



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3163514

Semester – VI

Subject Name: Solid Waste Management – I

Type of course: Professional Elective Course

Prerequisite: Understanding of solid waste along with some basics of solid waste management.

Rationale: to make students aware about various kind of solid wastes and their general characteristics along with different technologies for treatment of these wastes. Existing legislation for municipal waste, e-waste & hazardous waste.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
4	0	0	4	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1.	Introduction and characterization of solid waste: Classification of solid wastes, source-based classification, Factors affecting SWM system, SWM-Indian Scenario, Municipal Solid Waste Management Rules, 2016, with latest amendments; Waste generation and composition, Importance of segregation and collection.	08
2.	Municipal Solid Waste Management: Onsite Handling, Storage and Processing of Solid Waste: Handling methods, Factors considered for storage, Need for segregation, Onsite processing Collection and Transportation of Municipal Solid Waste: Waste collection, Collection systems and equipment, Layout of collection routes, means of transport, Need and design requirements of Transfer station Processing and Separation of Municipal Solid Waste: Importance, Storage, Conveying, Compacting, Shredding, Roll crushing, Material separation principle, Picking, Screens, Float/Sink separators, Magnetic separators, Other devices for processing and material separation, Drying and dewatering Recovery of Resources, Conversion Products and Energy: Material recovery & recycling, Recovery of chemical and biological products, Recovery of energy Disposal of Solid Waste: Landfill site selection criteria, Landfilling methods, Landfill processes, Landfill design, Landfill operations, Landfill closure and post-closure care	16
3.	Sustainable waste management practices, 4R principle for waste management. Physico-chemical and Biological methods (aerobic composting and anaerobic digestion) Composting (Indore & Bangalore Method) of treating solid wastes. Thermo-chemical methods (Pyrolysis, gasification and incineration) of treating solid wastes. Energy recovery through Refuse derived fuel, Best Practices in India and International	12
4.	Construction & Demolition waste Management - Rules & Requirements, One case study (Surat) Plastic Waste Management - Rule, Role & Responsibilities, recycle options, Methods of disposal including Energy recovery, Present Scenario	08



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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	15	08	07	00

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

- Environmental Engineering, Kiely G. McGraw Hill Book Company, 1998.
- Environmental Pollution Control and Engineering, Rao C.S., New Age International (P) Limited, 1991.
- Environmental Engineering by Arcadio Sincero and Gregoria Sincero, Second Edition, Prentice Hall India
- Integrated Solid Waste Management: Engineering Principles and Management Issues by George Tchobanoglous, McGraw-Hill Publication



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Course Outcomes: After learning this course students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Identify the characteristics of solid waste and learn about various solid waste management rules.	20
CO-2	Explain onsite handling, collection and transportation of Municipal Solid Waste Management.	20
CO-3	Interpret the importance of processing, recovery and disposal of solid waste.	20
CO-4	Appraise the best solid waste management practices and learn about sustainable ways to practice solid waste management.	20
CO-5	Summarise the management practices to deal with construction and demolition waste.	10
CO-6	Explain the practices and methods to manage plastic waste.	10