

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
RUBBER TECHNOLOGY

Subject Name: **Rubbers: Manufacturing and its Applications (Institute Elective-II)**

Subject Code: **152605**

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 4 | 0 | 2 | 6 | 70 | 30 | 50 |

| Sr. No. | Course content |
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| 1. | Rubber Science: Rubber vulcanizates, The structure of rubber vulcanizates, Classification of rubbers, Chain structure and chemical reactivity of rubbers, Molecular masses and sizes, Determination of relative molecular mass, General rules for polymer solubility, Crystallinity and Orientation, Glass- Rubber transition behaviour. |
| 2. | Basic Concepts of Caoutchouc (NR): Introduction, Basics of the production of caoutchouc (NR), Basic concepts of rubber and elastomer, Other types of caoutchouc, Structure, composition and properties of Natural Rubber (NR), Applications, compounding, curing and processing of Natural Rubber. |
| 3. | Basic Concepts of Synthetic Rubber: Introduction, Basics of the production of SR, Monomers for SR production, Some basics about polymerization, Structure of polymers and the determination of structure. |
| 4. | Synthetic Rubbers: Introduction, Manufacturing process, Structure, Properties, Applications, Compounding and Curing for: Styrene Butadiene Rubber (SBR), Polybutadiene Rubber (PBR), Synthetic Polyisoprene (IR) Rubbers, Ethylene-Propylene Rubbers (EPM & EPDM), Isobutene-Isoprene (Butyl) Rubbers, Chloroprene Rubber (CR), Acrylonitrile Butadiene (Nitrile) Rubbers, Silicones/Silicone Rubber. |
| 5. | Rubber Additives: Basic Principles: Introduction, Classification of Additives, Recurring Themes, Synergism, Toxicity. |
| 6. | Art of compounding: Calculation of compound cost of a recipe, Calculation of compound volume of a recipe, Calculation of compound specific gravity of a recipe, Formulation of mix, Processing requirements. |

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| 7. | <p>Engineering Applications:- (Brief overview)</p> <p>Various applications of rubbers and rubber products in field of Civil Engineering, Mechanical Engineering, Computer Engineering, Textile Engineering, Chemical Engineering, Plastics Technology, Environment Engineering, Automobile Engineering, Electrical Engineering, Electronics Engineering, Instrumentation & Process Control Engineering, Information Technology, Bio-Technology, Bio Medical, Medical Field, Pulp and Paper Technology, Fashion Technology, Sports Technology, Defense Engineering, General Field, etc.</p> |
| 8. | <p>Rubber Products:</p> <p>Overview of some major rubber products like tyres, tubes, cellular rubber product, belts, hoses, bridge bearings, dockside fenders, seals and gaskets, etc.</p> |

Practical and Term Work:

Based as per the syllabus prescribed.

Reference Books:

1. Handbook of Rubber Technology Volume-1, by J. M. Martin, W.K. Smith.
2. Rubbery Materials & their Compounds, by J. A. Brydson.
3. Synthetic Rubbers, their Chemistry and Technology, by D.C. Blackley.
4. Rubber Technology, by Maurice Morton.
5. Rubber Engineering, by IRI.
6. Polymer Science and Technology (Plastics, Rubbers, Blends and Composites), by Premamoy Ghosh.