GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code:3172614
Semester – VII
Subject Name: Corrosion of Elastomers

Type of course: Professional Elective course-V

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:** Permeation, Absorption, Corrosion of Polymers, Mechanisms of corrosion, Corrosion resistant properties of various materials, Proper fabrication and installation techniques, Methods to prevent or control corrosion, Corrosion testing techniques, Corrosion monitoring techniques.	07
2.	**Polymer types and Polymer synthesis & processing:** Introduction, Crystallization, melting and glass transition, Mechanical behavior of polymers, Mechanisms of deformation and strengthening of polymers, Characteristics and typical applications of few polymeric materials.	08
3.	**Thermoset Polymers:** Corrosion of Thermosets, Joining of Thermosets, Ultraviolet Light Stability,Reinforcing Materials, Halogenated resins, Epoxy-based thermosets, Corrosion Resistance, vinyl ester class of resins, Furan polymers, Phenolics, Siloxirane, Melamines, Alkyds, Ureas (Aminos), Allyls, Polybutadienes, Polyimides, Cyanate Esters.	08
4.	**Comparative Corrosion Resistance of Thermoplastic & Thermoset Polymers.**	06
5.	**Elastomers:** Importance of Compounding, Similarities of Elastomers and Thermoplastic Polymers, Differences between Elastomers and Thermoplasts, Causes of Failure, Selecting an Elastomer, Corrosion Resistance, Applications, Resistance to Sun, Weather, and Ozone of different rubbers, Chemical Resistance ofdifferent rubbers**.**	08

6.	**Surface Engineering for Corrosion and Wear Resistance:** Corrosive Wear, Methods to Control Corrosion, Methods to Control Wear, Material/Process Selection.	**08**

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	15	10	10	10	15

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:

- Corrosion of Polymers & Elastomers by Philip A.Schweitzer.
- C. A. Harper, Handbook of Plastics ,Elastomers and Composites.
- Rubber Products Manufacturing Technology by Hertz, Jr., D.L.
- General Purpose Elastomers: Structure, Chemistry, Physics and Performance by Robert A. Shanks and Ing Kong

Course Outcomes:

After learning this course students will be able to:

Sr. No.	**CO statement**	**Marks % weightage**
CO-1	Explain different corrosion resistant properties, fabrication and installation and corrosion preventive techniques	10
CO-2	Classify different polymer types with their synthesis and processing	15
CO-3	Analyze corrosion of Elastomers and thermoplastic polymers	15
CO-4	Compare corrosive resistance properties of thermoplastic and thermoset polymers	15
CO-5	Apply the methods to control corrosion and wear.	15

List of Experiments:

Tutorials/Presentation/Practical based on above topics.

Major Equipment:

Tensile Tester, Hardness Tester, Oven, Ozone Test Chamber etc.

List of Open Source Software/learning website:

- http://onlinelibrary.wiley.com/
- http://aea-al.org/
- http://www.sciencedirect.com/