



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Textile Engineering

Subject Code : ME03025031

Subject Name : Textile Product Development

w. e. f. Academic Year:	2024-25
Semester:	3
Category of the Course:	MOPEC

<b>Prerequisite:</b>	All core textile subjects.
<b>Rationale:</b>	Understanding of textile product development and its requirement to enhance overall functioning of textile processes.

## Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Understand the functional and ergonomic design aspects of textile products.	U,A
02	Understand the basics of design, requirement analysis, specification development, concept generation, product architecture, the use of natural analogies, and material selection (fibres, blends, yarns, fabrics, etc.).	R,U,A,N,E
03	To be able to analyze the application of mathematical models, performance-property relationships, and the estimation of design parameters (cords, technical fabrics, protective clothing, pressure garments, absorbent textiles, filter fabrics, geotextiles, etc.).	R,U,A,N,E

*\*Revised Bloom's Taxonomy (RBT)*



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## 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 / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	70	30	0	0	100

## Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction: Product development (PD) process, concept development, generic PD process, PD process flows; Product lifecycle and different phases, Design Procedure, Customer needs: Voice of the customer, gathering data and interpreting customer needs, organizing the needs into a hierarchy, establishing the relative importance; Quality function deployment (QFD), Specification Development Product specifications: Definition of specification, development of specification, Target specifications and final specifications; Typical specification for fibre, yarn, fabrics and technical textiles, Concept Generation and Selection, Material Selection.	10	23%
2.	Role of fibre, yarn and fabric parameters on product performance: Qualitative and quantitative relationships among fibre, yarn and fabric properties; Finishing treatments and its role on fabric performance. Product Architecture, Significance of Fibre Property, Significance of	7	15%



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	yarn characteristics in design, Significance of Fabric Property in design, Performance and aesthetic enhancement by finishing process.		
3.	Relationship between fabric properties and fiber, fabric and finishing parameters, Ergonomics, Heat exchange between human body & surrounding, Thermal Properties of clothing, Thermal comfort.	8	18%
4.	Estimation of design parameters, Designing cold weather clothing, Water absorbing medium.	6	13%
5	Bungee Jumping cord, Design for functionality: Anti-wrinkling, low pilling, fire protection, antibacterial, moisture management, UV protection textile fabric, design parameters estimation of nonwoven fabrics, Design and development of incontinent products, Significance of fit in design.	6	13%
6	Design guideline for sports textile, Pressure garment design, Tolerance Design, Joining techniques.	8	18%
	<b>Total</b>	<b>45</b>	<b>100</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20	25	35	10	10	0

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

## References/Suggested Learning Resources:

### (a) Books:



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- 1) Product Design and Development by Karl T. Ulrich and Steven D. Eppinger, Tata McGraw-Hill, 3rd edition, 2003.
- 2) Product Design by Kevin Otto and Kristin Wood, Pearson Education India, 2003.
- 3) Engineering textiles, Integrating the design and manufacture of textile products by Y. E. Mogahzy, Woodhead Publishing Ltd. Cambridge, England, 2009.
- 4) The Design logic of textile products by T. Matsuo and M. N. Suresh, Textile progress, Vol 27, No.3, Textile Institute.
- 5) NPTEL course on Product Design and Development by Inderdeep Singh, IIT Roorkee.

**(b) Open source software and website:**

1. <http://nptel.ac.in>
2. World Wide Web, Google Search Engine etc.

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