



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: PG

Branch: Plastic Engineering

Course/Subject Code: ME01084041

Course/Subject Name: Thermoplastic 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	Understand Thermoplastic Elastomers and its advantages
02	Explain the preparation of Polyolefin, Styrenics, Polyurethane, Polyamide and Polyester based Thermoplastic Elastomers
03	Describe processing, properties & applications of Polyolefin, Styrenics, Polyurethane, Polyamide and Polyester based Thermoplastic Elastomers properties and applications
04	Explain the preparation, properties & applications of Dynamically Vulcanized Thermo Plastic Elastomer Blends and Ionomeric Thermoplastic Elastomers

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)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No.of Hours	%of Weightage
1.	Introduction to Thermoplastic Elastomers (TPE) Polyolefin – based thermoplastic elastomers – Block copolymer, Random Block polymers, Graft copolymers, Polyolefin blend TPE's preparation, Properties, processing and applications	8	15
2.	Polyvinylchloride Based Thermoplastic Elastomers – PVC/Nitrile Rubber blends, PVC/Polyurethane blends, PVC/Co-	10	25



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	polyester elastomer blends. Styrenic Thermoplastic Elastomers – Manufacture, Properties, Compounding, Processing and Applications..		
3.	Thermoplastic Polyurethane Elastomer – Raw materials, Synthesis, Properties, Processing, Blends and Applications	10	15
4.	Polyamides Based Thermoplastic Elastomers – Polyamide thermoplastic elastomers, Preparation properties, Structure – Property relationship, Processing and applications. Thermoplastic Polyether Ester Elastomers – Synthesis, polymer structure and Morphology, Properties, Blends and applications	10	30
5.	Dynamically Vulcanized Thermo Plastic Elastomer Blends – Introduction - Preparation of Elastomer – Plastic blends by dynamic vulcanization, properties and applications. Ionomeric Thermoplastic Elastomers: Synthesis, Properties, ionic interactions in polymer blends and applications of ionomeric elastomers	7	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
15	15	20	10	5	5

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

References/Suggested Learning Resources:

Books:

1. G. Holden, N.R. Legge, R. Quirk, H.E. Schroll, Thermoplastic Elastomers – 2nd Edition, Hanser Publishers, Munich, 1996.
2. Anil K. Bhowmick, Howard L. Stephens, Hand Book of Elastomers New Developments and Technology, Marcel Dekker, Inc., New York, 1988.
3. S.K. De, Anil K. Bhowmick, Thermoplastic Elastomers from Rubber – Plastic Blends, Ellis Horwood, New York, 1990.



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4. Benjamin M. Walker, Hand Book of Thermoplastic Elastomers, Van Nostrand Reinhold Company, New York, 1979.

(b) Open source software and website:

- 1) <https://www.mdpi.com>
- 2) http://www.altinelpvc.com/altinelpvc/media/pdf/conta_teknik_bilgiler_en.pdf
- 3) <https://www.avient.com/products/thermoplastic-elastomers/tpe-knowledge-center/beginners-guide>

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