GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3162610
Semester – VI

Subject Name: Rubber &Latex Products

Type of course: Professional Elective course –III

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.	General Applications of Rubber: Application of rubber in civil, textile, chemical, medical, electrical and other engineering field.	03
2.	Rubber Band: Compound design, Formulations, Manufacturing process, limitations.	04
3.	Rubber Slipper Sole: Key points, Compounding & manufacturing process, Problems occurred during manufacturing, limitations.	04
4.	Cellular Rubber: Introduction, Difference between sponge & Expanded Rubber, Compounding Manufacturing of sponge rubber, Manufacture of expanded rubber.	04
5.	Latex Dipped Goods: Introduction, the principle latex dipping processes, production of articles by latex dipping processes, Design of latex compound for latex dipping processes,Design of latex compounds for latex dipping processes.	05
6.	Latex moulding and Casting: Outline latex-moulding and casting processes, Latex-moulding processes using plaster moulds, Latex-moulding processes using metal moulds, Other latex moulding and casting processes, After-treatments for latex mouldings and castings.	05
7.	Latex Foam Rubber: Introduction, General Principles, underline formulation of latex compounds for manufacture of latex foam rubber, The Dunlop Process, Production of Latex foam rubber from heat sensitized latices, The talalay process, Physical properties of latex foam rubber.	05

8.	Latex thread: Manufacture of vulcanized rubber thread from latices, Manufacture of rubber tapes and tubes from latices.	**03**
9.	Latex and cement: general considerations, Advantages of latex-cement compositions over conventional concrete in flooring applications, Latex-cement compositions.	**03**
10.	Latex and paper : Introduction, Beater or wet-addition of latices to paper pulp, paper saturation using latices, paper coating using latex containing compounds.	**04**
11.	Latex & Textiles: Introduction, Latex spreading, combining and doubling, Lattices as binders for non woven fabrics, Latex Carpet Backing, Lattices in Carpet underlay materials.	**05**
12.	Latex Based Adhesives: Introduction, Formulatery principles for latex based adhesives, Latex based adhesives for Paper, Leather & wood, metal, ceramics, plastics & glass.	**04**
13.	Miscellaneous applications of latices: Manufacture of latex-bonded fiber pads, Applications of latices to brickwork and masonry, Applications of latices as bituminous substances, Catalytic applications of latices, Use of latices in drug-delivery systems.	**05**

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**
10	10	20	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:

- Rubber Products Manufacturing Technology by Anil K. Bhowmick
- Rubber Technology by C.M.Blow
- Handbook of Rubber projects, Technology and Product formulary by SBP consultants & engineers (P) Ltd.
- Polymer Latices - Science and Technology, Vol.3(Applications of latices), by D. C.Blackley.
- Practical guide to Latex Technology by Rani Joseph.

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Course Outcomes:

After learning this course students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Classify different rubber and latex products as per various engineering fields.	15
CO-2	Explain the manufacturing process of different rubber and latex articles.	15
CO-3	Develop formulation for rubber and latex based products.	10
CO-4	Prepare process flow diagram for utilization of latex in paper, textile and other industries.	15
CO-5	List out the advantages and importance of rubber and miscellaneous applications of latices.	15

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Major Equipment:

Mixing Mill, Hydraulic Press, Adhesion tester, Dipped goods assembly, Jar mill, Compression Set Tester, Hot Air Oven etc.

List of Open Source Software/learning website:

- http://www.sciencedirect.com/
- https://wnshaw.com/shoe-sole-process/
- https://link.springer.com/chapter/10.1007%2F978-94-011-5848-0_5
- https://theconstructor.org/concrete/polymer-cement-concrete/5778/
- http://www.chemionics.com/natlatex.html