



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Plastics Engineering

Subject Code: ME03084031

Subject Name: Plastics and Environment

w.e.f.Academic Year:	2025-26
Semester:	3
Category of the Course:	MOPEC

Pre requisite:	NIL
Rationale:	NIL

Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes
01	Explain the production, types, and uses of plastics along with their environmental impact.
02	Identify sources of plastic waste and analyze global and national waste management practices.
03	Evaluate various rules and regulations concerning plastic waste.
04	Explore alternate materials and recovery methods for plastics.
05	Understand energy production from waste and solid waste management processes.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial/ Practical		
				ESE (E)	PA/ CA (M)	PA/CA(I)	ESE (V)	
02	0	02	03	70	30	20	30	150

Course Content:

Unit No.	Content	No.of Hours	%of Weightage
1.	Fundamentals of Plastics and Their Environmental Impact <ul style="list-style-type: none">• Definition, Types, and Applications of Plastics• Global and Indian Statistics on Plastic Production and Consumption• Sources and Characteristics of Plastic Waste	05	10



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	<ul style="list-style-type: none">• Impact of Plastics on Marine Life, Wildlife, and Human Health• Environmental Effects of Microplastics and Possible Remedies		
2.	Plastic Waste Management Regulations <ul style="list-style-type: none">• Overview of Plastic Waste Management Rules 2016 (India)• Global Regulations on Plastic Waste Management• Analysis of Plastic Bans and Their Effectiveness• Case Study: China Sword Policy and Its Implications on Global Plastic Waste Management	05	20
3.	Plastic Waste Management Practices <ul style="list-style-type: none">• Collection, Segregation, and Recycling Techniques• Use of Plastic Waste in Road Construction: Benefits, Issues, and Challenges• Plastic Electronic Waste Recycling• Microplastics and Their Treatment Techniques	10	30
4.	Plastic Alternatives and Circular Economy <ul style="list-style-type: none">• Exploration of Greener Alternatives to Plastics• Concept of Circular Economy in Plastics• Plastics Resource Recovery Techniques• Case Studies on Sustainable Alternatives in Packaging and Consumer Products	5	20
5.	Solid Waste Management and Energy Recovery <ul style="list-style-type: none">• Solid Waste: Sources, Types, and Characteristics• Waste Handling, Separation, Storage, and Processing• Energy Production from Plastics: Incineration, Gasification, and Pyrolysis• Syngas Utilization and Bioenergy Production• Biological Treatment Methods: Composting and Anaerobic Digestion	5	20
	Total	30	100



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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
15	15	20	10	5	5

Where R:Remember; U:Understanding; A:Application, N:Analyze and E:Evaluate C:Create (asper Revised Bloom's Taxonomy)

References/Suggested Learning Resources: Books:

1. Andrady, A. L. (2003). *Plastics and the Environment*. John Wiley & Sons.
2. Jambeck, J. R., et al. (2015). *Plastic waste inputs from land into the ocean*.
3. Indian Government Gazette: *Plastic Waste Management Rules 2016*.
4. Kreith, F., & Tchobanoglous, G. (2002). *Handbook of Solid Waste Management*. McGraw-Hill.
5. Ragaert, K., et al. (2017). *Mechanical and chemical recycling of solid plastic waste*.

(b) Open source software and website:

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

Suggested Course Practical List: As per the above syllabus topics
