GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: Post Graduate

Subject Code: ME03000201

Subject Name: Municipal Solid Waste Management

w.e.f.Academic Year:	2024-25
Semester:	3
Category of the Course:	MOPEC

Prerequisite:	Environmental Sciences, Introduction to Environmental Engineering.
Rationale:	The problems affiliated with solid waste management (SWM) in today's sprawling civilized and urbanized society are intricate because of the quantity and varied nature of wastes, the funding restriction for public disposal, interference of technology (energy and raw materials), and complex infrastructure development network in urban cities. As a result, if SWM is to achieve in consummate approach, the fundamentals aspects need to be identified. Thus, there is dire need to group the activities from the generation to the disposal point. The six different functional elements (generation, handing and separations, storage and processing at source, collection, the transformation of wastes, transfer and transport, and final disposal) for the engineering comparison and treatment need to be understood in detail. The understanding of the functional element is important because it helps in evaluating the impacts of projected changes and technological developments. Solid waste management is an essential part of every society, but it is also one of the most neglected one. An in-depth understanding of the subject is required to tackle the current solid waste management crisis effectively. This course attempts to familiarize various steps involved in solid waste management.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes
01	To enable a student to know about problems of SWM.
02	To enable a student to know the rate of generation of SW, its characteristics.
03	To enable a student to know onsite handling storage, design of bins, container etc.
04	To enable to get acquainted with methods of collection, labour requirement, economy of collection storage.
05	To enable him to get idea of industrial waste, type and technology and implement relevant laws related to SWM.

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Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/Practical		
L	T	PR	C	ESE (E)	PA/ CA (M)	PA/CA(I)	ESE (V)	
3	0	0	3	70	30	0	0	100

Course Content:

Unit No.	Content	No.of Hours	% of Weightage
1.	General: Problems Associated With Solid Waste Disposal. Generation of Solid Waste: Goals and Objectives of solid Waste Management, Classification of Solid Waste, Factors Influencing Generation of Solid Waste, Characteristics of Solid Waste. Analysis of Solid Waste.	7	14
2.	Onsite Handling, Storage and Processing: Public Health and Aesthetics, Onsite handling, Onsite Storage, Dust bins, Community Containers, Container Locations Onsite Processing methods.	5	12
3.	Solid Waste Collection, Transfer and Transport: Collection Systems, Equipment and Labour Requirement, Collection Routes, Options for Transfer and Transport Systems.	11	28
4.	Processing and Disposal Methods: Processing Techniques and Methods of Disposal, Sanitary Land filling, Composting and Incineration, Bioremediation.	13	25
5.	Recovery of Resources, Conversion Products and Energy: Material Recovery, Energy Generation and Recovery Operation, Reuse in other Industry. Industrial Solid Waste: Nature, Treatment and Disposal methods.	9	21
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
10	**20**	**25**	**25**	**10**	**10**

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(asperRevisedBloom'sTaxonomy)

References/Suggested Learning Resources:

(a) Books:

1) Christensen, H. T., Solid Waste Technology & Management, Wiley, 2010, Volume 1 & 2
2) Haug, T. R., The Practical Handbook of COMPOST ENGINEERING, Lewis Publishers, 1993
3) Reinhart, R. D. and Townsend, G. T., Landfill Bioreactor Design & Operation, CRC Press, 1997, 1st Edition
4) Tchobanoglous, G. and Kreith, F., HANDBOOK OF SOLID WASTE MANAGEMENT, McGraw Hill, 2002, 2nd Edition
5) Tchobanoglous, G., Theisen and Vigil, Integrated Solid Waste Management: Engineering Principles and Management Issues, McGraw Hill, 1993.
6) K. Sasikumar, Snoop Gopi Krishna, Solid Waste Management, Prentice Hall India Learning Private Limited, 2009
7) N. N. Bandela, D. G. Tare, Municipal Solid Waste Management, BR Publishing Corporation, 2009
8) Bhide A D, Solid Waste Management, Indian National Scientific Documentation, NewDelhi Edition 1983, ASIN: B0018MZOC2

(b) Open source software and website:

1. www.hsagolden.com
2.www.yousee.in
3. www.epa.gov/muncipal
4.wikipedia.org/waste management

Suggested Project List: ---

1. Preparation of charts showing solid waste management techniques
2. Preparation of charts showing tools, equipments, vehicles and machineries used in solid waste management
3. Preparation of compost using decomposable waste material adopting appropriate methods
4. Recycling of plastic wastes obtained from various sources
5. Writing report on Hazardous waste management
6. Visit to local city landfill site and recycling plants if any

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