GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3142309
Semester – IV
Subject Name: Thermoplastic Materials

Type of course: Professional Core Course

Prerequisite:

Rationale: To understand the manufacturing, properties, applications and of thermoplastic materials and apply this knowledge in selection of appropriate thermoplastic material for producing a finished product.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Introduction : Basic characteristics of Thermoplastic Molding materials. -Basic characteristics of Thermoplastic materials. -Structures of various commodity and engineering thermoplastic materials.	5
2	Monomer Preparation: Naptha cracking, Styrene , Vinyl chloride , Bisphenol-A, Methyl methacrylate, Ethylene glycol, Terephthalic acid, 1,4-Butanediol, Dimethyl terephthalate,	5
3	Manufacturing of Commodity Plastic Materials like: PE(HDPE&LDPE&LLDPE) PP PVC PS PMMA -Properties, applications and processing characteristics of : HDPE,LDPE,LLDPE,PP,PVC,PS,PMMA,PAN,EVA,EVOH,	15
4	Manufacturing of Engineering Plastic Materials like: Nylon 6 & Nylon 66 Polycarbonate Polyacetal PET PBT -Properties, applications and processing characteristics of: ABS,HIPS, Nylons, Polycarbonates, Polyacetal, PET,PBT.	17

Suggested Specification table with Marks (Theory): (For BE only)

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Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**15**	**15**	**10**	**5**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1) Plastic Materials by J.A.Brydson
2) Plastics: Materials and Processing by A.Brent Strong
3) Shreve's Chemical Process Industries by George Austin
4) Plastics Materials & Processes by Sidney H.Goodman

Course Outcomes: After learning this course students will be able to -

Sr. No.	CO statement	Marks % weightage
CO-1	List the basic characteristics of Thermoplastic Molding Materials	5
CO-2	Identify and write the structure of Thermoplastic materials.	5
CO-3	Understand and explain the monomer preparation of thermoplastic resins.	10
CO-4	Understand and explain the manufacturing process of thermoplastic materials.	35
CO-5	Identify the properties and applications of different thermoplastic materials and apply this knowledge in analysing the appropriate parameters for processing them.	45

List of Experiments: As per the above syllabus topics

Major Equipment:

List of Open Source Software/learning website:

1) **https://nptel.ac.in/**
2) **https://pslc.ws/**
3) **www.openlearn.edu/openlearn/science-maths-technology**