



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3724002

Semester – II

Subject Name: Rubber Blends

Type of course: Core-IV (M.E.Rubber Technology)

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No	Course Content	Total Hrs
1.	Rubber-Rubber blends: Introduction, morphology, analytical methods for blend characterization, preparation of rubber blends and properties of rubber blends, multiphase elastomers, miscible blends.	9
2.	NR/NBR Blends: Introduction, NR/BR41, NR/Krynac 34.50 Blends, Improving the Morphology and Properties of NR/NBR Blends with NR/PMMA Graft Copolymers, Improving the Morphology and Properties of NR/NBR Blends with Polychloroprene as the Compatibilizing Agent, NR/NBR Blends – Compounding for Food Contact Applications.	9
3.	Novel Natural Rubber/Ethylene Propylene Copolymer (EPM) Blends: Introduction, Dynamic Vulcanization, Selection of Dynamic Cure System, Dynamic Vulcanization of NR/EPM Blends, The Sandwich Mix Cycle, Processing Behavior, Vulcanization of DV Blends, Resistance to Environmental Damage.	9
4.	Natural Rubber/ENR-25 Blends : Introduction, Designed Experiments, Plasticizer Investigations, Cure Systems, Dynamic: Static Modulus Ratios, Tri-Blends, Improving Resistance to Low Temperature Crystallization in NR/ENR-25 Blends.	9
5.	NR/EPDM Blends : Solutions to the Basic Problems of Poor Physical Properties of NR/EPDM Blends, Approaches to Improving NR/EPDM Blend Properties, Mixing Procedures, Effect of EPDM Modification on Crosslink Density, Effect of EPDM Modification on Phase Morphology, Interaction of Modified EPDM and Carbon Black, Physical Properties, High Temperature Curing Effects, Modification of Different EPDM Grades, Compounding NR/EPDM Blends for Light-Coloured Applications NR/EPDM Blends for Extruded Profile Weather-strip.	9
6.	Blends of carboxylated elastomers with other polymers : Blends of carboxylated and regular nbr, blends of carboxylated NBR with polybutadiene,	9



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	with epichlorohydrin rubber, with pvc, with regular NBR and pvc, with chlorosulfonated polyethylene, with chlorobutyl rubber, with polychloroprene, with modified natural rubber, with polyacrylic rubber, with polyolefins, blends of carboxylated elastomers with polyamides, blends of carboxylated EPDM with polyethylene terephthalate.	
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Reference Books:

- Blends of Natural Rubber Novel Techniques for Blending with Specialty Polymers Edited by Andrew .J Tinker and Kevin P. Jones; Publisher: CHAPMAN & HALL
- Handbook of Elastomers edited by Anil K. Bhowmick and Howard I. Stephens

Course Outcome:

Sr. No.	CO Statement	Marks % weightage
CO-1	Learn about the morphology of rubber & its blends.	15
CO-2	Learn about analytical methods for blend characterization	15
CO-3	Understand the Processing Behavior of Blends.	15
CO-4	Develop the Solutions to the Basic Problems of Poor Physical Properties of Blends.	20
CO-5	Able to do Modification of Different Rubber Grades.	20
CO-6	Students can Improve the Morphology and Properties of Blends	15

List of Experiments:

Tutorials/Presentation/Practicals based on above topics.

Major Equipments:

Mixing Mill, Moulds, Tensile Testing Machine, Oscillating Disc Rheometer, Mooney Viscometer etc.

List of Open Source Software/learning website:

- <http://www.sciencedirect.com/>
- <http://rri.nsf.ac.lk/>
- <http://www.scirp.org/>