

GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)

Semester -III

Course Title: **Fabric Processing and Care**

(Course Code: 433105)

Diploma programmes in which this course is offered	Semester in which offered
Computer Aided Costume Design and Dress making	Third

1. RATIONALE

The course on Fabric Processing and care helps to develop requisite competency and skills in dyeing and printing technology. This will help in designing various types of textiles to match the client's requirement. Thus, it is the key course for textile designing and its maintenance.

2. COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Develop textiles using appropriate fabric processing techniques.**

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

- a) Select appropriate dyeing process for fiber, yarn and fabric.
- b) Explain various printing styles and its application.
- c) Classify different types of textile finishes.
- d) Apply specific laundering and stain removal technique for textiles.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
3	-	2	4	30*	70	25	25	150

(*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for assessing the attainment of the cognitive domain UOs required for the attainment of the COs.

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, CA - Continuous Assessment; ESE -End Semester Examination.

5. SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. Some of the PrOs marked "*" (in approx. Hrs column) are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Scouring of 10 samples of 8*8 inch and 1 sample of 10*10 inch.	3	2
2	Prepare 8*8 inch Tie & Dye samples using following techniques: 1) Circle tie	1	2
	2) Pleat tie	1	2
	3) Knot tie	1	2
	4) Sew tie	1	2
	5) Fold tie	1	2
	6) Marbeling	1	2
	7) Ruching	1	2
3	Prepare 10*10 inch sample of Batik.	2	6
4	Prepare 8*8 inch sample of stencil printing.	2	2
5	Prepare 8*8 sample of block printing using wooden block and vegetable block.	2	4
Total Practical Exercises			28 Hrs.

Note

- i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.
- ii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course which are embedded in the COs and ultimately the competency.

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Planning the process for performing practical.	10
2	Pre-preparation of sample for dyeing and printing	20
3	Performing the practical as per given instructions.	50
4	Finishing of the samples.	10
5	Presentation of the practical.	10
Total		100

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

This major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practical in all institutions across the state.

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1	Dye bath	1,2,3
2	Digital weighing balance-weight capacity- 1 gm. to 3000 gms.	1,2,3

7. AFFECTIVE DOMAIN OUTCOMES

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this course t competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Follow safety practices while using Dying & Printing equipments.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

- i. 'Valuing Level' in 1st year
- ii. 'Organization Level' in 2nd year.
- iii. 'Characterization Level' in 3rd year.

8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such higher level UOs could be included by the course teacher to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit – I Dyeing	1a. Classify the various types of dyes. 1b. Describe different dyeing techniques. 1c. Explain the dyeing process. 1d. Explain working of dyeing machineries.	1.1 Define Dye & Dyeing 1.2 Classification of dyes 1.2.1. Natural dye 1.2.1.1. Vegetable 1.2.1.2. Animal 1.2.1.3. Mineral 1.2.2. Synthetic dye 1.2.2.1. Direct 1.2.2.2. Acid 1.2.2.3. Basic 1.2.2.4. Vat 1.2.2.5. Reactive 1.2.2.6. Sulphur 1.2.2.7. Disperse 1.2.2.8. Pigment 1.2.2.9. Naphthol/Azo dye 1.3 Methods of dyeing 1.3.1. Fiber dyeing 1.3.2. Yarn dyeing 1.3.3. Fabric dyeing 1.3.4. Garment dyeing 1.3.5. Solution dyeing 1.4 Basics steps of the dyeing process 1.4.1. Scouring of material to be dyed 1.4.2. Preparation of dye bath

