

# GUJARAT TECHNOLOGICAL UNIVERSITY

## Rubber Technology

### B. E. SEMESTER: VI

Subject Code: 162602

Subject Name: **Synthetic Rubbers**

| Sr. No. | Course Contents   | Total Hrs |
|---------|---|-----------|
| 1.      | <p><b>(A) General Purpose Synthetic Rubber</b></p> <p><b>Styrene-Butadiene Rubber (SBR) :</b><br/>Introduction, Preparation, Structure and Variations of Emulsion SBRs, Structure and Variations of Solution SBRs, IISRP Numbering System, General Properties, Comparison of Solution and Emulsion SBRs, Compounding, Processing, Applications.</p> <p><b>Polybutadiene Rubber (PBR) :</b><br/>Manufacture, Structure and Properties of Polybutadienes, IISRP Numbering System, Classifications, Processing and Applications.</p> <p><b>Synthetic Polyisoprene (IR) Rubbers:</b><br/>Preparation of Synthetic Polyisoprene (IR) Rubbers, Properties, IISRP Numbering System, Processing, Applications</p> <p><b>Ethylene-Propylene Rubbers (EPM &amp; EPDM):</b><br/>Introduction, Manufacture, Structure and Properties, Variables between Grades, General Vulcanizate Properties, Processing, and Compounding.</p> <p><b>Isobutene-Isoprene (Butyl) Rubbers :</b><br/>Introduction, Manufacture, Structure-Property Relationships, Grades, General Vulcanizate Properties, Processing, Compounding, Applications of Unmodified Butyl Rubbers, Halobutyl Rubbers, Vulcanization, Applications, Cross-linked Butyl Rubbers.</p> | 16        |

| Sr. No. | Course Contents  | Total Hrs |
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| 2.      | <p><b>(B) Special Synthetic Rubbers:</b></p> <p><b>Chloroprene Rubber (CR) :</b><br/>Introduction, Production of Polychloroprene, Structure of CR &amp; Structural Variables, Classification, Structure &amp; Properties, Processing, Compounding (Curing Systems &amp; other additives), Applications</p> | 16        |

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| 3. | <p><b>Acrylonitrile Butadiene (Nitrile) Rubbers:</b></p> <p>Introduction, Preparation, Structure &amp; Properties General Vulcanizate Properties, Processing, Compounding (Blends with other polymers) Special Grades of Nitrile Rubber, Applications.</p> <hr/> <p><b>Silicones/Silicone Rubber :</b></p> <p>Introduction, Nomenclature of Organosilicone Compounds &amp; Elastomers, Manufacture of Silicone Elastomers, Structure &amp; Properties of Silicone Elastomer Polymers, General Properties, Compounding (Curing Systems, Fillers, Other additives), Processing, Liquid Silicone Rubbers, Room Temperature Vulcanizing Rubbers (RTV), Applications.</p> <hr/> <p><b>Acrylic &amp; Other Rubbers with Ester side chain :</b></p> <p>Introduction</p> <hr/> <p><b>Acrylic Rubbers (ACM) :</b></p> <p>Chemistry, General Properties , Compounding &amp; Processing &amp; Vulcanization.</p> <hr/> <p><b>Ethylene-Methyl Acrylate Rubbers (AEM) :</b></p> <p>Properties, Compounding, Processing ,Applications</p> | 03 |
| 4. | <p><b>Fluoro Rubbers :</b></p> <p>Introduction, Copolymers based on Vinylidene fluorides &amp; Hexafluoro propylene (Grades, Compounding, Processing, Properties, Applications), Copolymers based on Vinylidene fluorides &amp; Chlorotrifluoro ethylene (CFM), Perfluorinated Elastomers, Tetrafluoro ethylene, Propylene Copolymers, Polyphosphazene, Carboxy, Nitroso Rubbers</p> <hr/> <p><b>Polysulphides, Polyethers &amp; Halogenated Polyethylene :</b></p> <p>Introduction</p>   | 04 |
| 5. | <p><b>Polysulphide Rubbers:</b></p> <p>Manufacturing, Structure &amp; Properties, Vulcanization &amp; Compounding, Liquid Polysulphides, and Applications.</p>  | 04 |
| 6. | <p><b>Epichlorhydrin Rubbers (CO, ECO, AECO):</b></p> <p>Manufacturing, Structure &amp; Properties, General Properties, Processing, Compounding, Applications,</p>  | 03 |
| 7. | <p><b>Propylene Oxide Rubbers (GPO):</b></p> <p>Structure &amp; Properties, Processing, Compounding, Applications</p>   | 03 |

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| 8. | <b>Chlorinated &amp; Chlorosulphonated Polyethylenes (CM &amp; CSM):</b><br><br><b>Structure</b> & Properties of CSM Rubbers, Compounding & Vulcanization of CSM Rubbers, Applications of CSM Rubbers, Properties of CM Rubbers, Compounding & Vulcanization of CM Rubbers, Applications of CM Rubbers | 05 |
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**Practical:**

It should be based on theories.

**Text Books:**

1. Synthetic Rubbers, their Chemistry and Technology, by D. C. Blackley
2. Handbook of Elastomers: New Development & Technology by Anil K. Bhowmick, Howard L. Stephenes

**Reference Books:**

1. Rubber Technology, by Maurice Morton
2. Rubbery Materials & their Compounds, by J. A. Brydson