

IV YEAR B.Tech I - Sem

Waste Management Techniques & Power Generation  
(Open Elective - III, Offered by EEE Dept.)

Pre-requisites: NIL

Course Objectives:

1. To classify the sources of solid waste & e-waste.
2. To identify methods of solid waste disposal.
3. To understand various waste management techniques.
4. To study various energy generation methods as per type of waste available locally.
5. To analyze energy generation methods and recycling of waste.

Unit-I: Waste Management and Handling (~8 Lecture Hours)

Sources & types of wastes (Industrial, Municipal, Agro, Domestic). Generation of wastes, Pollution standards, Waste characterization. Functional elements of waste management, technological aspects related to waste generation, on site handling, storage, collection, transfer and transport. Processing techniques and equipment (volume reduction, size reduction, component separation, dewatering, drying).

Unit-II: Waste Management Issues (~ 8 Lecture Hours)

Planning, organization & control Hazardous & toxic wastes, hazard & its management, classification, generation, handling, processing and disposal. Industrial safety, Waste disposal, Environmental impact (toxic & non-toxic).

Unit-III : Conversion Techniques & Methods (~ 10 Lecture Hours)

Recovery of value added components: Recycling, conversion products and energy  
 Conversion technologies: Incineration, - principle features of an incinerator - site selection and plant layout of an incinerator - Thermo-chemical conversions.  
 Biochemical conversion: Biogas & ethanol Conventional Chemical & biological treatment.  
 Power generation & its utilization.

(12) G. Anur  
(13) K. Reddy

Unit-IV: Processing Techniques and Recovery of Energy (~ 08 Lecture Hours)

Processing techniques - purposes mechanical volume reduction - necessary equipments - chemical volume reduction - mechanical size reduction selection of equipments - components separation - methods - drying and dewatering. Refusal disposal - various methods.

(14) R. Jay

Unit-V: Concepts of Land Fill & e-Waste (~ 10 Lecture Hours)

Concepts of Land Fill:

Land Fill method of solid waste disposal, Land fill classification, Types, methods and Site consideration, Layout and preliminary design of landfills: Composition, Movement and control of landfill leachate and gases, Environmental monitoring for land fill gases.

(15) K. S. Jay

(16) R. Balakrishna

e-Waste:

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|--------------|-----------|---------|
| (1) N. Muthu | 4) S. ... | 8) ...  |
| (2) D. ...   | 5) ...    | 9) ...  |
| (3) ...      | 6) ...    | 10) ... |
|              | 7) ...    | 11) ... |

e-waste in global context, Environmental concerns, Global trading in hazardous waste, Management of e-waste, e-waste legislation, Government regulations on e-waste management & Recycling.

### TEXT BOOKS :

1. T.V. Ramachandra, "Management of Municipal Solid Waste", The Energy and Resources Institute, TERI, 2009.
2. Thomas Christensen, "Solid waste technology and Management", 2<sup>nd</sup> Volume Set., WILEY Publishers, 2011.
3. K.Sasi Kumar, Sanoop Gopi Krishna, "Solid Waste Management", PHI Learning Pvt. Ltd, 2009.

### REFERENCE BOOKS:

1. Vasudevan Rajaram, Faisal Zia Siddiqui, Sanjeev Agrawal, Mohammad Emran Khan, "Solid and Liquid Waste Management: Waste to Wealth", PHI Learning Pvt. Ltd, 2016.
2. P.Jayarama Reddy, "Energy Recovery from Municipal Solid Waste by Thermal Conversion Technologies", CRC Press, 2016.
3. Ms Bhatt Asheref Illiyan, "Solid waste Management: An Indian Perspective" Synergy Books India, 2012.

**Course Outcomes:** Upon the completion of the course, the students will be able to:

1. Understand technologies for generation of energy from solid waste
2. Compare methods of solid waste disposal.
3. Identify sources of energy from waste using various conversion techniques.
4. Analyze methods for waste management.
5. Assess the harmful effects of e-waste
6. Differentiate between the normal waste and e-waste

1) N. Malle Reddy  
2) M. Subrahmanyam

3) E. M.

4) S. S. Sankar

5)

6) H. Reddy

7) H. Reddy

8) K. Reddy

(9) M. Reddy

(10) S. Reddy

(11) R. Reddy

(12) G. Reddy

(13) P. Reddy

(14) R. Reddy

(15) M. Reddy

(16) K. Reddy

(17) R. Balasubramanian