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
		1.4.3. Pre-treatment (if required) 1.4.4. Actual dyeing 1.4.5. Post-treatment (if required) 1.4.6. Washing 1.4.7. Drying 1.4.8. Finishing 1.5 Dyeing machines 1.5.1. For fiber dyeing: Kier dyeing Dope dyeing 1.5.2. For yarn dyeing: beam dyeing 1.5.3. For fabric dyeing: Jig dyeing, jet dyeing, winch dyeing, beam dyeing
Unit – II Printing	2a. Define printing. 2b. Explain different methods of Printing. 2c. Explain different styles of Printing. 2d. Describe various methods of printing.	2.1. Definition of Printing 2.2. Types of printing 2.2.1. Hand printing 2.2.2. Machine printing 2.3. Styles of printing 2.3.1. Direct style of printing 2.3.2. Resist style of printing 2.3.2.1. Batik 2.3.2.2. Tie and dye 2.3.3. Discharge style of printing 2.4. Methods of printing 2.4.1. Block Printing 2.4.2. Screen printing 2.4.2.1. Flat bed screen printing 2.4.2.2. Rotary screen printing 2.4.3. Roller printing 2.4.4. Transfer printing
Unit– III Finishes	3a. Define Textile finishes. 3b. Classify various Textile Finishes. 3c. Explain different types of Mechanical finishes. 3d. Explain different types of Chemical finishes.	3.1 Textile finishes: definition 3.2 Classification of finishes: 3.2.1. Mechanical & Chemical finishes 3.2.2. Durable & Non- durable finishes 3.3 Mechanical finishes 3.3.1. Beetling 3.3.2. Brushing & Shearing 3.3.3. Calendering

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
		3.3.4. Tentering 3.3.5. Embossing 3.3.6. Glazing 3.3.7. Napping 3.3.8. Weighing 3.3.9. Sizing 3.3.10. Sanforizing 3.4 Chemical finishes 3.4.1. Mercerizing 3.4.2. Crease resistant 3.4.3. Creping 3.4.4. Fire proof 3.4.5. Water proof 3.4.6. Water repellent 3.4.7. Scouring
Unit- IV Fabric care	4a. Define Laundering. 4b. Explain about different laundry agents. 4c. Apply different stain removal techniques for textiles.	4.1 Laundering 4.1.1. Definition of Laundering 4.1.2. Laundry Agent 4.1.2.1. Soaps & Detergents 4.1.2.2. Stiffening agents (Starch, gums) 4.1.2.3. Whitening agents (laundry blue, bleaches, optical brighteners) 4.1.3. Dry Cleaning 4.2 Stain removal techniques 4.2.1. Blood 4.2.2. Ink 4.2.3. Tea 4.2.4. Coffee 4.2.5. Rust 4.2.6. Perspiration 4.2.7. Lipstick 4.2.8. Turmeric 4.2.9. Oil

9. SUGGESTED SPECIFICATION TABLE FOR QUESTIONPAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Dyeing	13	4	8	10	22
II	Printing	13	4	8	10	22

III	Textile Finishes	10	4	8	4	16
IV	Fabric care	06	2	4	4	10
Total		42	14	28	28	70

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: This specification table provides general guidelines to assist student for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.

10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Students should conduct following activities in group and prepare reports of about 5 pages for each activity. They also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

- a) Visit to nearby dyeing/printing unit.
- b) Undertake micro-projects in teams.
- c) Give seminar on any relevant topic.
- d) Market survey with specifications of dyeing/printing material available in market.
- e) Prepare showcase portfolios.

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

- a) Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- b) Guide student(s) in undertaking micro-projects.
- c) '**L**' in **section No. 4** means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the students for **self-learning**, but to be assessed using different assessment methods.
- e) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.
- f) Industrial visits to the related industry.

12. SUGGESTED MICRO-PROJECTS

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain

dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

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

13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
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; 2 nd edition (1 January 2005) ISBN: 812391038X

14. SOFTWARE/LEARNING WEBSITES

- <https://textiletuts.com/types-of-dyes/>
- <https://youtu.be/jRNqaOA8ZRI>
- https://www.youtube.com/watch?v=ZyKW5tfw_l8
- <https://www.youtube.com/watch?v=CHzLckkSATI>
- <https://www.youtube.com/watch?v=HsKgYRIKFF8>

15. PO-COMPETENCY-CO MAPPING

Semester III	Fabric Processing and Care (Course Code: 433105)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning

Competency	Develop textiles using appropriate fabric processing techniques.						
Course Outcomes							
CO a) Select appropriate dyeing process for fiber, yarn and fabric..	3	3	2	3	2	2	3
CO b) Explain various printing styles and its application.	3	3	3	3	2	2	3
CO c) Classify different types of textile finishes.	3	2	2	2	2	2	3
CO d) Apply specific laundering and stain removal technique for textiles.	3	3	3	3	3	2	3

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlation of each CO with PO.

16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

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