GUJARAT TECHNOLOGICAL UNIVERSITY

RUBBER TECHNOLOGY (26)
BELTS, HOSES & FOOTWEAR TECHNOLOGY
SUBJECT CODE: 2182602
B.E. 8TH SEMESTER

Type of course: BE

Prerequisite: NA

Rationale: NA

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)	
					PA	ALA	ESE	OEP		
3	0	3	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	**Conveyer Belting:** Functions of Conveyer belting, Components, driving gear, idlers, Conveyer belt design, Choice of belt width & Spread, Elevator belt design.	**10**	**20**
2.	**Belt Construction:** Cover, Carcass & insulation, effect of textile components of Performance, Belt selection, Belt joining, Care & maintenance of belting. Belt properties, applications, belt quality grades	**10**	**20**
3.	**Power Transmission Belts:** Flat belts v-belts-main types of power transmission belt- grouped v-forms, timing belts, out length belonging, flat belting, Belt tension, Cabled cord, Care & maintenance of power transmission belts. Materials in V-belt Composition, Outline of material processing, Main points in rubber processing for V-belts. Characteristics & control factors of SFRR practice of rubber processing, Preparation for determining vulcanizing conditions. Cord properties, cord processing, practice of cord processing, post processing, canvas processing. Methods for processing unwrapped v-belts: building, skiving, wrapping, vulcanization, marking. Methods Raw edged v-belts: building, vulcanization, and cutting. Methods for processing v-ribbed belts: Control factors of grinding resistance, practice of grinding.	**10**	**20**
4.	**Hoses:** Hose design & construction, Mfg. Process, Hose fittings & Couplings, Hydraulic assemblies, Hose Standardization testing & specification, care & maintenance of hose. Different types of hoses and their manufacturing process.	**12**	**20**
5.	**Footwear:** Various mfg. processes, types of adhesives, Preparation & testing of various adhesives like solvent based rubber, mfg. of various components like soles, insoles, foot bed, counter, toe, puff, stiffeners, finishers etc. specialty.	**12**	**20**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	**12**	**16**	**15**	**15**	**0**

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:

1. Hose Technology By Evans
2. Rubber Products Manufacturing Technology By: Anil K. Bhowmick
3. Rubber Technology By: C. M. Blow
4. Recent Advances in Rubber Technology Conference book.

Course Outcome:

After learning the course the students should be able to:

- Able to learn about Hose design.
- Learn about the classification of Hoses.
- Understand the Construction of different types of V-Belt.
- Able to identify the hoses and belts according to their rating.
- Learn about different types of hoses and their manufacturing process.
- Understand the importance of role of adhesive in footwear.
- Learn about functions of different components of footwear.

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Design based Problems (DP)/Open Ended Problem:

- Innovation in design of conveyor belt.
- Reaction kinetics, geospeedometry, and relaxation theory.
- Food grade conveyor belt.
- Design of Hose used in Petroleum Industry.
- Modification in Shoe Last Design.

Major Equipment:

Mixing Mill, Tensile Testing Machine, Oscillating Disc Rheometer, Universal Tensile Testing Machine etc.

List of Open Source Software/learning website:

- http://www.pentagonrubber.com/
- http://www.premierrubber.net/
  http://www.transflexconveyors.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.