

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

**COURSE CURRICULUM
COURSE TITLE: FABRIC STRUCTURE - III
(COURSE CODE: 3352902)**

Diploma Programmes in which this course is offered	Semester in which offered
Textile Manufacturing Technology	5 th Semester

1. RATIONALE

Uses of textile materials is not limited for garment only but are used for other domestics, industrial and decorative purpose. Diploma students must know all types of special structures required for these special purpose applications, these types include Double cloth, Leno, Gauze, Damask, Brocade, Toilet quilt and their related calculations for fabric like cloth cover, ends/units and picks/units space. In this course students will be able to develop skills to prepare special/advanced/ decorative types of woven designs on point paper/computer and also will be able to prepare samples accordingly on a computerized Sample loom/Weaving machine/electronic Jacquard. They will also be able to select the Weave according to the end use of the fabric and acquire upper level ability. Through this course essential efforts are made to satisfy industrial needs. It is therefore an important course.

2. LIST OF COMPETENCY

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

- **Develop design for production of special / advance / decorative types of fabric.**

3. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Develop designs on double cloth.
- Use thread diagram for Gauze and leno Weave
- Differentiate between Damask and Brocade fabric
- Draw the design on Tapestry and Quilt fabrics
- Develop Jacquard design using suitable motif on Jacquard design Sheet.

4. TEACHING AND EXAMINATION SCHEME

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

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

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Double Cloth	1a. Justify end use of Double Cloth fabric. 1b. Explain the principle of tying for constructing the double cloth. 1c. Describe the methods of producing the double cloth. 1d. Develop design, draft, peg-plan and cross section of double cloth on graph paper in: opening in two width, Tubular cloth, Self stitched (with Warp Tye, Weft Tye), Wadded, Centre stitch and Cut double cloth 1e. Justify loom equipments required to produce Double cloth	1.1 Double cloth structure, Double cloth designing and features of double cloth with end use of the fabric. 1.2 Principle of tying or stitching. 1.3 Construction of point paper design for Double cloth for the following: opening in two width, Tubular cloth, Self stitch, wadded, Centre stitch and Cut double cloth 1.4 Loom mechanism required for producing double cloth.
Unit– II Gauze and Leno Weave	2a. Differentiate between gauze, leno weaving and end use of gauze and leno fabrics. 2b. Explain the principle of gauze and leno weaving and leno fabric. 2c. Explain shed formation in leno weaving. 2d. Describe the shed formation with the doup heald mechanism. 2e. Describe the function of easer bar and shaker motion. 2f. Using thread diagram, draft and lifting plan to distinguish the following for gauze and leno weave. <ol style="list-style-type: none"> Simple gauze or leno weave. Counter leno for point draft. Cross over effect. Twill leno effect Net leno effect Russian cord. 	2.1 Gauze and leno weave and features of leno fabric. 2.2 Gauze and leno weaving 2.3 Loom mechanism required for leno weave. 2.4 Types of gauze and leno weave. <ol style="list-style-type: none"> Simple gauze or plain leno Counter leno for point draft Cross leno effect Twill leno effect Net Leno effect Russian cord

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit–III Damask and Brocade Fabrics	3a. Differentiate Damask and Brocade fabric. 3b. Justify end use of Damask and Brocade fabric. 3c. Develop the design for small motif of true Damask and ordinary one sided Damask. 3d. Explain loom equipment required to produce Damask fabric. 3e. Develop the design for small motif of Brocade. 3f. Explain the loom equipment required to produce Brocade.	3.1 True Damask structure. 3.2 Loom mechanism for damask fabric and end use of the fabric. 3.3 Construction of damask on point paper 3.4 Damask and brocade structure. 3.5 Loom mechanism required for brocade fabric. 3.6 Construction of small brocade motif.
Unit–IV Tapestry and Quilt Fabrics	4a. Differentiate between tapestry and quilt fabric and their end use 4b. Differentiate Warp and Weft tapestry structure with sketches 4c. Describe loom mechanism required to produce tapestry fabrics. 4d. Draw the design for following quilts. a) Loose back toilet quilts b) Fast back toilet quilts. 4e. Explain the loom mechanism required to produce quilt fabric.	4.1 Weft tapestry designing and its end use 4.2 Loom mechanism for tapestry fabric and end use of the fabric. 4.3 Construction of: • Loose back toilet quilts • Fast back toilet quilts 4.4 Loom mechanism for quilt fabric and its end use
Unit–V Jacquard Fabric Designing and Fabric Calculation	5a. Discuss the different sources from where the motif of jacquard designs. 5b. Explain the factors affecting on Jacquard design 5c. Draw/Prepare Jacquard design for a particular need from simple motif on point paper/computer with following steps: i. Selection of motif ii. Select size of motif according to ends and picks iii. Selection of proper count of design paper. iv. Enlarge the motif on a point paper. v. Marking of proper setting. vi. Selection of figuring weave vii. Selection of ground weaves. viii. Figure shedding if any ix. Proper binding points x. Perfect joining of figuring and ground weave.	5.1 Different sources for motif jacquard design: Nature, Historical Incidence, Geometrical Shape, Reproducing from earlier Design 5.2 Factor affecting on Jacquard design 5.3 Preparation of Jacquard designing from simple motif on point paper/computer.

