GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Diploma

Branch: Textile Design

Course Code/ Subject Code:DI01C59011(Only for C to D Students)

Course Name / Subject Name: Fundamentals of Yarn and Fabric Technology

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	BSC-02

Prerequisite:	Basic information about different types of textile yarn and fabric
Rationale:	Textile engineering is the matter of dealing with the very delicate material like the fiber and yarn. Textile designer creates different designs and patterns on surface of the fabric. For different designs we need different fabric, and to produce the different types of fabric we need a different types of the yarn (Thread). So Textile designer should know the different technology, techniques as well as different material used for the yarn manufacturing and different types of yarn for fabric manufacturing process.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Identify various textile yarn and fabric on their origin.	R
02	Assign relevant carded and combed spinning machine sequences.	U
03	Understand the Weaving preparatory and weaving process.	U
04	Relate the developments in yarn& fabric manufacturing technology to current trends.	A

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Introduction to different typesofyarn and fabric.** 1.1 Definition of Yarn, Threads, Fabric and Garment 1.2 Types of textile yarn, threads and fabric 1.3 Sequence of machine for carded and combed yarn 1.4 Sequence of machine for conversion from fiber to Garment	05	15
2.	**Ginning and Blow Room** 2.1. Saw roller ginning machine: Explain construction, working, passage of material through machine and function of important parts in machine. 2.2. Opening and Cleaning machine: Explain construction, working, passage of material through machine and function of important parts in machine. (Hopper bale opener (HBO), Striker cleaner, Axi flow cleaner, 2/3 bladed beater, Porcupine beater, etc.) 2.3. Mixing machine: Explain construction, working, passage of material through machine and function of important parts in machine. (Auto mixer, Multi mixer, Hopper feeder, etc.) 2.4. Scutcher: Explain Construction, working, passage of material through machine and function of important parts in machine.	10	25
3.	**Lap to Yarn package** 3.1 Carding and Draw frame: Explain construction, working, passage of material through machine and function of importance parts in machine. 3.2 Speed frame and Ring frame: Explain construction and working, passage of material through machine and function of importance parts in machine. 3.3 Combing preparation and comber machine: Explain construction, working, passage of material through machine and function of importance parts in machine. 3.4 Developments in yarn manufacturing technology	10	25

4.	**Weaving preparatory:** 4.1 Winding machine: Explain construction, working, passage of material through machine and function of importance parts in machine. 4.2 Warping Machine (Direct and Sectional): Explain construction, working, passage of material through machine and function of importance parts in machine. 4.3 Sizing Machine: Explain construction, working, passage of material through machine and function of importance parts in machine.	10	15
5.	**Weaving** 5.1 Shuttle Loom: Explain construction, Working, Passage of material through machine and function of importance parts in machine. (Primary, Secondary, Auxiliary Loom motions) 5.2 Types of Shedding & Picking mechanisms 5.3 Shuttle less weaving: Air jet, Waterjet, Rapier, Projectile 5.4 Developments in fabric manufacturing technology	10	20
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
30	**40**	**20**	**10**	**-**	**-**

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:

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	Handbook on cotton spinning industry	B.Purushothama	Publisher: WPI Publishing; 1st edition (14 August 2015) ISBN-10 : 9385059017
2	Beginner's guide to Spinning	Hetty M wickers	Publisher: Butterworth & Co(Publishers) ltd, 1982 ISBN: 0-408-00573-4
3	A practical guide to Blow room and Carding: Vol 2 (Manual of textile technology)	Werner Klein	Publisher: Manchester: Textile institute 1999 ISBN-10: 1870812999 ISBN-13: 978-1870812999
4	A practical guide to Ring spinning	Werner Klein	Publisher: Manchester: Textile institute 1987, (Short staple spinning) (January 1, 1987) ISBN-10: 0900739940 ISBN-13: 978-0900739941
5	The technology of short staple	Werner Klein	Publisher: Manchester: Textile institute 1998 ISBN-10: 18708129880 ISBN-13: 978-18708129880
6	A handbook to cotton spinning	J E Holme, Christopher Parkinson	Publisher: Wentworth Press (26 August 2016) ISBN-10: 1362687510 ISBN-13: 978-1362687511
7	Weaving preparation Technology	N. Gokarneshan	Publisher: Abhishek Publication ISBN :9788182472471, 8182472474
8	Weaving: Machines, Mechanisms, Management	Dr. M. K. Talukdar	Publisher: Mahajan Publication ISBN-10: 8185401160 ISBN-13: 978-8185401166
9	Principle of weaving	Marks, R. and Robbinsons	Publisher- The Textile Institute Manchester ISBN:0900739258 -
10	Shuttle less loom	Vinscent	Publisher- The Textile Institute ISBN:0904095320-9780904095326

