



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Master of Engineering**  
**Subject Code: Program Elective –IV**  
**Semester – II**  
**Subject Name: Sustainable Waste Management**

**Type of course:** Engineering and Technology

**Prerequisite:** Sustainable waste Management

**Rationale:** To understand the concept of sustainability and to restore the environment for pollution abatement

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total Hrs
1	<b>Introduction:</b> Principles of Sustainable Development: History and emergence of the concept of Sustainable Development, Global scenario, Definitions, Environmental issues and crisis, Concept of sustainability in waste management	4
2	Water reuse and reclamation, Water reclamation technologies – process flow diagrams; Public health and environmental issues in water reuse, ground water recharge with reclaimed water – ground water recharge Techniques; Risk assessment for water reuse, Industrial water reuse, Rainwater and Roof water harvesting, economic sanitation methods	14
3	Solid waste treatments: Landfills - Classification - Types and methods. Biological process – Composting - production of biofertilizers and energy. Thermal process – Incineration, gasification, wet oxidation, pyrolysis, pelletisation and energy production. Waste management through Reduce, Recycle and Reuse. Kitchen waste management. Current Issues in Solid Waste Management, waste to energy concept and its implementation, Composting: A Sustainable Solution for Bio-waste	14
4	Cleaner Production: definition of CP and terminology, the need of CP and its benefits, Cleaner Production (CP) In Achieving Sustainability – Prevention Versus Control Of Industrial Pollution – Environmental Policies And Legislations – Regulation To Encourage Pollution Prevention And Cleaner Production	8



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### Reference Books:

1. M. H. Fulekar, Bhawana Pathak, R. K. Kale, Environment and Sustainable Development, Springer Nature; 2014 ed. edition (4 October 2013)
2. Urvashi Dhamija, Sustainable Solid Waste Management: Issues Policies and Structures, Academic Foundation (2006)
3. Cites R.W., Middlebrooks E.J., Reed S.C., Natural wastewater Treatment Systems, CRC Taylor and Francis, 2006.
4. Sanjay K. Sharma (Editor), Rashmi Sanghi (Editor), Wastewater Reuse and Management, Springer; 2013 edition (14 December 2014)
5. Martin, A.M., Biological Degradation of Wastes, Elsevier Appl. Science, New York, 1991.

### Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	To examine the technical points that are required to set up an integrated solid waste management system.	10%
CO-2	To evaluate the existing water treatment system and adopt harvesting methods for water conservation.	35%
CO-3	To study reuse, recycle and reclamation of wastewater.	35%
CO-4	To analyse the existing EMS and check the feasibility of cleaner production in industries at macro level for overall abatement of pollution.	20%

### List of Experiments:

Term work will comprise of assignment and case studies based on natural wastewater system, water conservation systems, smart building, waste to energy, biowastes, Bioremediation etc.

### List of Open Source Software/learning website:

1. <https://nptel.ac.in/>