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	5d. Describe the different arrangements of Jacquard design. <ol style="list-style-type: none"> Unit repeating designs Geometric arrangement Symmetrical arrangement Drop principle Sateen arrangement 5e. Interpret data with respect to fabric cover and density, warp cover and weft cover, cloth cover factor 5f. Establish relation with count, weave and sort of the fabric with formula. 5g. Analyze the given fabric sample, based on weave structure, draft and peg-plan to suggest the loom equipment required and end use of the fabric. Prepare double cloth sample for a given weave, warp and weft on a sample loom weaving machine.	5.4 Different arrangement of Jacquard designing. 5.5 Cloth cover 5.6 Relation with count, weave and sort of fabric

6. SUGGESTED SPECIFICATION TABLE WITH HOURS and MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Double Cloth	08	03	08	03	14
II	Gauze and Leno Weave	10	03	10	05	18
III	Damask and Brocade fabrics	04	01	04	02	07
IV	Tapestry and Quilt Fabric	06	02	04	04	10
V	Jacquard Fabric Designing and Fabric Calculation	14	03	10	08	21
Total		42	12	36	22	70

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised 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.

7. SUGGESTED LIST OF EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop abilities and skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire and demonstrate the course learning and programme outcomes. Following is the list of practical exercises for guidance.

Note: Here performance outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed and demonstrated appropriately, they would contribute to the development of demonstrated learning in behavioral terms in affective

domain. As a whole, the total approach towards acquisition of knowledge, skills, abilities and behavior and demonstration of the same would lead to the development of **Course Outcomes**. Thus over all development of **Programme Outcomes** (as given in a common list at the beginning of curriculum document for this programme) would be assured.

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical Exercises (Outcomes' in Psychomotor Domain)	Hrs. required
1	I	Draw Structural design for 'Double Cloth' on graph paper. a) Tubular cloth , Double cloth opening in two width. b) Self stitched Double cloth with b) Warp Tye ,Weft Tye ,Warp and Weft Tye a) Wadded double cloth. b) Centre stitch double cloth c) Cut double cloth	06
2	I	Analyse double cloth samples	02
3	I	Prepare double cloth sample on sample loom/weaving machine. a) Tubular Cloth b) Self Stitch double cloth	04
4	II	Prepare chart of shed formation in leno weaving.	02
5	II	Draw designs, draft and peg plan for 'Gauze and Leno Design' on graph paper. a) Simple gauze or plain leno b) Counter leno for point draft c) Cross leno effect, Twill leno effect, Net Leno effect d) Russian cord	12
6	II	Analyse of the leno fabric.	02
7	III	Prepare Damask design on graph paper with suitable Motif.	02
8	III	Prepare Brocade design on graph paper with suitable Motif.	02
9	IV	Prepare Warp and Weft Tapestry design on graph paper with suitable Motif.	04
10	IV	Prepare Quilt design on graph paper. a) Loose back toilet quilts b) Fast back toilet quilts	04
11	V	Develop Jacquard design on point paper/computer.	12
12	V	Prepare small motif showing the arrangement of Jacquard designing.	02
13	VI	Calculate Warp Cover, Weft Cover and Fabric Cover of the given sample, Possible maximum EPI and PPI for particular weave.	02
Total			56

8. SUGGESTED LIST OF 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.

- i. Collection of various Textile fabric samples from market.
- ii. Visit to the design development studio of weaving mill.
- iii. Demonstration of Leno doup.
- iv. Prepare sample on sample loom
- v. Preparation of charts for quality particulars and end use of fabric

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

- i. Show video films/photographs/animations for different fabric manufacturing processes.
- ii. Arrange visit to relevant industries.
- iii. Expert lectures by textile engineers associated with production of special fabrics.

10. SUGGESTED LEARNING RESOURCES

A) List of Books

S. No.	Title of Book	Author	Publication
1.	Elementary Textile Design and Colour	William Wattson	Longmans Green and co., London
2.	Advance Textile Design	William Wattson	Longmans Green and o.,1955, London
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	Ernest Benn Limited, Boutverie House, 154 Fleet Street, London
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 with Broad Specifications

- i. Textile Laboratory – Sample loom

C) List of Software/Learning Websites

- i. www.handweaving.net
- ii. <http://www.cs.arizona.edu/patterns/weaving/articles770.html>
- iii. www.colourmatters.com
- iv. <http://www.mariaclaudiacortes.com/colors/Colors.html>
- v. <http://www.worqx.com/resource-recommends.htm>
- vi. www.micro.magnet.fsu.edu

- vii. www.textilearts.net/directory/techniques/colour
- viii. www.members.cox.net/mrsparker2
- ix. www.teonline.com
- x. www.bharatextile.com/directory
- xi. www.en.wikipedia.org/wiki/Textile_design
- xii. www.fibre2fashion.com
- xiii. www.designdiary.nic.in
- xiv. www.handlooms.com
- xv. <http://mytextilenotes.blogspot.com/>
- xvi. <http://www.textileassociationindia.org/>
- xvii. <http://textilelearner.blogspot.in>
- xviii. <http://www.designdiary.nic.in/>

11. 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. D.V. Bihola** Lecturer in Textile Manufacturing, R.C Technical Institute, Ahmedabad
- **Prof. S.M.Zala**, Lecturer in Textile Manufacturing, Sir B.P.T.I, Bhavanagar.

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. C. K. Chugh**, Professor, Department of Mechanical Engineering
- **Dr. Joshua Earnest**, Professor, Department of Electrical and Electronics Engineering