

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

RUBBER TECHNOLOGY

Subject Code

Subject Name INTRODUCTION TO RUBBERS & RUBBERY MATERIALS
(Institute Elective-I)

Sr.No	Course content
1.	Introduction: Polymers, Crystallization in Polymers, TG, Polymerization, Rubber and Additives, The Historical Development of Rubber Technology, The Advent of Synthetic Rubber, Additives of Rubber, The Return of Synthetic Rubber, Markets and Applications of Rubbery Materials.
2.	Properties and Structure: Rubbery Properties: Introduction, The Molecular Nature of High Elasticity, Rubber Elasticity in Uniaxial Tension, Rubber Elasticity in Shear and Compression, Visco- Elasticity and Rubbers, Stress Relaxation during Ageing.
3.	Structure-Property Relationship in Rubbers: Introduction, Structure and Rubbery Properties, Chain Flexibility, Networks, Weak Links, Non-Rubbery Properties: Heat Resistance, Low Temperature Resistance, Chemical Reactivity, Solution Properties, Electrical Properties, Structure and Processing Properties, Strength of Rubbers.
4.	Natural Rubber: Introduction, Natural Rubber Plantation, Tapping of Rubber Latex, Preservation and Coagulation of Latex, Preparation of Dry Rubber, Structure, Properties, Vulcanization, Natural Rubber Ebonite, Gutta Percha, Balata and Related Materials, Epoxidized Natural Rubber (ENR).
5.	Introduction of Synthetic & Thermoplastic Rubbers: Rubbers from Stereo-regular Polymerization of Isoprene and Butadiene, Styrene- Butadiene Rubber (SBR), Polychloroprene Rubber(CR),Nitrile Rubber(NBR), Butyl Rubber (IIR),Ethylene- Propylene- Diene Terpolymer(EPDM), Polysulphide Rubber (PSR), Polyacrylic Rubber or Acrylate Rubber (ACR),Fluorocarbon Rubber (FKM).Silicone Rubber, Polyurethane Rubber, The Heat- Fugitive Cross-Link, Styrene- Butadiene Triblocks and Related Materials, Different types of Thermoplastics Rubbers.
6.	Rubber Compounding and Processing Technology: Introduction, Mastication and Mixing, Open Mill, Internal Mixers, Reclaimed Rubber, Fillers, Antidegradants, Accelerators, , Retarders, Activators.
7.	Vulacanization: Introduction, theory of Sulphur Vulcanization and Accelerator Action, Non-Sulphur Vulcanization etc.

PRACTICAL AND TERMWORK

It should be based on theories

Note: Recent developments to be covered.

Reference Books:

1. Rubbery Materials and Their Compounds by J. A. Brydson
2. Polymer Science and Technology (plastics, Rubbers, Blends and Composites) second edition by Premamoy Ghosh