

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BRANCH NAME: RUBBER TECHNOLOGY**  
**SUBJECT NAME: Rubber Bonding & Its Technology (RB&T)**

**SUBJECT CODE: 3714008**  
**M.E. 1<sup>st</sup>SEMESTER**

**Type of course: Program Elective-I (M.E.Rubber Technology)**

**Prerequisite:**

**Rationale:**

**Teaching and Examination Scheme:**

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

**Content:**

Sr. No	Course Content	Total Hrs	% Weightage
1.	<b>Introduction to Rubber bonding:</b> Types of Bonding, Overview of Bonding Process, Development of Bonding.	7	10
2.	<b>Substrate Preparation Methods:</b> Metal Preparation, Pre-treatments of Plastics and Rubbers, Bonding Rubbers to Plastic Substrates, Substrate Preparation for Bonding Using the Wet Blast Process.	8	15
3.	<b>Rubber to Metal Bonding:</b> Bond System Characteristics, Adhesion, Effective Bond Formation, Post Vulcanisation Bonding, Factors Affecting Bond Integrity, Bond Failure Types, Bond Test Procedures.	8	15
4.	<b>Rubber to Metal and Other Substrate Bonding:</b> Substrates and their Preparation, Bonding Agent Preparation, Bonding Agent Application and Use, Post Vulcanisation Bonding, Waterborne Bonding Systems, Bonding Agent Testing, Shelf Life Considerations.	8	15
5.	<b>Rubber to Rubber Bonding:</b>	8	15

	Bonding of Unvulcanised Rubbers, Bonding of Vulcanised Rubbers to Unvulcanised Rubbers, Bonding of Vulcanised Rubbers.		
<b>6.</b>	<b>Rubber to Metal Bonding Using Metallic Coagents :</b> Introduction, Metallic Coagents, Adhesion to Metals, Adhesion to Fibres and Fabrics.	<b>7</b>	<b>15</b>
<b>7.</b>	<b>Failures in Rubber Bonding to Substrates:</b> Incorrect Moulding 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 Occuring Under Service Conditions.	<b>8</b>	<b>15</b>

### Reference Books:

- Handbook of Rubber Bonding edited by Bryan Crowther, Rapra Technology.

### Course Outcome:

After learning the course the students should be able to:

- Understand about Overview of Bonding Process.
- Learn the Development of Bonding Process.
- Develop the Pre-treatments of Plastics and Rubbers & Metals used for bonding.
- Identify the Factors Affecting Bond Integrity & Bond Failure.
- Prepare the different bonding agents and their testing according to the requirement.
- Develop the Metallic Coagents for adhesion of Rubber, Metal, Fabrics & Fibres.
- Identify the bonding failures in rubber bonding to substrate under service conditions.

### List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

### Major Equipments:

Adhesion Tester, Pilling Tester, Spilt Tear Tester, Mixing Mill, Press.

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

- <http://www.crepress.com>
- <http://www.taylorandfrancis.com>
- [The American Synthetic Rubber Research Program. Philadelphia: University of Pennsylvania Press.](http://www.americanrubber.com)
- [www.lord.com/products-and-solutions/adhesives/product.xml/254/2](http://www.lord.com/products-and-solutions/adhesives/product.xml/254/2)

