GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

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

Course Title: Fabric Design-1
(Course Code: C4325902)

Diploma programme in which this course is offered	Semester in which offered
Textile Design	Second

1. **RATIONALE**

- Fabric design is the process of creating patterns, designs and structures for woven, knitted, non-woven or embellishments of fabrics. It involves producing fabric used in clothing (Sarees, Kurta, salwar, dupatta, pants, shirts, etc), household textiles (curtains, bedcovers, sofa covers, table covers, etc), towels and decorative textiles such as carpets. It is a creative field that bridges fashion design, carpet manufacturing and any other cloth-related field. The Textile designers should have knowledge of different types of weave design and fabric structure for the process of fabric manufacturing for different end uses. This will assist them to create designs during fabric production. This subject provides knowledge regarding methods of fabric representation, representation of weave design on point paper, construction of different types of weave design, fabric structure, as well as analysis of weave design and different fabric parameters for given fabric samples to be able to manufacture the same by weaving processes for fabric production.

2. COMPETENCY

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

- Construct elementary weave design patterns for fabrics using principles of woven design and fabric structure.

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

a) Interpret the type of given fabric based on its structure.
b) Create weave design on the point paper.
c) Create woven design patterns for elementary weaves.
d) Create woven design patterns for derivatives of elementary weaves.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T/2+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
3	0	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 the 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) that are the sub-components of the COs. *Some of the **PrOs** marked **'*'** 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	Draw basic operations of loom weaving.	I	02
2	Represent Weave with Design, Draft, lifting plan & denting on point paper	II	02
3	Prepare 2 samples on hand loom for elementary weave- Plain weave(Drawing-in and denting)	III	02
4	Prepare 2 samples on hand loom for elementary weave- Plain weave(Weaving)	III	02
5	Prepare 2 samples on hand loom for elementary weave- Twill weave (Drawing-in and denting)	III	02
6	Prepare 2 samples on hand loom for elementary weave- Twill weave (Weaving)	III	02
7	Prepare 2 samples on hand loom for elementary weave- Satin/Sateen weave(Drawing-in and denting)	III	02
8	Prepare 2 samples on hand loom for elementary weave- Satin/Sateen weave(Weaving)	III	02
9	Prepare 2 samples on hand loom for derivatives of Plain weave(Drawing-in and denting)	IV	02
10	Prepare 2 samples on hand loom for derivatives of Plain weave(Weaving)	IV	02
11	Prepare 2 samples on hand loom for derivatives of Twill weave(Drawing-in and denting)	V	02

12	Prepare 2 samples on hand loom for derivatives of Twill weave(Weaving)	V	02
13	Analyze the given fabric samples (min 3) for different weaves and interpret its EPI, PPI and weave design.	II	02
14	Prepare report on use of weave design software to create specified types of weave patterns	V	02
	Total		**28**

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 required which are embedded in the COs and ultimately the competency..*

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Use of basic operations of loom weaving for design creation	15
2	Representation of Weave on point paper for design creation	30
3	Construction of woven design patterns for elementary weaves	30
4	Construction of woven design patterns for derivatives of elementary weaves and fancy weaves	25
Total		**100**

6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

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

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	Basic stationary material Pencil, scale, eraser, sketch pen/highlighter etc.	All
2	Fabric analysis kit (pick glass, ruling scale, forcipes plucker)	All
3	Point paper/ Design paper	All
4	Handloom/ Cardboard	All
5	Yarn for weaving	All
6	Computer System with Internet connection and weave design software	14

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 fulfil the development of this competency.

a) Work as a designer/team member of a textile design studio.
b) Creation of woven design as per end use requirement.

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.

- **UNDERPINNING THEORY**

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* in order development of the COs and competency is not missed out by the students and teachers. 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 Application and above level)	Topics and Sub-topics
Unit – I Loom Weaving & Elements of woven design	1a. Describe basic weaving operation 1b. Identify the function of different parts of loom 1c. Demonstrate weaving on handloom 1d. Identify specified woven fabric as per its structure	1.1 Basic operations of loom weaving (Shedding, Picking, Beat-up, Let-off, Take-up) 1.2 Function of different parts of loom for weaving 1.3 Working of handloom 1.4 Details of woven fabric structure 1.5 Elements of woven fabric structure
Unit – II Representation of Weave Design on Paper	2a. Represent weave patterns on point paper (Design paper) 2b. Create weave patterns on point paper (Design paper) 2c. Correlate Design, Draft, lifting plan for weave patterns on point paper 2d. Create denting plan for weave patterns	2.1Methods of fabric representation 2.2Representation of Weave with Design 2.3 Representation of Weave with Draft 2.4Representation of Weave with lifting plan 2.5Making denting plan for weave

