GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Computer Aided Costume Design & Dress Making

Subject Code: DI04051091

Subject Name: Nonwoven Textiles in Fashion & Apparel

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

Prerequisite:	General knowledge of Textile Technology and Fibers is required for this course.
Rationale:	This course introduces fashion design students to the world of 'Nonwoven' textiles, which differ from traditional woven and knitted fabrics. In garment manufacturing, nonwovens are indispensable for interlinings, structural supports, medical textiles, and sustainable fashion. Through this subject, students will gain knowledge about fabric construction, bonding methods, and their specific applications in garment aesthetics and functionality.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes	RBT Level
01	Classify non-woven textiles based on their unique characteristics.	U
02	Analyze various web formation processes used for Non-Woven Textiles**.**	A
03	Differentiate various bonding methods of Non-Woven Textiles**.**	U
04	Describe modern technologies used for Non-Woven Textiles.	R
05	Evaluate non-woven textile Finishes and its Application.	E

**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
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA(M)	PA(I)	ESE (V)	
3	00	00	3	70	30	00	00	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction to Nonwovens in Fashion:** Definition and scope in the apparel industry. Advantages over woven/knitted fabrics. Classification based on durability (Disposable vs. Durable). Raw materials used in fashion (Polyester, Polypropylene, Viscose, and Sustainable fibers). Manufacturing process Flow chart of non-woven textiles.	9	20
2.	**Web Formation Processes:** Fiber preparation: raw materials, opening and mixing. Carding Process. Web Laying processes: Parallel-lay, Cross-lay, and Air-lay processes. Web Formation process: Dry Laid Process, Wet Laid Process. Role of web uniformity in garment drape and silhouette.	11	24
3.	**Bonding Technologies for Non-Woven textile: Mechanical:** Needle-punching (for felt-like textures) and Hydroentanglement. **Thermal:** Calender bonding (common for interlinings). **Chemical:** Adhesive and binder application for structural support and stiffness in garments.	7	16
4.	**Polymer-Extrusion Process:** Principles and Process of Spun bond and Melt blown technology. Characteristics of Spun bonded textile and Melt blown textile.	7	16
5.	**Non-Woven textile Finishes and its Application:** Mechanical (Calendaring, Heat setting, Embossing, Laminating) and Chemical finishes (Antistatic, Water-repellent, Flame-retardant). Application of mechanical, thermal, and Chemical bonded non-woven textiles. Application of Spun bonded textile and Melt blown textile. Introduction to breathable and water proof nonwoven membranes for active wear.	11	24
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
24	**38**	**24**	**14**		

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:

1. S. J. Russell (Ed.), *Handbook of Nonwovens*, Woodhead Publishing.
2. W. Albrecht, H. Fuchs, W. Kettelmann, *Nonwoven Fabrics: Raw Materials, Manufacture, Applications*, Wiley-VCH.
3. M. S. Casper, *Nonwoven Textiles*, Noyes Data Corp.
4. C. Tomasino, *Chemistry & Technology of Fabric Preparation & Finishing*, North Carolina State University.
5. Dharmachakra, R.K. et al., *Thermal Bonding of Nonwoven Fabrics*, the Textile Institute.
6. Dr T. Karthik, Prabha Karan C., R. Rathinamoorthy -*Nonwovens: process, structure, properties and applications*
7. Han-Yong Jeon-*Non-Woven Fabrics*
8. R. Chapman -*Applications of Nonwovens in Technical Textiles*

(b) Open source software and website:

1. www.edana.org
2. www.inda.org

Suggested Course Practical List: If any

List of Laboratory/Learning Resources Required: N.A.

Suggested Project List:

1. Difference between woven, knitted and non-woven fabrics
2. Study of Non-Woven Applications in Medical Textiles.
3. Testing of Physical Properties of Non-Woven Fabric
4. Decorative Product from Non-Woven Fabric
5. Non-Woven Fabric Recycling Project
6. Market Survey of Non-Woven Products in Local Market
7. Eco-Friendly Biodegradable Non-Woven Study
8. Testing of Physical Properties of Non-Woven Fabric

Suggested Activities for Students:

a) Power point presentation
b) Internet based assignments
c) Teacher guided self-learning activities
d) Library/internet/lab based mini-project etc.

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