



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

SOLID WASTE MANAGEMENT								
VI Semester: CE								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ACED34	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 48			
Prerequisite: Nil								

I. COURSE OVERVIEW:

A course on solid waste management provides students with a comprehensive understanding of the management and disposal of solid waste, which includes municipal, industrial, and hazardous waste. The goal of this course is to equip students with the knowledge and skills needed to address the challenges of managing solid waste in an environmentally responsible and sustainable manner.

II. COURSE OBJECTIVES:

The students will try to learn:

- I. The present methods of solid waste management systems and to analyze their drawbacks comparing with statutory rules.
- II. The different elements of solid waste management from generation of solid waste to disposal.
- III. The different processing technologies and to study conversion of municipal solid waste to compost or biogas.
- IV. The sanitary landfill reactions. The design of structural elements necessary for creating efficient and economic steel structures.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO 1 Categorize and communicate the types of solid wastes, along with their sources
- CO 2 Analyze existing solid waste management systems and identify their drawbacks.
- CO 3 Evaluate different elements of the solid waste management system.
- CO 4 Explain the transport and segregation of solid wastes
- CO 5 Suggest methods for material and energy recovery based on the quality and quantity of solid wastes.
- CO 6 Outline disposal methods of solid wastes.

IV. COURSE CONTENT:

MODULE –I: INTRODUCTION TO SOLID WASTE MANAGEMENT (10)

Solid wastes and their types, Characteristics of solid wastes: Physical, Chemical and biological characteristics, Problems due to improper disposal of solid waste.

MODULE -II: SOLID WASTE MANAGEMENT COLLECTION METHODS (10)

Solid Waste Management: Reuse, Reduction, recycling and Recovery Principles of waste management, Functional elements of solid waste management, Waste generation and handling at source, Collection of solid wastes , Collection methods and services guidelines for collection route layout.

MODULE -III: TRANSFER AND TRANSPORT OF SOLID WASTES (10)

Transfer station, types of transfer stations, design and operation of transfer stations, advantages of transfer stations, processing of solid waste, size reduction, volume reduction, densification, drying.

Segregation of solid waste, manual segregation, mechanical segregation, trommel screens, vibrating screens, air classifiers, magnetic separators, eddy current separators, optical sorters, biological methods of segregation, chemical methods of segregation.

MODULE -IV: PROCESSING AND TRANSFORMATION OF SOLID WASTES (9)

Composting, Advantages, Methods: Incineration and its methods, Advantages and disadvantages of incineration, energy recovery processes.

MODULE -V: ULTIMATE DISPOSAL OF SOLID WASTES (9)

Volume reduction, open dumping, land filling techniques, design and operation of landfills, land farming, deep well injection.

V. TEXTBOOKS:

1. M.N.Rao, , “*Solid and Hazardous Waste Management*”, BS Publications, 2nd Edition, 2020.
2. P.M.Cherry, “*Solid and Hazardous Waste Management*, CBR Publications 2018.
3. K Sasi Kumar, “*Solid Waste Management*”, Prentice Hall India Learning Private Limited, 2009.

VI. REFERENCE BOOKS:

1. George Tchobanoglous “*Integrated Solid Waste Management*”, McGraw Hill Education, 2015.
2. Tchobanoglous, G., Theisen, H., & Vigil, S. “*Integrated Solid Waste Management: Engineering Principles and Management*”, Issues, 2nd Edition, McGraw-Hill, 1993.

VII. ELECTRONICS RESOURCES:

1. <https://archive.nptel.ac.in/courses/105/103/105103205/>
2. https://onlinecourses.swayam2.ac.in/ugc19_bt18/preview

VIII. MATERIAL ONLINE:

1. Course template
2. Tech-talk topics
3. Assignments
4. Definition and terminology
5. Tutorial question bank
6. Model question paper – I
7. Model question paper – II
8. Lecture notes
9. Early lecture readiness videos (ELRV)
10. Power point presentations