GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering
Level: Diploma
Branch: Textile Manufacturing Technology
Course / Subject Code: DI01C29031(Only for C to D Students)
Course / Subject Name: Weaving Technology-I

w. e. f. Academic Year:	2024-25
Semester:	1st
Category of the Course:	Professional Core Courses

Prerequisite:	Basic knowledge of winding, pin winding and weaving process.
Rationale:	Fabric is the end product of textile manufacturing. Yarn must undergo preparatory processes before fabric production begins. These preparatory steps are crucial for successful fabric formation. Weaving, one of the primary methods for fabric production, has seen significant advancements in loom technology, progressing from non-automatic to modern shuttle-less looms. Techniques for manufacturing warp and weft yarns to create diverse woven structures have also developed extensively. This course provides students with comprehensive knowledge of the weaving process, including power looms.

Course Outcome:
After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
CO-1	Make use of winding machine for producing yarn packages as per requirements.	A
CO-2	Make use of pin winding machine for producing pin as per requirements.	A
CO-3	Make use of plain power loom for fabric formation as per specifications.	A
CO-4	Explain the process of recycling weaving waste.	U

**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)	
2	0	2	3	70	30	20	30	150

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

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Cone/Cheese Winding** 1.1 Sequence of weaving preparatory process-Objects of winding machine-Classification of winding machine. 1.2 Passage of yarn through winding machine. 1.3 Yarn clearing device, Tensioning device, Anti- patterning device. 1.4 Yarn take-up-Angle of wind-Type of wind. 1.5 Methods of package driving, Methods of yarn traversing. 1.6 Features of Automatic winding machine 1.7 Defects of winding package	07	25%
2.	**Pirn winding** 2.1 Objects of Pirn winding 2.2 Features of Automatic Pirn winding machine 2.3 Package fault in pirn winding	03	10%
3.	**Basic of Weaving** 3.1 Classification of loom. 3.2 Primary motion of loom. 3.2.1 Shedding motion- different shedding mechanism, types of sheds, tappet shedding motion with timing and settings, early and late shedding, Heald staggering, dwell period. 3.2.2 Picking and checking motion - different types of picking mechanism, over pick and under mechanism with timing and settings, picking accessories, Shuttle box. 3.2.3 Beating up motion - Beat up motion with timing and settings, Different types of reeds and Heald shaft, Reed count and Heald count. 3.3 Secondary motion of loom. 3.3.1 Objects of take-up 3.3.2 Different types of take-up motion 3.3.3 Object of let-off 3.3.4 Different types of let-off motion 3.4 Auxiliary motions- Objects and type of: 3.4.1. Loose reed warp protector motion, 3.4.2. Fast reed Warp protector motion, 3.4.3. weft stop motion, 3.4.4. Temples, 3.4.5. Brake	14	50%

	3.5 Cloth defects their causes and remedies 3.6 Production calculations of plain power loom.		
4.	**Recycling of Weaving Waste and Noise Pollution in Weaving** 4.1 Types of waste in textile 4.1.1. Pre-consumer waste & 4.1.2. Post-consumer waste 4.2 Recycling of weaving waste 4.3 Impact of noise pollution. 4.4 Methods to handle the noise level in textile industries.	06	15%
	Total	**30**	**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	**30**	**30**	**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:

1. Weaving machine,material & management, Ajgaonakar D.B. & Talukdar, Mahajan Publisher Private Limited. Ahmedabad.1998. ISBN:81-85401-16-0
2. Weaving: conversionof yarn to fabric, Lord P.R. & Mohamed M.H., Merrow Publishing Limited, England, 1992ISBN:0-900 -54178-4
3. Fundamentals of Yarn Winding, Korrane Milind, Woodhead Publication India PVT Ltd., New Delhi, 2013, ISBN: 978-93-80308-38-8
4. Weaving PreparationTechnology, Gokarneshan N., Abhishek Publications, Chandigarh, ISBN: 978-81-8247-247-1
5. Principle of Weaving, Marks & Robinson, The Textile Institute, Manchester, England,1976, ISBN:0-900739258
6. The mechanisms ofWeaving, Thomas W. Fox, Textile Book Service, New Jersey, 1992.
7. Woven Textile, Gandhi K. L., The Textile Institutes, New Delhi, 2012, ISBN 978-1-84569-930-7

(b) Open-source software and website:

1. https://nptel.ac.in/courses/116/102/116102005/
2. https://saurer.com/en/products/machines/winding/autoconer
3. https://textilevaluechain.in/in-depth-analysis/articles/textile-articles/noise-pollution- and-its-control-in-a-weaving-plant/
4. https://textilelearner.net/shedding-mechanism-in-weaving/
5. https://www.youtube.com/watch?v=0w1zcMflibE
6. https://www.youtube.com/watch?v=7eWA7IN0_U4
7. https://www.youtube.com/watch?v=fYa6hyCXunQ
8. https://www.youtube.com/watch?v=0w1zcMflibE
9. https://www.youtube.com/watch?v=g5_wRrBaGGY
10. https://indiantextilejournal.com/articles/FAdetails.asp?id=5955

Suggested Course Practical List:

1. Demonstrate the passage of yarn through winding machine.
2. Use various types of yarn tensioner.
3. Use various types of yarn traversing mechanism.
4. Use yarn joining methods to join yarn ends on winding machine.
5. Demonstrate the passage of yarn through pirn winding machine.
6. Demonstrate the passage of yarn through plain power loom.
7. Use tappet shedding mechanism for shed formation.
8. Use picking mechanism for inserting the weft yarn.
9. Use beat up mechanism to beat the weft yarn up to fell of the cloth.
10. Use let off mechanism to maintain yarn tension.
11. Demonstrate five wheels take up mechanism to maintain pick density.
12. Demonstrate seven wheels take up mechanism to maintain pick density.
13. Demonstrate side weft fork mechanism to avoid fabric defects.
14. Demonstrate warp stop mechanism to avoid fabric defects.

List of Laboratory/Learning Resources Required:

No.	Equipment Name with Broad Specifications
1	Winding Machine with speed of 600-800 m/min with grooved drum, electronic yarn clearer and splicer or knotter.
2	Automatic Pirn Winding Machine with speed of 600-800 RPM withbunching, traversing, and advancing mechanism.

3	Plain power loom with speed up to 120 RPM, negative tappet shedding using eight (8) Heald shafts, (7) seven-wheel take-up motion, positive let-off motion, mechanical serrated bar warp stop, weft stop, temple, brake, and warp protector mechanism.

Suggested Project List:

a) Winding: Prepare the report of different winding machines with their specifications.
b) Pirn Winding: Prepare the report of pirn machines with their specifications.
c) Weaving: Prepare the report of different weaving machines with their specifications.
d) Loom-Primary Motions: Prepare the report of different of primary mechanism of plain power loom by writing features of each component.
e) Loom-Secondary Motions: Prepare the report of different of secondary mechanism ofplain power loom by writing features of each component.
f) Loom-Auxiliary Motions: Prepare the report of different of auxiliary mechanism of plain power loom by writing features of each component.
g) Package defect: Prepare a portfolio of samples of different types of package defects.
h) Fabric defects: Prepare a portfolio of samples of different types of fabric defects.
i) Recycling of weaving waste and Noise pollution: Prepare the report of different weaving waste, methods for reducing noise pollution in loom shed.

Suggested Activities for Students:

a) Prepare report on different manufacturers' winding machine based on industrial visit.
b) Prepare report on pirn winding machine based on industrial visit.
c) Prepare report on weaving machine based on industrial visit.
d) Give seminar on recent technological advancement of winding machine.

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