

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT
Course Curriculum

FABRIC STRUCTURE-I
(Code: 3332904)

Diploma Program in which this courses offered	Semester in which offered
Textile Manufacturing Technology	3 rd Semester

1. RATIONALE

Knowledge of woven structure is prime requirement for production of fabric. Fabric structure plays vital role in fabric properties like strength, feel, drape and appearance etc. It is necessary to develop design on graph paper with all necessary details like weave, draft, peg-plan and denting required for actual fabric production on machine. With use of dobby, movement of warp group can be controlled and order of lifting can be planned.

2. COMPETENCY (Programme Outcome according to NBA Terminology):

The course content should be taught and implemented with the aim to achieve different types of skills so that students are able to acquire following competency:

- **Develop basic fabric structures, derivatives and “special structures” with design, draft, peg-plan, denting plan and prepare sample for the same on handloom.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
L	T	P		Theory Marks		Practical Marks		Total Marks
			C	ESE	PA	ESE	PA	
3	0	4	7	70	30	40	60	200

Legends: L-Lecture; T – Tutorial/Teacher Guided Student Activity; P -Practical; C – Credit;; ESE -End Semester Examination; PA - Progressive Assessment.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
Unit – I Representation of Weave on Graph Paper	1a. Explain different methods to represent interlacement of warp & weft in design. 1b. Develop a plain weave on graph paper. 1c. Construct draft and Peg-plan from given design.	1. Representation of Weave on graph paper
Unit– II Construction of Basic Weaves & its Features	2a. Represent Plain / Twill /Satin/Sateen weaves on graph paper. 2b. Identify the basic characteristics and end use of the Plain / Twill / Sateen /Satin weaves 2c. List methods of ornamentation of plain weave 2d. Develop regular and irregular satin and sateen. 2e. Differentiate between satin and sateen designs. 2f. Discuss Influence of twist on fabric properties	2. Construction of basic weaves and its features. 2.1 Plain Weave. 2.2 Twill Weave. 2.3 Sateen. 2.4 Influence of twist direction of yarn on appearance of twill line. 2.5 Ornamentation of Plain Weave.
Unit–III Modification of Plain, Twill & Sateen Weave	3a. Develop regular and 3b. irregular warp / weft rib weaves. 3c. Develop basket / matt weave (Regular, Irregular and fancy) 3d. Develop pointed twill, Herring bone twill, broken twill, zig-zag, curved and waved twill, and transpose twill by changing draft & peg-plan from given twill weave. 3e. List four methods to produce crepe weave. 3f. Develop crepe weaves based on each method. 3g. Develop Cork-screw weave 3h. Develop Diamond & Diaper Design.	3. Modification of Plain, Twill & Sateen Weave. 3.1 derivatives of Plain Weave. -Rib Weave -Matt Weave 3.2 Twill derivatives. - Pointed Twills - Broken Twills - Transposed Twills - Rearranged Twills - Herringbone Twills 3.3 Crepe Weave.(all four methods of construction) 3.4 Cork-screw Weave.(Warp and Weft) 3.5 Diamond & Diaper Design. 3.6 Loom equipment required for above Weaves.
Unit–IV Toweling weaves	4a. Develop specific weaves like, honeycomb, huckaback , mock leno weaves. 4b. Draw and differentiate ordinary and brighton honey comb. 4c. Develop honey comb weave on straight draft and pointed draft. 4d. Develop brighten honeycomb weave	4.1 Honeycomb - Huckaback - Mock-Leno 4.2 Loom equipment required for above Weaves.

Unit	Major Learning Outcomes (Course Outcomes in Cognitive Domain according to NBA terminology)	Topics and Sub-topics
	<p>on graph paper.</p> <p>4e. Develop different huckaback weaves including special weave like "Devon".</p> <p>4f. Develop all types of mock leno</p> <p>4g. weave with denting order</p>	
Unit-V Distorted Weave	5a. Develop Warp and Weft distorted effect	4. Distorted Weave. 4.1 Warp distorted effect. 4.2 Weft distorted effect
Unit-VI Extra Warp & Extra Weft Figuring with Loom Equipment	6a. Develop a motif using extra warp and weft . 6b. State the methods to select the motif and ratio of ground and figuring threads .	5. Extra Warp & Extra Weft Figuring with Loom equipment.
Unit-VII Yarn and Fabric Calculation	7a. Calculate average count 7b. Calculate resultant count. 7c. Discuss heald and reed count. 7d. Calculating weight of warp and weft.	6. Yarn & Fabric calculation. 6.1 - Average count. 6.2 - Resultant count. 6.3 - Heald & Reed count. 6.4 - Weight of Warp & Weft.
Unit-VIII Fabric Particulars and their Trade Names	8a. List various types of fabric trade name and their particulars.	7. Selection of weave 7.1 According to end use of the fabric. 7.2 Features and quality particulars of special structures like - Calico, Rubia, Voiles, Denim, Jean, Poplin, long cloth, Georgette.

