GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Computer Aided Costume Design and Dress Making

Course / Subject Code: DI01051041

Course / Subject Name: Basics of Fiber and Yarn Manufacturing

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	ESC

Prerequisite:	**NA**
Rationale:	In this emerging era of technology, there are multiple ways evolved to produce textile products as per the demand of society. The fashion designer has to work with different types of textile material. This course is designed to gain knowledge about different types of fibre and yarn and its properties, manufacturing process of yarns. It's a great foundation for students who want to learn about fashion design.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes	RBT Level
01	Select suitable type of textile fiber based on its properties for given application.	R
02	Explain properties, manufacturing process and uses of natural fibers.	U
03	Elaborate properties, manufacturing process and uses of man-made fibers.	U
04	Use suitable yarn for given application.	A
05	Explain yarn spinning processes and techniques.	U

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

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Course Content:

Unit No.	Content	No. of Hours	% of Weightage

1.	**Textile fibers and its characteristics**
	1.1 Define textile fiber.
	1.2 Classification of textile fibers.
	1.3 Properties of textile fibers
	    ∗ Primary properties:
	        Length, Strength, Fiber diameter, Flexibility, Uniformity, Spin ability and Cohesiveness.
	    ∗ Secondary properties:
	        Density, Physical shape, Color, Luster, Moisture regain, Absorbency, Elongation and Elastic recovery, Elasticity, Resiliency and Compressibility, Static electricity, Pilling, Crimp, Wicking and Dye ability.
		08	15

2.	**Natural fibers**
	2.1 Overview of Natural fibers
	    ∗ Manufacturing process, microscopic appearance, and properties of vegetable (Cotton and linen), animal (Silk and Wool) and mineral (Asbestos) fibers.
	    ∗ End uses of Cotton, Hemp, Ramie, Kapok, Sisal, Linen, Jute, Flex, Banana, Bamboo, Lotus, Silk, Wool and Asbestos fibers.
		10	25

3.	**Manmade fibers**
	3.1 Overview of Man-made fibers
	    ∗ Manufacturing process, microscopic appearance and properties of regenerated (Acetate and Viscose) and synthetic (Polyester, Acrylic and Nylon) fibers.
	    ∗ End uses of Acetate, Viscose, Modal, Lyocell, Cup ammonium, Alginate, Polyester, Acrylic, Nylon, Glass, Metal, Acetate, Elastane, Spandex and Polypropylene fibers.
		10	25

4.	**Fundamentals of yarn** 4.1. Define yarn 4.2. Yarn twist and Yarn count 4.3. Types of Yarns: Spun and Filament yarn 4.4. Classification of yarn: ∗ Simple Yarn: Single yarn, Ply yarn, Cord yarn	07	15

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	∗ Complex / Novelty Yarn: Slub yarn, Spiral yarn, Flake yarn, Ratine yarn, Boucle, Loop or Curl yarn, Knot, Spot or Knob yarn, Chenille yarn 4.5. Application of various yarns.		
5.	**Yarn Spinning** 5.1. Define spinning 5.2. Yarn spinning processes: Opening and picking, Carding, Combing, Drawing, Roving and Spinning 5.3. Yarn spinning techniques: ∗ Spun yarn: Ring spinning, Open end spinning, and Air jet spinning, Self-twist spinning, Twist less spinning. ∗ Filament yarn: Wet spinning, Dry spinning and Melt spinning.	10	20
	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**
20%	**60%**	**20%**	-	-	-

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. Fabric Science Arthur Price & Allen C. Cohen by Fairchild publication, New York. ISBN: 1-56367-004-6
2. Textiles: Fiber to Fabric by Bernard P. Corban   MC Graw Hill, New York. ISBN: 0-07-013137-6
3. Text book of Clothing & Textiles by Dr. Sushma Gupta, Neeru Garg & Renu Saini, Kalyani Publisher, New Delhi. ISBN: 81-7663-252-X
4. UGC- NET/SLET (Home Science) by Nanette Kaur Sokhi COSMOS book hive, (P) Ltd., Gurgaon-122016
5. Textile Science An explanation of fibre properties by E.P.G Golf, L. D, Vilensky CBS; 2nd edition (1 January 2005). ISBN: 812391038X

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(b) Open-source software and website:

1. https://textilelearner.net/classification-of-textile-fibers/#google_vignette
2. https://www.commonobjective.co/article/quick-guide-to-different-types-of-textile-fibres
3. http://courseware.cutm.ac.in/wp-content/uploads/2020/06/L-4-CLASSIFICATION-OF-YARN.pdf
4. https://www.onlineclothingstudy.com/2019/03/introduction-to-spinning-process-worsted.html
5. https://www.egyankosh.ac.in/bitstream/123456789/61757/3/Unit-2.pdf

Suggested Project List:

* Collect different fibers or yarns and identify each.
* Survey of different latest yarns available in the market and prepare a report.
* Prepare different yarns manually using raw cotton.
* Prepare different charts showing classification of fibers, manufacturing processes of fibers etc.
* Prepare a chart or scrapbook showing photographs of various end uses of different nonconventional fibers like Jute, Coir, and Flex etc.

Suggested Activities for Students:

* Internet-based assignments.
* Teacher guided self-learning activities
* Undertake micro-projects in teams
* Undertake a market survey of different yarns.

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