Unit– III Elementary weaves	3a. Identify type of elementary weaves 3b. Create the elementary weaves designs 3c. Create the elementary weaves draft 3d. Create the elementary weaves lifting plan and denting order	3.1 Plain weave 3.2 Twill weave (Z Twill, S Twill, Warp way Twill, Weft way Twill) 3.3 Sateen and Satin weaves (Regular Sateen, Irregular Sateen, Regular Satin, Irregular Satin)
Unit– IV Development of weave on Elementary basis (Plain Weave)	4a. Classify derivatives of Plain weaves 4b. Create the weaves designs for derivatives of Plain weaves 4c. Create draft for derivatives of Plain weaves 4d. Create lifting plan for derivatives of Plain weaves	4.1 Derivatives of Plain weave 4.1.1 Warp Rib weave 4.1.2 Weft Rib weave 4.1.3 Hopsack weave 4.1.4 Basket 4.1.5 Mat weave
Unit– V Development of weave on Elementary basis (Twill Weave)	5a. Identify derivatives of Twill weaves 5b. Create the weaves designs for derivatives of Twill weaves 5c. Create draft for derivatives of Twill weaves 5d. Create lifting plan for derivatives of Twill weaves 5e. Identify various weave design software	5.1 Derivatives Twill weave 5.1.1 Waved Twill 5.1.2 Herringbone Twill 5.1.3 Curved Twill 5.1.4 Broken Twill 5.1.5 Transposed or Re-arranged Twill 5.1.6 Elongated Twill 5.2 Introduction to common weave design software used in current time

***Note**: The UOs need to be formulated at the 'Application Level' and above of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.*

SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A	Total Marks
1	**Loom Weaving & Elements of woven design**	06	2	4	6	12
2	**Representation of Weave Design on Paper**	08	2	6	6	14
3	**Elementary weaves**	12	2	8	10	20

4	**Development of weave on Elementary basis (Plain Weave)**	08	2	4	6	12
5	**Development of weave on Elementary basis (Twill Weave)**	08	2	4	6	12
Total		**42**	**10**	**26**	**34**	**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 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.*

6 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, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

a) Collect fabric samples based on its structure (manufacturing technique), types & end uses.
b) Analyse the given cloth samples for different weaves
c) Construct woven design patterns for different weaves

7 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.(please check availability, else cover to "Online Courses")
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.11***, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.

8 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. However, in the fifth and sixth semesters, it should be preferably be ***individually*** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations

where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than ***16 (sixteen) student engagement hours*** during the course. The student 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:

a) Explore weave design software from online resources and prepare a comparison for any two/ three

b) Visit various weaving units and prepare report on any one unit on points such as – machinery required, specifications of machine and raw material used, manpower required, skills of the various persons employed, weaves used in the unit,etc

c) Prepare report of different weave designs currently used in a market for clothing.

9 SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	Watson's Textile Design and Colour: Elementary Weaves and Figured Fabrics	William Watson and Z Grosicki	Woodhead CBSPD,1975, New Dehli, ISBN: 978-1855739956
2	Grammer of Textile Design	Harry Nisbet	Wentworth Press, 1906, ISBN: 978-1362902478
3	Elementary Textile Design and Fabric Structure	John Read	Read Books, 1931, ISBN:978-1447401100
4	Woven Textile Design	Jan Shenton	Laurence King Publishing, 2014, ISBN: 978-1780673370

10 SOFTWARE/LEARNING WEBSITES

10.1.1.1 https://www.textileworld.com/
10.1.1.2 https://nptel.ac.in/courses/
10.1.1.3 www.thetextileblogspot.in
10.1.1.4 https://www.textileschool.com/453/woven-design/
10.1.1.5 https://www.youtube.com/watch?v=DdwhvbxMiD4

11 PO-COMPETENCY-CO MAPPING

Semester II	Fabric design –I (Course Code: C4325902)								
	POs and PSOs								
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**	**PSO 1**	**PSO 2**
Competency	Construct elementary weave design patterns for fabrics using principles of woven design and fabric structure.								
COa) Interpret the type of given fabric based on its structure.	3	1	2	2	-	1	1	3	2
COb) Create weave design on the point paper.	3	1	2	2	-	1	1	3	2
COc) Create woven design patterns for elementary weaves.	3	2	2	2	-	1	1	3	2
COd) Create woven design patterns for derivatives of elementary weaves.	3	2	2	2	-	1	1	3	2

Legend: '**3'** for high, '**2**' for medium, **'1'** for low or **'-'** for the relevant correlation of each competency, CO, with PO/ PSO

12 COURSE CURRICULUM DEVELOPMENT COMMITTEE

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