GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Post Graduate

Branch: Rubber Technology

Course / Subject Code : ME01088071

Course / Subject Name : Rubber Waste Utilization

w. e. f. Academic Year:	2024-25
Semester:	1st Semester
Category of the Course:	PEC

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Identify and compare options for disposing of rubber waste.
02	Comprehend the pyrolysis process and the products obtained from vacuum pyrolysis.
03	Learn about various techniques for disposing of rubber waste.
04	Recognize the importance of the concept of green technology.

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)	
03	00	02	04	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction:** Types and Specification of the wastes, Waste reuse, The manufacture of other materials and articles from wastes, Waste hierarchy etc.	06	15
2.	**Rubber Waste disposal Options:** Retreading, Crumbling, Pyrolysis, Incineration Re-use and Disposal etc.	06	15
3.	**Rubber Waste Disposal Techniques:** Life cycle of a rubber product, Recycling: Barriers and Benefits, Land	07	10

	filling, Reuse of waste as drainage culverts, Resource depletion etc.		
4.	**Incineration:** Waste to energy incineration, Incineration of waste as a fuel substitute, advantages etc.	06	15
5.	**Pyrolysis:** Introduction, Pyrolysis Process, Product obtained from Vacuum Pyrolysis, Recovery of Byproducts.	06	15
6.	**Energy Recovery:** Options for energy recovery from waste tires, impacts of tires in energy recovery, Mass & Energy balance, Co-production of energy and activated carbon black from rubber wood waste etc.	07	15
7.	**Utilization of Rubber Waste:** Concept of Green Technology, Production of corrugated asbestos boards, roofing, tie plates, Rezdor slabs and floor slabs for stock farms, crumb rubber, reclaim rubber, rubber asphalt and other applications etc.	07	15
	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	10	20	10	10	10

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

References/Suggested Learning Resources:

(a) Books:

1. Reprocessing of Tyres and Rubber Waste by Valadimir M. Makarov & Valerij F. Drozdovski
2. Energy from Rubber Waste Proceedings .

Suggested Course Practical List: If any

Practical based on above topics.

List of Laboratory/Learning Resources Required:

- **http://www.bvsde.paho.org/**

- **http://www.crcpress.com**
- **https://www.linkedin.com/advancements-in-rubber-disposal-biodegradation-and-the-environment**

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