



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3172318

Semester – VII

Subject Name: PLASTICS PRODUCT DESIGN

Type of course: Professional core Course

Prerequisite:

Rationale: At the end of the course, the student will be able to understand the factors affecting product design and general design considerations for product design. They will be able to identify and optimize various plastic materials and processes with respect to actual product design.

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.	Content	Total Hrs
1.	Introduction : Introduction to product design, steps for product design, factors to be considered while designing the product, Reasons for failure of plastic product, checklist, Role of product designer, role of End user's requirement in product designing.	4
2.	General design considerations for Part Design: General design considerations like wall thickness, undercuts, ribs and bosses, fillets and radii, holes, weld lines, taper or draft, inserts, external and internal threads, Tolerances, parting lines, Lettering and embossing, size and location of Gate	12
3.	Selection of plastic materials for making product: Selection of plastic materials used for making product-Different plastic materials used for making a product- short term and long term properties and plastic materials- comparison of various plastic materials – optimization of material.	8
4.	Relation of process selection with product design- Various plastic processing methods –its advantages and disadvantages- comparison of plastic processing methods with respect to product shape, quantity, size, cost and quality.	8



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	Product design features related to Injection Moulding, Blow Moulding, Thermoforming, Compression moulding, Transfer Moulding, Rotational Moulding, etc.-Optimization of the process	
5.	Design of Specific Products : Procedure for designing pipes, hinged products, pump impellers, chemical reactors, insulated wires for electrical applications, contact lens, Car bumper, helmets, milk-pouch, toothbrush, overhead water storage tank, gears, Chair, , disposable cups, gasket and seals etc	10

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

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	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. Plastics Product Design by Paul F. Mastro (Author)
2. Plastics Engineered product design by Dominick Rosato
3. Plastics Products Design Handbook- Part A and Part B by Edward Miller.
4. Plastic Materials by J.A.Brydson
5. Plastics Product Design Engineering Handbook by John Harry DuBois and Sidney Levy
6. Designing Successful Products with Plastics: Fundamentals of Plastic Part Design by Mark T. MacLean-Blevins
7. The complete part design handbook by E. Alfredo Campo
8. Plastics Design Handbook by Dominick Rosato and Marlene G. Rosato

Course Outcomes:

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

Sr. No.	CO statement	Marks % weightage
CO-1	Explain product design steps, long term and short term properties of plastics, role of product designer, end user role,etc	15



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CO-2	Identify important properties and applications of thermoplastic and thermoset materials for product design, applications, etc	20
CO-3	Analyze product design factors and design considerations in detail	25
CO-4	Select various plastic processes related to product design features	20
CO-5	Design of plastic products as per end use applications	20

List of Experiments: - As per the syllabus topics

Major Equipment:

List of Open Source Software/learning website:

1. www.nptel.ac.in
2. www.bpf.co.uk