

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)

WEAVING TECHNOLOGY I

SUBJECT CODE: 2142902

B.E. SEMESTER IV

Type of course: Engineering

Prerequisite: Zeal to learn the subject

Rationale: Yarn preparation processes are considered to be the most important processes for the performance of subsequent fabric formation process.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
				PA	ALA	ESE	OEP			
4	0	4	8	70	20	10	20	10	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	<p>Winding</p> <p>(i) Warp Winders: Central idea of development of Winding Machines; Fundamentals of Conventional Winders; Precision Winding; Tension Control; Traversing Techniques; Slub Catchers and Tensioners; Study of Automatic Winders like Auto-coner and other recently developed machines; Auto-Doffing; Winding faults & remedies; Package characteristics. Calculations related to production, efficiency etc.</p> <p>(ii) Pirn Winders: Need for Pirn Winding; Brief outline of non-automatic pirn winders; Study of automatic pirn winders; Modern developments in Pirn winding; yarn traversing system; standard winding parameters; Calculations related to production, efficiency etc.</p>	16	33 %
2.	<p>Warping</p> <p>Beam and Sectional Warping Process & Mechanisms, Different types of Creels, Reeds, Leasing Systems; High Speed Warping; Planning for Colored Warp; Adjustment of Machine parameters and machine conditions/maintenance for minimizing end breaks for various materials and counts; Management Information System; Production assessment to improve the Productivity; Calculations related to production, efficiency etc. Latest developments in Warping Machines.</p>	12	25 %
3.	<p>Sizing</p> <p>Objectives; Features of Two cylinders sizing; Multi cylinder sizing; Hot air Sizing Machine and Single end sizing Machine; Types of</p>	12	25 %

	Creels; Systems in Sizing Machines: Temperature Control – Size Level Control – Moisture Control – Stretch Control; Method to increase Weavability; Preparation of size Mixtures for various Yarn & Cloth requirements, Modern controls. Beam pressing devices: mechanical – pneumatic – hydraulic. Management Information System; Calculations related to production, efficiency etc.; Latest developments in Sizing Machines.		
4.	Methods of Drawing – in Through Healds & Reeds, Working principles of Knotting Machines for Warp; Latest developments	8	17 %

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
15	23	22	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom’s 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

Reference Books:

1. SYDEL, Textile, Warp Sizing
2. BTRA, Winding
3. BTRA, Warping & Sizing
4. BTRA, Loom Shade
5. BTRA, Weaving Productivity Standards & Methods of Evaluation
6. BTRA, Preventive Maintenance of Sizing -Machines
7. HOUGUMN, Cotton Warp Sizing Hand Book.
8. Principles of weaving by Marks & Robinson, Textile Institute
9. Yarn Preparation Vol. I by Sengupta
10. Prof. P. A Khatwani and Prof. A. K Gupta, Weaving-I, Shuttle Looms, NCUTE Pilot Programme, Indian Institute of Technology, New Delhi, 2002.

Course Outcome:

After learning the course the students should be able to

1. Know the basic requirements for formation of Wound Packages/ Pirns suitable for subsequent processes.
2. Know the basic requirements for formation of Warpers Beams suitable for Sizing process.
3. Know the basic requirements for formation of Sized Beams suitable for subsequent processes like Drawing-in, Denting and weaving.
4. Should be able to calculate production and efficiency of various Machines.

List of Practical:

1. To study the layout of weaving Lab.
2. To study the passage of yarn through P. S Metler Winding Machine.
3. To study the creel package holder (Cone/ Cheese), Groove drum of winder.
4. To study different types of yarn clearers and Tensioners used on Machine.
5. To study different types of yarn clearers and Tensioners used on latest winding machine.
6. To study drive to drum shaft, speedometer and Rocking shaft.

7. Calculation of speed and surface speed of different parts of winding machine.
8. To study Thread stop motion on winding machine.
9. To study the operation of thread stop motion for different counts and material.
10. To study anti patterning device on P.S Metler winding machine.
11. To find the production of Winding machine.
12. To study the features of latest winding machine.
13. To study yarn path through pirn winder.
14. To study different parts of pirn winding machine.
15. To study gearing diagram of pirn winding machine.
16. To study Traverse Mechanism on Pirn winding machine.
17. To study the traverse advancement on pirn winding machine.
18. To study diameter control mechanism on the machine.
19. Calculate speed and surface speed of Pirn winding machine.
20. Calculate the production of pirn winding machine.
21. To study the yarn path through Direct warping machine.
22. To study the yarn path through Sectional warping machine
23. To study the gearing diagram of Direct and Sectional warping machine.
24. To study the features of latest warping machine.
25. Calculation for warping machine.
26. To study yarn path through sizing machine.
27. To study different parts of sizing machine.
28. To study gearing diagram arrangement of sizing machine.
29. Calculate speed and surface speed of sizing machine.
30. To study sizing machine used for cotton, blend and synthetic material.
31. Preparation of size recipe for different material.

Open Ended Problems/Design Oriented Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Develop a tensioner of Winding Machine.
2. Develop a magazine creel of Warping Machine.
3. Develop a size box of Sizing Machine.

Major Equipments:

Winding Machine
 Pirn Winding
 Sizing Machine
 Warping Machine

List of Open Source Software/learning website: <http://nptel.iitm.ac.in>, World Wide Web, Google Search Engine etc.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate

chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.