

# GUJARAT TECHNOLOGICAL UNIVERSITY

## B.E Semester: 4 Rubber Engineering

Subject Code 142602

Subject Name NATURAL RUBBER SCIENCE & TECHNOLOGY

Sr.No	Course contents
1.	Natural Rubber: Introduction, Preparation of Dry Rubber, Technically Specified Rubber, Constant-Viscosity and Peptized Rubber, Speciality Natural Rubber, Structure ,Properties, Mastication Behavior, General Chemical Reactivity, Solubility and Swelling, Burning Behavior, Natural Rubber Ebonite,, the Status of Natural Rubber, Gulta pereha, Balata and Related Materials, Epoxidized Natural Rubber
2.	Chemical Modification of Natural Rubber : Introduction ,Modification Research, Chemical Reactivity of Natural Rubber, Simple Addition Reactions of the olefinic double bond, Electro cyclic Reactions, Degradation Reactions, Epoxidation Chemistry, Properties of ENR, Applications of ENR
3.	Graft Copolymers from Natural Rubber : Introduction ,Thermoplastic Rubber, Grafting Chemistry, Physical Properties of Polystyrene Graft Copolymers, Grafting to other backbones, Graft Chains other than Polystyrene, Alternative Grafting Chemistry,Heveaplus MG & Related Materials
4.	Diffusion of Liquids and Solids in Natural Rubber : Introduction ,Diffusion Theory, Experimental Methods, Diffusion of Hydrocarbon Liquids and Oils, Blooming of Waxes, Diffusion of Water in Rubber Practical Relevance
5.	Low Temperature Crystallization of Natural Rubber : Crystallization in Natural Rubber, Theories, Experimental Techniques, Tensile Strain, Compression ,Shear, Crystallization in Bridge Bearings, Characterization of Engineering Vulcanizates
6.	Engineering Use of Natural Rubber : Introduction ,Force-Deformation Behaviour,Load-deflection Characteristics of Bonded Rubber Components, Dynamic Properties, Transmissibility of Rubber Components, Effects on Transmissibility due to component Design, Environmental Factors, Flexible Rubber, Steel Laminates
7.	Other Rubbers : Tetrafluoroethylene-propylene Rubbers, Polyphosphazene Elastomers, Polynorbormene, Polypentenamer, Carboxylated Rubbers, Polyalkalynes, Polytetrahydroduran, Nitroso & Traizine Elastomers, Recent Developments

8.	Liquid Rubbers: Introduction, Classes of commercially established Liquid Elastomers, Model studies using Terminally Functional Polybutadiene, Practical considerations affecting the development of Telechelic Polymers as General purpose Elastomers, Additional Terms in Telechelic Elastomer Research & Development, Counseling Remarks
9.	Powdered Rubbers : Introduction, Conventional Mixing, Powdered Polymer Technology, Extrusion, Injection Moulding & Transfer Moulding of Powdered Rubber preblended compounds, Effect of Powder Technology on Mixing cycle times, Power consumption & Plant maintenance costs, Continuous Production, Polymer blends (NBR-SBR), Adhesives & Doughs, Environmental Considerations Economics of Powdered Rubber Systems, Conclusion.
10.	Reclaim Rubbers : Introduction, Types of Reclaim Rubbers, Different Manufacturing Processes of Reclaim Rubbers, Applications of Reclaim Rubbers

#### Reference Books:

1. Natural Rubber Science and Technology, by Roberts
2. Handbook of Rubber Projects, Technology and Product Formulations, by SBP Consultants & Engineers (P) Ltd.
3. Rubber Materials and their components, by J. A. Brydson