(b) Open source software and website:

1. https://nptel.ac.in/courses/
2. http://www.textileworld.com/
3. www.learningseed.com
4. http://www.teonline.com/knowledge-centre/
5. http://www.sitra.org.in
6. http://www.btraindia.com
7. www.nitratextile.org/
8. https://textilestudycenter.com/textile-books-free-donwload/
9. http://www.textileassociationindia.org/
10. http://textilelearner.blogspot.in/
11. https://textilestudycenter.com/
12. https://study.com/academy/topic/textile-fibers-fabrics.html
13. www.fibersource.com
14. https://www.fibre2fashion.com/
15. http://en.wikipedia.org/wiki/weaving
16. http://www.lakshmiautomatic.com/
17. www.staubli.com
18. www.sulzer.com/
19. www.rapierloom.in/rapier-looms.html

Suggested Course Practical List:

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1	Prepare a chart for the classification of Different Yarns, Threads and Fabric out of collected samples.	I	02
2	List the sequence of machinery for the Carded yarn, Combed yarn and conversion from fibre to garment.	I	03
3	Prepare a chart depicting construction and working of Saw roller Ginning machine.	II	02
4	Prepare a chart depicting construction and working for Blow room (Opening, Cleaning and Mixing machinery).	II	02
5	Prepare a chart depicting construction and working of Scutcher machine.	II	02
6	Prepare a chart depicting construction and working of Carding and Draw frame machine.	III	02
7	Prepare a chart depicting construction and working of Speed frame and Ring frame machine.	III	02
8	Prepare a chart depicting construction and working of sliver lap and comber machine.	III	02
9	Prepare a chart depicting construction and working of winding machine.	IV	02

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
10	Prepare a chart depicting construction and working of Direct and Sectional warping machine.	IV	02
11	Prepare a chart depicting construction and working of sizing machine.	IV	02
12	Prepare a chart depicting construction and working of Shuttle loom machine.	IV	02
13	Prepare a chart depicting motions of plain power loom.	V	02
14	Prepare a chart depicting construction and working of Projectile, Rapier, Air jet and Waterjet weaving machine.	V	03
	Total		**30**

List of Laboratory/Learning Resources Required:

S. No.	Equipment Name with Broad Specifications	PrO. No.
1	Fibre chart for natural and synthetic, and sequence of machine for different manufacturing processes.	1,2
2	Saw roller Ginning machine.	3
3	Blow room machinery	4,5
4	Carding and draw frame machine	6
5	Speed frame and Ring frame machine	7
6	Sliver lap and comber machine	8
7	Yarn winding and pirn winding machine	9
8	Direct warping and Sectional warping machine	10
9	Sizing machine	11
10	Wooden handloom and shuttle loom	12, 13
11	Projectile, Rapier, Airjet, Waterjet weaving machine	14

Suggested Project List:

a) **Introduction of types of Textile yarn and fabric:** Collect various samples of Yarn, threads and fabric and prepare chart.
b) Ginning and Blow Room: Make a small working machine model for the blow room machinery and calculate the production and efficiency for the machinery.
c) Lap to Yarn package: Make a small working machine model for Card, Draw frame, Speed frame, Lap former, Comber, and machine and calculate the production and efficiency for the machinery.
d) Weaving preparatory: Make a small working machine model for Yarn winding, Pirn winding, direct warping, Sectional warping, sizing machine.
e) Weaving: Make a small working machine model for Hand loom, Shuttle loom, Air jet, and Waterjet, Rapier, Rapier and Projectile machine and calculate the production and efficiency for the machinery.

Suggested Activities for Students:

a) Collect the different yarn, threads& fabric and prepare a chart.
b) Explore library/internet for production technologies being used for production of different yarn, threads& fabric and make a report.
c) Visit to spinning & weaving mill and prepare the report for the same with sketches.
d) Visit Handloom (Khadi) production unit and prepare the report with sample.
e) Arrange seminar, Brain storming session and discussion forum on different topics.
f) Invite expert from industry, research institute and from market for expert talk.

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