



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Plastics Engineering

Subject Code: DI04023051

Subject Name: Designing of Plastic Products

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - I

Prerequisite:	NA
Rationale:	Product designing is related with entire spectrum of materials, processes, testing and technical aspects. In this course, student will learn design considerations to strengthen the product as well as broaden the applications of it. Proper material selection is a key to success of product. Process selection also needs knowledge of variety of processes out of which finding out the best fit for the given product. Wide range of products from different field like Automobile, Telecommunications, Power transmission, Medical etc require continuous efforts in refining design.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Identify the factors which affect product design.	R,U
02	Draft a design for a plastic product.	R,U,A
03	Select a proper material for a product.	R,U,A
04	Select an appropriate process to manufacture a product.	R,U,A
05	Develop a marketable product design.	R,U,A

*Revised Bloom's Taxonomy (RBT)

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150



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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
Unit – I	Introduction To Product Design 1.1 Introduction to product design 1.2 Difference between drawing & design 1.3 Product design flow chart 1.4 Factors affecting product design 1.5 Steps involved in product design	07	17 % (12 Marks)
Unit – II	Product Design Considerations 2.1 Check list for product design 2.2 Preliminary design considerations 2.2.1 End user's requirements 2.2.2 Drafting preliminary design 2.2.3 Prototyping the design 2.2.4 Testing the design 2.2.5 Taking a second look 2.2.6 Writing meaningful specifications 2.2.7 Setting up production 2.2.8 Assuring the quality 2.3 General design considerations related to 2.3.1 Wall thickness 2.3.2 Fillet & Radii 2.3.3 Ribs & Bosses 2.3.4 Undercuts 2.3.5 Taper or Drafts 2.3.6 Holes 2.3.7 External & Internal threads 2.3.8 Inserts 2.3.9 Parting lines 2.3.10 Surface treatments 2.3.11 Molded lettering 2.3.12 Snap fitting	15	34 % (24 Marks)
Unit – III	Material Selection 3.1 Concept of Material selection 3.1.1 Listing out available materials	06	15 % (10 Marks)



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	3.1.2 Mapping of properties with end user's requirements 3.1.3 Screening method 3.1.4 Identifying missing properties in selected material 3.1.5 Use of compounding to fulfill missing properties selected materials 3.2 Long term & Short term properties of plastic materials 3.3 Cost effectiveness of selected material		
Unit – IV	Process Selection 4.1 List of variety of plastic processing techniques 4.2 Identifying features of products made by different processes 4.3 Impact of size & shape of product on process selection 4.4 Effect of quantity of products to be made on process selection 4.5 Manual, Semi-automatic & automatic process with respect to product design	07	17 % (12 Marks)
Unit – V	Case Studies 5.1 Pipe 5.2 Disposable cup 5.3 Overhead water tank 5.4 Contact lens 5.5 Gear 5.6 Chemical container 5.7 Wind mill blade 5.8 O-ring / Seal 5.9 Food package 5.10 Weather shades	10	17 % (12 Marks)
	Total	45	100 % (70 Marks)

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
32	34	34	-----	_____	_____

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)



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References/Suggested Learning Resources:

(a) Books:

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Product design with plastics	J.B.Dym	Industrial press inc. New York
2			
3	Plastic product design Handbook	Edward Miller	Marcel Dekker Inc. New York
4	Plastic product design	R.D.Back	Van Nostrand Reinhold Inc.,U.S.
5	Plastic product design engg. Hand book	Levy & Dubois	Van Nostrand Reinhold
6	Plastics Engineered Product Design	Dominick V.Rosato & Donald V.Rosato	Elsevier Advance Technology U.K.
7	Plastics: Product Design and Process Engineering	Harold Balofsky	Hanser Publications
8	The Complete Part Design Handbook	E. Alfredo Campo	Hanser Publications
9	Understanding Product Design for Injection Molding	Herbert Rees	Hanser Publications

(b) Open-source software and website:

1. <https://www.apisolution.com/plastic-design-guide.php>
2. <https://idsys.com/plastic-product-design/>
3. <https://www.youtube.com/watch?v=kd72OheMI18>
4. <https://www.youtube.com/watch?v=hMNIwnXL5ko>
5. <https://www.youtube.com/watch?v=RK0J5hNbZUw>

Suggested Practical List:

Sr. No.	Practical/Exercise (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx. Hrs Required
1	Study and List the factors affecting plastic product design.	2
2	Prepare a product design flow chart.	2
3	Study and list product design steps.	2



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4	Prepare a check list for plastic product design.	2
5	Analyze wall thickness variation in product design.	2
6	List and signifies technical aspects in plastic product design.	4
7	Tabulate & compare properties of various plastic materials.	4
8	Study variety of plastic processing techniques.	4
9	Design procedure for a product – Disposable cup	4
10	Design procedure for a product – Overhead water storage tank.	4
	Total	30

Suggested Activities for Students:

1. Students will collect information related to the experiment through internet.
2. Students will collect different plastic products and evaluate its design concepts.
3. Students will tabulate variety of plastic products and their material and process.
4. Prepare a chart for different types of plastics materials available.
5. Collect products made with ribs & bosses.
6. Prepare a chart for variety of plastic processing techniques.
7. Prepare chart for features of products made by different processing techniques.
8. Collect products made with fillets & radii.
9. Collect various types of products with wall thickness variations.

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