GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Post Graduate

Branch: Rubber Technology

Course / Subject Code: ME01088031

Course / Subject Name : Rubber Bonding & its Technology

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	Learn about the development of bonding processes.
02	Develop pre-treatments for plastics, rubbers, and metals used in bonding.
03	Identify the factors influencing bond integrity and failure.
04	Prepare various bonding agents and conduct tests according to specific requirements.

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 to Rubber bonding:** Types of Bonding, Overview of Bonding Process, Development of Bonding.	06	10
2.	**Substrate Preparation Methods:** Metal Preparation, Pre-treatments of Plastics and Rubbers, Bonding Rubbers to Plastic Substrates, Substrate Preparation for Bonding Using the Wet Blast Process.	06	15
3.	**Rubber to Metal Bonding:** Bond System Characteristics, Adhesion, Effective Bond Formation, Post Vulcanization Bonding, Factors Affecting Bond Integrity, Bond Failure Types, Bond Test Procedures.	06	15

4.	**Rubber to Metal and Other Substrate Bonding:** Substrates and their Preparation, Bonding Agent Preparation, Bonding Agent Application and Use, Post Vulcanization Bonding, Waterborne Bonding Systems, Bonding Agent Testing, Shelf Life Considerations.	07	15
5.	Rubber to Rubber Bonding: Bonding of Unvulcanised Rubbers, Bonding of Vulcanized Rubbers to Unvulcanised Rubbers, Bonding of Vulcanized Rubbers.	07	15
6.	**Rubber to Metal Bonding Using Metallic Coagents:** Introduction, Metallic Coagents, Adhesion to Metals, Adhesion to Fibers and Fabrics.	06	15
7.	**Failures in Rubber Bonding to Substrates:** Incorrect Molding Procedures, Incorrect Production Quality Testing Procedures, Corrosion in Service, Product Abuse, Factors Affecting Adhesion of Rubbers, Topography of Substrate, Surface Conditions of Adherend, Bonding - Interphase or Interface Considerations, Undesirable Adhesion Occurring Under Service Conditions.	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**
00	10	20	10	20	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. Handbook of Rubber Bonding edited by Bryan Crowther, Rapra Technology.

Suggested Course Practical List: If any

Practical based on above topics.

List of Laboratory/Learning Resources Required:

- http://www.crcpress.com
- http://www.taylorandfrancis.com
- The American Synthetic Rubber Research Program. Philadelphia: University of Pennsylvania Press.
- www.lord.com/products-and-solutions/adhesives/product.xml/254/2

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