



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3734004

Semester – III

Subject Name: Thermosetting Resins & Silane Technology(TRST)

Type of course: Program Elective IV

Prerequisite:

Rationale:

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)		
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Introduction: History of Hydrocarbon Resins, Reinforcing Effect, Petroleum Resins, Polyterpene Resins, Aliphatic Resins, Cyclopentadiene Resins, Resinex Resins, Miscellaneous Resins etc.	4
2	Compounding: Different types of elastomers, tackifiers, fillers, plasticizers, softeners, antioxidants, curing agents and sequestering agents etc.	5
3	Requirements: Glass transition Temperature, Viscosity Change ,Resin Action, Obtaining Tack, Function of Tackifiers	5
4	Identification : Color, Compatibility, stability, observation , Effect on applications, etc.	5
5	Hydrocarbon Resin: Resin Manufacturing, Molecular Weight Distribution, Different Testing Methods , Properties etc.	5
6	Phenolic Resin: Chemistry, Manufacture, Properties , Applications etc.	5
7	Amino Resin : Chemistry, Characteristics, Manufacturing, Catalysts and Hardeners, Properties , Applications etc.	5
8	Acrylic Adhesives and Sealants : Acrylic Monomers, Production, Properties, Applications, Flocking Adhesives, Building Adhesives, Pressure Sensitive Adhesives, Acrylic Sealants etc.	5
9	Unsaturated Polyester Resins: Composition of Reinforced Polyester Systems, Formulation, Fabrication, Laminating, Molding, Filament Winding, Pultrusion, Properties, Applications etc.	5



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10	Polyurethanes & Epoxy Resins: Epoxy Resins: Chemistry of preparation and Curing, Properties, Applications etc. Polyurethanes : Urethane Chemistry, Flexible and Rigid Foams, RIM Urethanes etc.	5
11	Silane – Coupling Agent : Definition of Silane, Importance, Benefits, Silane Chemistry, Silane description, Mode of action, Filler Treatment, Applications etc.	5

Reference Books:

- Resins in Rubber by Gardner L. Brown
- Handbook of Adhesives by Irving Skeist.
- Textbook of Polymer Science by Fred W. Billmyer
- Handbook of Thermoset Resins by Debdatta Ratna

Course Outcomes:

After learning the course the students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Learn the importance of usage of Resin for Rubber Product.	15
CO-2	Identify the different types of Resin & correlate Silane Chemistry & Mode of its action.	20
CO-3	Select the Compounding ingredients according to formulation	15
CO-4	Examine the Resin Action during processing	15
CO-5	Correlate the Chemistry, Characteristics, Manufacturing Process and Properties of different types of Resin etc.	15
CO-6	Evaluate the effect of Silane on Rubber Compound as well as Rubber Processing.	20

List of Open Source Software/learning website:

- <https://www.threebond.co.jp/en/technical/technicalnews/pdf>
- <http://www.crcpress.com>
- www.academicjournals.org