GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3162603
Semester – VI
Subject Name: High Performance Elastomers

Type of course: Professional Core Course

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Introduction**:** General Purpose Rubber, Speciality Elastomer, Difference between General purpose Elastomer and Speciality Elastomer, Application of High performance elastomer	6
2	Hydrogenated Nitrile Rubber (HNBR): Basic technology of Hydrogenated Nitrile Rubber, Structure, Manufacturing process, Physical & Chemical Properties of Hydrogenated Nitrile Rubber, Compounding of Hydrogenated Nitrile Rubber, Vulcanization System, Applications	6
3	Fluoroelastomers, FKM, and FEPM: Introduction, History, Fluoroelastomers Molecular Structure, Monomers, Polymer Structure—Molecular Weight, Vulcanization, Selection of the Right Fluoroelastomers, Compounding for Special Needs, Processing, Troubleshooting, Applications	6
4	Polyacrylate Elastomer: Introduction, Structure and Types, Physical & Chemical Properties of Polyacrylate elastomer, Processing Properties, Vulcanization, Compounding, Applications	6
5	Ethylene/Acrylic (AEM) Elastomer: Introduction, Chemical Composition, Commercial Grades, Molecular Structure, Physical & Chemical Properties of Ethylene/Acrylic (AEM) Elastomer, Compounding, Vulcanization, Mixing & Processing of AEM Compounds, Applications	6
6	Polyepichlorohydrin Elastomer: History, Commercial Grades of Polyepichlorohydrin, Physical & Chemical Properties of Polyepichlorohydrin, Compounding, Vulcanization, Manufacturing Process, Applications	6
7	Chlorosulfonated Polyethylene and Alkylated Chlorosulfonated Polyethylene: Introduction, Chlorosulfonated Polyethylene, Molecular Structure, Physical & Chemical Properties of Chlorosulfonated Polyethylene, Compounding, Vulcanization, Applications	6

8	Polysulfide Elastomers: Introduction, Molecular Structure, Physical & Chemical Properties of Polysulfide Elastomers, Compounding of Polysulfide, Processing, Applications, Troubleshooting	**6**
9	Ethylene Vinyl Acetate Elastomers (EVM): Introduction, Polymerization and Production Process, Structure Property Relationships, Compounding, Processing, Applications	**6**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	**12**	**16**	**10**	**10**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

- Handbook of Elastomers: New Development & Technology by Anil K. Bhowmick, Howard L. Stephenes
- Handbook of Speciality Elastomers by Robert C Klingender
- Rubber Technology by Maurice Morton

Course Outcome:

After learning this course students will be able to:

Sr. No.	**CO statement**	**Marks % weightage**
CO-1	Differentiate between general purpose rubber & high performance elastomer	15
CO-2	Select the proper grade of rubber according to application	15
CO-3	Solve the problems related to compounding, mixing and environment	15
CO-4	Develop various rubber products according to application	15
CO-5	Design the different rubber formulation according to application	10

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Major Equipment:

Mixing Mill, Internal Mixer, Kneader, Hydraulic press, brabender mixer, Specific gravity balance, Weighing balance, Tensile Testing Machine, Abrasion tester.

List of Open Source Software/learning website:

- http://www.chicagorubbergroup.org/
- https://www.dowcorning.com.cn
- http://www.allsealsinc.com/

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