

# GUJARAT TECHNOLOGICAL UNIVERSITY

## RUBBER TECHNOLOGY

### B. E. SEMESTER: VII

Subject Name: **Rubber Adhesion & Adhesion Science**

**(Department Elective - I)**

Subject Code: **172605**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	<b>Introduction to Adhesives:</b> Different Terminology, Definition of Adhesion & Adhesive Joint, advantage of Adhesive Bonding, Adhesive Action, Development of Adhesive Strength, Physical & Chemical factors influencing Adhesive Action, Types of Adhesives, Applications & Setting etc.	6
2.	<b>The Role of Adhesives in the Economy :</b> The Adhesives in the Economy, The Adhesive using Industries, Construction, Abrasives & Friction Materials etc.	4
3.	<b>Thermodynamics of Adhesion :</b> Contact angle, Work of Adhesion, Acid-Base considerations	6
4.	<b>Influence of Constitution on Adhesion:</b> Influence of Constitution on Adhesion: Adhesion between Dry Solids, Wettability 7 Contact angle, Mechanism of Adhesive action, guiding principles in making Adhesion joints.	6
5.	<b>Inorganic Adhesives &amp; Cements:</b> Soluble Silicates, Organic Polymer Mixtures, Ceramic Cements, Plastics Cements, Hydraulic Cements, Miscellaneous Cements etc.	6
6.	<b>Resins for Rubber Based Adhesives:</b> Types of Rubber based Adhesives, Function of Resins in rubber based adhesives, Adhesive Test Methods etc.	4
7.	<b>Natural Rubber &amp; Reclaimed Rubber Adhesives:</b> Introduction, Raw materials, Formulation of solution adhesives from natural	4

	rubber, Mastics, Asphaltics & Sealants, use of grafted copolymer Heveaplus MG etc.	
8.	<b>Butyl Rubber &amp; Polyisobutylene Adhesives:</b> Introduction, Basic properties, General compounding-Sealants, Adhesives & coatings, Application areas & Formulations..	4
9.	<b>Nitrile Rubber Adhesives:</b> Introduction, Commercial processes & Applications, The commercial Nitrile rubbers employed as Adhesives, Nitrile Rubber Latex Adhesives etc.	4
10.	<b>Styrene-Butadiene Rubber Adhesives:</b> Introduction, General properties of SBR in Adhesives, Types of SBR available for adhesive use, Typical formulations & application of SBR solvent base Adhesives, Latex & Dispersions of SBR as Adhesives etc.	6
11.	<b>Neoprene Adhesives:</b> Introduction, Disadvantages, solvent- based adhesives, Manufacturing procedures & Equipments, Properties & Testing of Neoprene Adhesive, Methods of applications, End users , Neoprene latex adhesives etc.	4
12.	<b>Thermoplastics Rubber (A-B-A Block Copolymers) in Adhesives:</b> Introduction, Basic Concepts-Morphology & Compatibility, Physical properties of TPE- alone & in simple mixtures, Formulating Ingredients, Mixing & Applications, Formulating for specific application etc.	6
13.	<b>Epoxy Resin Adhesives:</b> Introduction, Characteristics, Compounding etc.	4
14.	<b>Cyanoacrylate Adhesives:</b> Introduction, Preparation & Properties of Alkylz- cyanoacrylates, Formulation of Cyanoacrylate Adhesives, Theory of Adhesive action, applications, Properties of Cyanoacrylate Adhesive Bonds etc.	4
15.	<b>Water Based &amp; Solvent Based Adhesives:</b> Introduction, Water based adhesives, Properties, Solvent based adhesives, Comparison between Water based Vs Solvent based Vs Hot melts, Adhesive requirements etc.	6

### Practical and Term work:

It should be based on theories

### Text Books:

1. Handbook of Adhesives (second Edition) by IRVING SKEIST
2. Rubber Technology Handbook, by Werner Hofmann; Hanser Publishers

**Reference Books:**

1. Rubber Engineering, by IRI
2. Rubber Technology & Manufacture by Blow & Hepburn