

GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: Rubber Technology (26)
SUBJECT NAME: Rubber Products Manufacturing
SUBJECT CODE: 2172604
B.E. Semester-VII

Type of course: (B. E. Rubber Technology)

Prerequisite: NA

Rationale: NA

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		ESE (V)		PA (I)		
PA	ALA	ESE		OEP						
3	0	2	5	70	20	10	20	10	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

Content:

Sr.No	Course Content	Total Hrs	% Weightage
1.	Cellular Rubber: Introduction, Difference between sponge & Expanded Rubber, Compounding Manufacturing of sponge rubber, Manufacture of expanded rubber.	4	05
2.	Ebonite Rubber: Introduction, Properties, applications, Manufacturing of ebonite rod.	2	05
3.	Sports Goods: Tennis ball, Conventional ground golf ball, Solid golf ball, simple play ball.	4	10
4.	Hospital Rubber Goods: Comp. design, formulations, Manufacturing process of Hot water bag, Rubber sheets, surgical tubing.	4	05
5.	Rubber Gasket, Washers & Seals: Prop. of seal materials, selection of Rubber for oil seals, Types of seals, methods of mfg.	4	05
6.	Slipper Sole: Compounding and manufacturing process, problems occurred during manufacturing, limitation, key points etc.	2	05

7.	Rubber Band: Comp. design, Formulations, Mfg. process, limitations..	2	05
8.	Rubber Cables: Comp. Design, Formulations, Mfg. process, causes & remedies. XLPE cable manufacture. Design of cables, electrical properties.	4	10
9.	Rubber Rollers: Introduction, Application, Method of Mfg., Comp. design, Diff. types of rollers.	4	10
10.	Printing Blankets: Introduction, Comp. design, Method of mfg., Practical problems, Remedies, Applications etc.	4	05
11.	Rubber in Automobile Industries: Introduction, Automobile brake lines, Brake chamber diaphragm, Formulations.	4	05
12.	Defense Rubber Articles: Introduction, Comp. design, Procedure for Mfg., Applications etc.	4	05
13.	Engineering & Other Applications of Rubber: Application of rubber in civil, textile, chemical, medical, electrical and general field.	4	05
14.	Vibration Isolators and Mounts : Definition of Vibration & Shock, Principles of Isolation, Principles of Damping, Combination of Isolation and Damping, designing and Compounding for Vibration Isolation and Shock Absorption, Manufacturing Technology.	4	10
15.	Rubber Lining & Electro deposition of Metals: Lining of tanks, Lining of Piper and fittings, Lining of barrels and drums, Lining of pickling tanks etc., Rubber armor, Compounding and Formulations, Electro deposition of rubber.	4	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
Remembrance R Level	Understanding U Level	Application A Level	Analyze N Level	Evaluate E Level
10	15	15	15	15

Reference Books:

- Rubber Products Manufacturing Technology By: Anil K. Bhowmick
- Rubber Technology By : C. M. Blow.
- Handbook of Rubber Projects, Tech. & Product Formulary By : SBP Consultants & Engineers (P) Ltd.

Course Outcome:

After learning the course the students should be able to:

- Know about the difference between sponge & Expanded Rubber.
- Learn about properties & applications of ebonite rubber..
- Able to understand the importance of rubber in manufacturing of hospital goods..
- Understand the design of Cables.
- Learn about the other applications of rubber in different fields..
- Learn the importance of designing part in vibration isolators.
- Know about different types of Electro deposition of metals.
- Know & study about Printing Blankets.

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Design based Problems (DP)/Open Ended Problem:

- Application of rubber for manufacturing artificial organs .
- Use of EPDM rubber in Pond Lining.
- Design of bridge bearing pad.

Major Equipments:

Mixing Mill, Calender Machine, Semi Hydraulic Press, Oscillating Rheometer, Mooney Viscometer etc.

List of Open Source Software/learning website:

- <http://www.sciencedirect.com/>
- <http://www.scielo.br/>
- <http://www.azom.com/>

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.