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (Theory)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1.	Representation of Weave on Graph Paper	02	0	3	03	06
2.	Construction of Basic Weaves & Its Features	08	0	4	10	14
3.	Modification of Plain, Twill & Sateen Weave	07	0	4	08	12
4.	Toweling Weaves	07	0	4	06	10
5.	Distorted Weave	04	0	2	04	06
6.	Extra Warp & Extra Weft Figuring with Loom Equipment	04	0	2	04	06
7.	Yarn and Fabric Calculation	08	0	4	08	12
8.	Fabric Particulars and Their Trade Names	02	2	2	00	04
Total		42	2	25	43	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revise taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

6. SUGGESTED LIST OF EXERCISES/PRACTICAL

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (**Course Outcomes in psychomotor domain**) so that students are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

Note: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of **Programme Outcomes/Course Outcomes in affective domain** as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.

S. No.	Unit No.	Practical/Exercise (Course Outcomes in Psychomotor Domain according to NBA Terminology)	Approx Hours Required
1	I	Prepare graphical representation of the weave.	04
2	I	Prepare structural design for plain weave on graph paper.	04
3	I	Draw structural design of twill and satin/sateen weave on graph paper.	04
4	I	Draw structural design of satin/sateen weave on graph paper	04
5	II	Prepare fabric sample of plain weave on sample loom.	04
6	II	Prepare sample of Twill Weave on a sample loom.	04
7	II	Prepare sample of Satin/Sateen Weave on a sample loom.	04
8	II	Analyze sample of Plain/Twill/Satin/sateen (design, draft, peg plan)	02
9	III	Draw designs on a point paper - Plain derivatives.	02
10	III	Draw designs on a point paper - Twill derivatives.	02
11	III	Prepare sample of Plain/Twill derivative on sample loom.	04
12	III	Develop design on a graph paper. - crepe, - diamond, - diaper - cork-screw.	04
13	III	Develop design on graph paper - Honeycomb - Huckaback - Mock-Leno	04
14	IV	Draw design and cross section of warp and weft distorted effect	04
15	V	Draw design of Extra warp and weft figuring.	02
16	VI	Analyze sample of Plain/Twill (design, draft, pegplan)	02
17	VI	Analyze sample of Plain weave, design, draft, pegplan with quality particulars. i.e. - Approximate count of threads. - Threads/unit space. - Heald & Reed calculation - Weight of Warp and Weft.	04
18	VI	Analyze sample of extra warp/weft figuring with quality particular and loom equipment required.	02
19	VII	Prepare of chart for weave and end use of the fabric.	04
Total			64

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like: course/topic based seminars, internet based assignments, teacher guided self learning activities, course/library/internet/lab based mini-projects---etc.

- i. Collection of various Textile fabric samples.
- ii. Visit to weaving preparatory unit, and preparing report with sketches.
- iii. Visit to the design development studio of weaving mill.
- iv. Visit to weaving unit, and preparing report with sketches.

8. SPECIAL INSTRUCTIONAL STRATEGY (If Any)

- i. Use Hand loom for sample preparation
- ii. Use Pick glass to find out EPI, PPI, twist direction and type of weaves
- iii. Demonstrate drawing and denting of yarn on sample loom by use of reed hook.
- iv. Show Educational videos/animation films on preparation of different fabric structures
- v. Demonstrate samples of different weaves.
- vi. Arrange a visit to nearby loom/textile mill

9. SUGGESTED LEARNING RESOURCES

A. List of Books

Sr. No.	Title of Books	Author	Publication
1	Elementary Textile Design and Colour	William Wattson	
2	Advance Textile Design	William Wattson	
3	Watson's Textile Design and Colour	Z. Grosiky	Universal Publishing Corporation, 534, Kalbadevi Road, Dhobi Talao, Bombay-400002
4	Watson's Advance Textile Design	Z. Grosiky	Universal Publishing Corporation, 534, Kalbadevi Road, Dhobi Talao, Bombay-400002
5	Grammar of Textile Design	Nisbet	
6	Fabric Structure and Design	N. Gokarneshan	New Age International (P) Limited, Publishers, New Delhi
7	Weaving calculation	R. Sengupta	

B. List of Major Equipment/ Instrument

Textile Laboratory – Sample loom

C. List of Software /Learning Websites

Searching engine could be used to locate textile related sites; following are some examples of useful websites.

- a. <http://www.textileassociationindia.org/>
- b. <http://www.fiber2fashion.org/>
- c. <http://www.nift.ac.in/>
- d. www.itamma.org/
- e. www.en.wikipedia.org/wiki/Textile_design
- f. <http://www.designdiary.nic.in/>
- g. <http://textilelearner.blogspot.in>

10. COURSE CURRICULUM DEVELOPMENT COMMITTEE**Faculty Members from Polytechnics**

- **Prof. V. N. Soni**, HOD Textile Manufacturing , R.C Technical Institute, Ahmedabad
- **Prof. Y. M. Gandhi** HOD Textile Manufacturing , Sir B.P.T.I, Bhavanagar
- **Prof. R. T. Patel**, Lecturer in Textile Manufacturing, R.C Technical Institute, Ahmedabad
- **Prof. S. M. Zala**, Lecturer in Textile Manufacturing, Sir B.P.T.I, Bhavanagar,
- **Prof. D.V. Bihola**, Lecturer in Textile Manufacturing, R.C Technical Institute, Ahmedabad

Coordinator and Faculty Member from NITTTR Bhopal

- **Dr. C. K. Chugh**, Professor, Department of Mechanical Engineering
- **Prof. S. K. Gupta**, Professor and Coordinator for State of Gujarat