



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3152312

Subject name: Adhesives and Sealants in Plastics

Semester V

Type of course: Open Elective

Prerequisite: NA

Rationale: To understand the advantages of adhesive bonding, techniques of adhesive bonding and applications of adhesives in industries. The student will acquire knowledge of various resin based adhesives and their end uses methods of recycling individual plastics and plastic products.

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total Hrs
1	Introduction to Adhesives, Advantages of Adhesive Bonding Types of Adhesives Compatibility of Adhesive to adherant The role of Adhesives in the economy-Rapid growth adhesives, adhesive using industries Fundamentals of adhesion, Surface treatment for adhesion bonding,	3
2.	Adhesive Bonding of plastics Selection criteria for adhesives, Adhesive Forms Types of cements used in Bonding of plastics Rules to be observed for cementing of plastics Reasons for using adhesives Solvent Bonding of plastics, application methods for solvent bonding Selection of Bonding Materials & Processes	4
2	Adhesive selection and screening General considerations in Adhesive Selection Basic steps in adhesive selection Adhesive handling, preparation and application	2
4	Resin Based Adhesives and their End Uses Phenolic resin adhesive, amino resin adhesive, epoxy resin adhesive, Polyurethane & isocyanate based adhesive Polyvinyl acetate emulsions for adhesives, polyvinyl alcohol	5

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	for adhesives, Acrylic adhesives, polyester and polyamide high performance hot melt adhesives, silicone adhesives sealants.	
5	Bonding plastics Bonding Design advantages, Surface interactions in Bonding, Joining Processes, Bonding Technology, Adhesive joint design for plastics	3
6	Pressure Sensitive Adhesives for Tapes & Labels Introduction, Construction & Manufacturing, Test methods for evaluating PSA products, Applications of PSA products	4
7	Sealants Introduction Form, Type & Performance, Polymers for Sealants,	4
8	Adhesives For Industrial Application Adhesives for building construction, adhesives in electrical industry, conductive adhesives, structural adhesives in aerospace industry, adhesives in automobile industry	3

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	15	5	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

Reference Books:

1. Handbook of adhesives (Third edition) by Irving Skeist
2. Handbook of Adhesives and Sealants by Edward M. Petrie
3. Plastic Material & Processes by Sidney Goodman
4. SPI Plastic Engineers Handbook by Micheal Berins
5. Adhesives and Sealants: Technology, Applications and Markets by David J Dunn
6. Handbook of Adhesives and Sealants: Basic Concepts and High Tech Bonding

Phillipe Cognard

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.



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Sr. No.	CO statement	Marks % weightage
CO-1	Understand the types of adhesives, its advantages and its uses in various industries.	25
CO-2	Remember general considerations in selecting adhesives for plastics and Adhesive handling, preparation and application.	20
CO-3	Understand Resin based adhesives and Bonding of Plastics.	15
CO-4	Understand about pressure sensitive adhesives, sealants.	20
CO-5	Apply the knowledge of adhesives and sealants for industrial applications.	20

List of Experiments: - As per the syllabus topics

Major Equipment:

List of Open Source Software/learning website:

- i. <https://www.adhesives.org/adhesives-sealants>
- ii. <https://www.slideshare.net/cladeluna/adhesives-and-sealants-51588961>