; overburden and other wastessampling. Profile sampling, Characterisation of Solid Waste, Proximate Analysis and Ultimate Analysis, Calorific Value; Determination of coarse fraction; pH & buffered pH, KCl & CaCl<sub>2</sub> solution; EC & CEC; exchangeable Na & K; non-exchangeable K & HNO<sub>3</sub>-soluble-K. ESP and SAR. mineralisable -N and total nitrogen in profile samples. Determination of organic matter and organic carbon C:N ratio; Determination of plant available P and total P; DTPA -extractable micronutrients and trace elements in OB samples; Leachate Analysis.

TENTATIVE  
Likely to be Modified