GUJARAT TECHNOLOGICAL UNIVERSITY

PLASTIC ENGINEERING (24)
POLYMER BLENDS AND ALLOYS
SUBJECT CODE: 2712407
M.E. 1ˢᵗ SEMESTER

Type of course: Theoretical + Tutorials

Prerequisite: Basic knowledge of degradable plastics and plastic materials

Rationale: Make a biodegradable plastic and ecofriendly materials

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
4	2	0	5	70	30	30	0	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction to polymer blends & alloys – Definitions and nomenclature – reasons for making polymer blend – how to select blend components – preparation of alloys & blends – economy of blending.	4	10
2	Compatibilization and Reactive Blending: Introduction – compatibilization mechanisms – compatibilization methods – compatibilization by addition of copolymer reactive blending – future trends..	6	15
3	Rheology of Polymer Blends - Introduction – Miscibility and flow behaviour of polymer blends – Immiscible blends – Flow behaviour of immiscible and miscible polymer blends. Complex flow – processing of polymer blends – flow through a contraction.	8	25
4	Techniques for Studying Blends and Alloys – light microscopy – the microscope, micro structure – scanning electron microscopy – specimen preparation – application to polymer blends. Transmission electron microscopy - specimen preparation – application to polymer blends.	8	20
5	Thermal Analysis – Differential thermal analysis, Differential scanning calorimeter – Gloss transition temperature. Other Techniques: Light scattering – X-ray scattering – spectroscopy	10	30

Reference Books:
1. L.A. Utracki, Commercial Polymer Blends, Chapman & Hall, London, 1998.
2. R.P. Singh, C.K. Das, S.K. Mustafi, Polymer Blends and Alloys an Overview, Asian Books Pvt. Ltd., New Delhi, 2002.
3. R. Paul & Seymour Newman, Polymer Blends, Vol. 1 & 2, Academic Press, New York,1978

Course Outcome:

After learning the course the students should be able to: formulate the blends as per the desired properties and applications. Students can able to analyze the blends formulation and its properties such as mechanical, morphological and rheological properties.

Major Equipment: Differential Scanning Calorimetry, TGA, FT-IT, SEM, TEM, DMA

List of Open Source Software/learning website:

www.ptonline.com