



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Post Graduate

Branch: Rubber Technology

Course / Subject Code : ME01088081

Course / Subject Name : Tribology of Elastomers

w. e. f. Academic Year:	2024-25
Semester:	1 st Semester
Category of the Course:	PEC

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes
01	Analyze its essential role in studying tribological problems, including systems analysis, and identify the basic features of elastomers.
02	Explain the concept of run-in friction and describe how it differs from other types of friction.
03	Assess the effectiveness of computer image analysis in evaluating wear debris and compare it with traditional methods.
04	Evaluate the implications of abrasive erosion mechanisms on the performance and durability of different materials.

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
03	00	02	04	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction: Definition of Tribology of Elastomers, Significance of Tribology of Elastomers, An Essential Approach for Studying in Tribological Problems – Systems Analysis, Basic Features of Elastomers	09	20
2.	Friction: Definition and Essential Characters, Run-in Friction, Rubber Friction by a	08	20



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	Point Contact, Rubber Friction by a Line Contact, Tires Traction (Friction) Forces on Ice and Snow.		
3.	Introduction to Wear: Definition and Essential Characters, Classification.	07	15
4.	Theory of Rubber Abrasion: Dry Abrasion, Oily Abrasion, Wet Abrasion., Fatigue-Fracture Theory, Energy Theory, Fractal Analysis and Computer Simulation of Worn Surfaces, Computer Image Analysis of Wear Debris.	08	15
5.	Erosion: Mechanisms of Abrasive Erosion, A Brief Introduction to Theory of Metal Erosion, Theory of Abrasive Erosion Surface Mechanochemical Effects of Abrasive Erosion: Introduction, Surface Mechanochemical Effects of Nature Rubber, Nitrile Rubber, Fluororubber, polyurethane etc.	08	15
6.	Fatigue Wear and Frictional Wear: Fatigue Wear, Frictional Wear	05	15
	Total	45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	10	20	10	10	10

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Tribology of Elastomers By SI-WEI ZHANG, University of Petroleum, Beijing, People's Republic of China (b)

Open-source software and website:

1. Mixing of Rubber By Dr. Gupta
2. <http://www.crcpress.com>
3. <http://freevideolectures.com/Course/3070/Science-and-Technology-of-Polymers>

w.e.f. 2024-25

<http://syllabus.gtu.ac.in/>

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Suggested Course Practical List: If any
Practical based on above topics.
