



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Computer Aided Costume Design and Dress Making

Course / Subject Code: DI03051031

Course / Subject Name: Fabric Science

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

Prerequisite:	Basics of fiber and yarn manufacturing (DI01051041)
Rationale:	The subject “Fabric Science” equips students with fundamental knowledge of textile processing and care through its core units: dyeing, printing, finishes, and laundry science. The dyeing unit focuses on colour application techniques and the interaction of dyes with various fibers to achieve desired effects and durability. The printing unit teaches surface design methods that enhance the visual appeal of fabrics. The finishes unit explores chemical and mechanical treatments that improve fabric performance and functionality. Lastly, the laundry science unit equips students with practical knowledge of fabric care, soaps and detergents, bleaches or whitening agents and the effects of cleaning process on different materials. Together, these units provide a holistic understanding of fabric behavior and treatment, enabling students to make informed design decisions and uphold quality standards in textile production and care. This makes Fabric Science a core subject for careers in textile and fashion industries.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes	RBT Level
01	Select appropriate dyes and dyeing techniques based on fabric types and its end-use.	R
02	Demonstrate suitable textile printing methods to create visually appealing and accurate surface designs.	A
03	Classify various fabric finishing processes to enhance the appearance and performance of textiles.	U
04	Identify laundering agents to maintain the quality of fabric.	R

*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(M)	PA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	<p>Textile Dyeing</p> <p>1.1. Definition of Dye & Dyeing</p> <p>1.2. Classification of dyes:</p> <ul style="list-style-type: none"> • Natural dyes: Vegetable, Animal, Mineral dye • Synthetic dyes: Direct, Acid, Basic, Vat, Reactive, Sulphur, Disperse, Pigment, Naphthol /Azo dye <p>1.3. Methods of dyeing: Fibre dyeing, Yarn dyeing, Fabric dyeing, Garment dyeing, Solution dyeing</p> <p>1.4. Basics steps of the dyeing process: Scouring of material, Preparation of dye bath, Pre-treatment (if required), Dyeing, Post-treatment (if required), Washing, Drying, Finishing</p> <p>1.5. Dyeing machines:</p> <ul style="list-style-type: none"> • Fibre/Stock dyeing: Kier dyeing, Dope dyeing • Yarn dyeing: Skein (Hank) dyeing, Package dyeing, Warp Beam dyeing • Piece dyeing: Jig dyeing, Jet dyeing, Winch dyeing, Beam dyeing • Garment dyeing: Paddle dyeing <p>1.6. Application of suitable dyes on various fabrics.</p>	13	30
2.	<p>Textile Printing</p> <p>2.1. Definition of Printing</p> <p>2.2. Types of printing: Hand printing and Machine printing</p> <p>2.3. Styles of printing:</p> <ul style="list-style-type: none"> • Direct style of printing 	10	20



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	<ul style="list-style-type: none"> • Resist style of printing: • Discharge style of printing <p>2.4. Methods of printing: Block Printing, Stencil printing, Screen printing (Flat-bed screen and Rotary screen), Roller printing, Transfer printing, Digital printing, Batik, Tie and dye</p>		
3.	<p>Textile Finishes</p> <p>3.1 Definition and aim of finishing process</p> <p>3.2 Classification of finishes:</p> <ul style="list-style-type: none"> • Based on textile processing: Mechanical/Dry finishes & Chemical/ Wet finishes • Based on degree of permanence: Durable & Semi-durable finishes • Based on end use: Aesthetic and functional finishes <p>3.3 Finishing processes:</p> <ul style="list-style-type: none"> • Preparatory finishes: Scouring, Bleaching, Desizing and Singeing • Mechanical finishes: Beetling, Brushing & Shearing, Calendering, Tentering, Embossing, Glazing, Napping, Weighting and Sanforizing • Chemical finishes: Mercerizing, Crease resistant, Creping, Fire proof, Water proof and Water repellent <p>3.4 Application of various finishes to different fabrics.</p>	12	30
4.	<p>Laundry Science</p> <p>4.1 Definition of Laundry and laundering agents</p> <p>4.2 Soaps and detergents: Definition and its application</p> <ul style="list-style-type: none"> • Types of soaps: Hard and Soft soap • Composition of soap <p>4.3 Stiffening agents: Definition and its application</p> <ul style="list-style-type: none"> • Types of stiffening agents: Starch, Gum Arabic, Gelatin, Borax <p>4.4 Whitening agents: Definition and its application</p> <ul style="list-style-type: none"> • Laundry blues: Insoluble blues, Soluble blues • Bleaches: Definition and its application • Classification of bleaches-Oxidizing, Reducing and Optical bleaches 	10	20
Total		45	100



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Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
40	40	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, Fairchild publication, New York. ISBN: 1-56367-004-6
2. Textiles: Fiber to Fabric, Bernard P. Corbman, MC Graw Hill, New York. ISBN: 0-07-013137-6
3. Textbook of Clothing & Textiles, Dr. Sushma Gupta, Neeru Garg & Renu Saini Kalyani Publisher, New Delhi. ISBN: 81-7663-252-X
4. UGC- NET/SLET (Home Science), Navneeta Kaur Sokhi, COSMOS book hive, (P) Ltd., Gurgaon-122016
5. Textile Science An explanation of fibre properties, E.P.G Gohl, L. D, Vilensky CBS; 2nd edition (1 January 2005), ISBN: 812391038X

(b) Open-source software and website:

1. <https://textiletuts.com/types-of-dyes/>
2. <https://youtu.be/jRNqaOA8ZRI>
3. https://www.youtube.com/watch?v=ZyKW5tfw_18
4. <https://www.youtube.com/watch?v=CHzLckkSATI>
5. <https://www.youtube.com/watch?v=HsKgyRiKFF8>

Suggested Course Practical List:

Sr.No.	Practical List	Hours
1	Scouring of 10 samples of 8*8 inch and 1 sample of 10*10 inch.	2
2	Prepare 8*8-inch Tie & Dye samples using following tying techniques	
	Circle tie	2
	Pleat tie	2
	Knot tie	2
	Sew tie	2



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	Fold tie	2
	Marbling	2
	Rouching	2
3	Prepare 10*10-inch sample of Batik.	6
4	Prepare 8*8-inch sample of stencil printing.	4
5	Prepare 8*8-inch samples of block printing using wooden block and vegetable block.	4
		30

List of Laboratory/Learning Resources Required:

- Dyeing & Printing Laboratory

Suggested Project List:

1. **Collection & Identification:** Collect different printed fabrics and identify its printing methods.
2. **Chart making:** Prepare a chart with samples showing stain removal techniques.
3. **Sample making:** Prepare one article of block print using vegetables or eco printing.
4. **Fabric collection:** Collect different finished fabric samples and identify its finish type.

Suggested Activities for Students: If any

1. Assign internet-based assignments.
2. Give seminar on any relevant topic.
3. Assign teacher guided self-learning activities.
