

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BRANCH NAME: PLASTIC ENGINEERING**

**Subject Name: POLYMER BLENDS & ALLOYS**

**SUBJECT CODE: 3712407**

**Type of course: CORE - II**

**Prerequisite: B.E. PLASTICS**

**Rationale:**

**Teaching and Examination Scheme:**

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

**Content:**

Sr. No	Content	Total Hrs	% 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.	5	11%
2	<b>Compatibilization and Reactive Blending:</b> <b>Introduction</b> – compatibilization mechanisms – compatibilization methods – How to select a compatibilizer – Chemical compatibility for various blends – compatibilization by addition of copolymer reactive blending – future trends..	8	17%
3	<b>Rheology of Polymer Blends - Introduction</b> – 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. Practical methods of studying flow behaviour	10	23%
4	<b>Techniques for Studying Blends and Alloys</b> – light microscopy – study of micro structure, requirements in polymer systems, – scanning electron microscopy – specimen preparation – application to polymer blends. Transmission electron microscopy - specimen preparation – application to polymer blends. Difference between SEM and TEM	15	33%

5	<p><b>Thermal Analysis</b> –Differential thermal analysis, Differential scanning calorimeter – Glass transition temperature. FTIR, UVIR, applications and study of interpretation of test results.</p> <p><b>Other Techniques:</b>Light scattering – X-ray scattering – spectroscopy</p>	7	16%
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**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.
4. **Polymer Blends and Alloys , CRC Press, 19-May-1999, Gabriel O. Shonaike, George P. Simon**
5. **Polymer Characterization Techniques and Their Application to Blends, American Chemical Society, 2003, George P. Simon**

**Course Outcome:**

1. Identification of Polymers which can made as alloys and blends
2. To understand combatibilization
3. To practically make alloys and blends.