

**4/4 B.Tech. SEVENTH SEMESTER**

**CE7T4D**

**ADVANCE ENVIRONMENTAL ENGINEERING**

**Credits: 3**

**Lecture: 3 periods/week**

**Internal assessment: 30 marks**

**Tutorial: 1 period /week**

**Semester end examination: 70 marks**

**Pre-requisites:** Environmental engineering

**Learning objectives:**

- To know about Sources, types, Composition of MSW
- To know the method of transfer and transport the solid waste after the collection from the source.
- To identify the pollutants and their sources and then the transport mechanisms of the pollutants followed by the affected population and respective controls

**Course outcomes:**

After the exposure to the subject, student knows:

1. Comprehend Solid Waste Management program success in a city or town.
2. Analyze existing scenario of solid waste management in India
3. Assess different techniques for solid waste processing.
4. Understand the contemporary pollution issues.
5. Evaluate different parameters of air sampling procedures.

**UNIT – I**

**SOURCES, TYPES AND COMPOSITION OF MUNICIPAL SOLID WASTE**

Sources- Types- Composition of Solid Waste- Effects of improper disposal of solid waste- public health effects-Types of materials recovered from MSW.

**WASTE HANDLING, SEPARATION AND STORAGE**

On- site handling and separation at solid waste-on - site storage of solid waste-options under Indian conditions.

**UNIT-II**

**COLLECTION OF MUNICIPAL SOLID WASTE**

Methods of collection-equipment- types of vehicles-man power requirement-collection routes.

**TRANSFER AND TRANSPORT OF MUNICIPAL SOLID WASTE**

Need for Transfer operations-Transfer Stations-Selection of Location of Transfer Station-Transport means and methods.

**UNIT-III**

**PROCESSING TECHNIQUES**

Mechanical volume reduction-Thermal volume reduction- manual component separation.

**DISPOSAL OF SOLID WASTE**

Disposal of Solid Waste – Sanitary land Fills- Site selection- Planning-Design and operation of Sanitary landfills- Leachate collection & treatment-composition of land fill gases.

**UNIT-IV**

**AIR POLLUTION**

Air pollution - definitions-scope, significance - air pollutants - measurements of pollution classification –natural and artificial-primary and secondary, point and non-point.

**EFFECT OF AIR POLLUTION**

Effect of air pollutants on man-material and vegetation-global effects of air pollution green house effect, heat lands, acid rains and ozone.

## **UNIT-V**

### **METEOROLOGY AND PLUME DISPERSION**

Properties of atmosphere-heat, pressure, wind forces, moisture and relative humidity influence of meteorological phenomenon on air quality- wind rose diagram.

#### **LAPSE RATE**

Lapse rate, pressure systems, wind and moistures, inversions and plume behavior plume rise models- Gaussian model for plume dispersion.

#### **Learning resources:**

##### **Text Books:**

1. Integrated Solid waste management by Goerge Tchobanolous, Hilary Theisen & Samuel A. Vigil. McGraw Hill International Editions
2. Air Pollution and Control by Rao, M.N and Rao, H.N., Tata McGraw Hill, New Delhi, 2007.

##### **Reference books:**

1. CPCB Manual on solid waste Management
2. Solid waste management K.sasikumar, sanoop Gopi Krishna PHI Learning (P) Ltd.
3. An Introduction to Air pollution by Trivedy, R.K., B.S.Publications, 2005.

##### **e-learning resources:**

NPTEL