

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29) SUBJECT NAME: MODERN WEAVING TECHNOLOGY SUBJECT CODE: 2172902 B.E. 7th SEMESTER

Type of course: Engineering

Prerequisite: Students should have thorough knowledge of shuttle weaving machines.

Rationale: This course cover preparatory processes and different types of shuttleless weaving machines.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
			PA		ALA	ESE	OEP			
4	0	2	6	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; AL-Active learning assignments; OEP-Open Ended problem

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Need for modern weaving machines in India. Problems with shuttle looms. Techno economics of Modern Weaving machine installation. Introduction to shuttleless loom. Pre-requisites for installation.	4	7.14
2.	Yarn parameters necessary for shuttleless weaving. Requirements from preparatory (winding, warping & sizing) for shuttleless weaving.	6	10.71
3.	Special needs for preparing weft yarn for shuttleless loom. Comparative weft velocities of different looms. Need for accumulators, storing and measuring devices & types of accumulators.	4	7.14
4.	Sulzer loom introduction, projectile & its movements. Torsion bar picking. Projectile & picker shoe velocity & acceleration & forces. Action of weft tensioner, returner & expeller. Preparation for picking, shedding & various attachments of shedding.	10	17.86
5.	Air Jet: Yarn insertion Systems, Principles of Air jet filling insertion, performance of yarns in air jet insertion, Functional characteristics of modern air jet weaving machines.	10	17.86
6.	Requirements of water for water jet loom. Weft insertion on water jet loom. Picking mechanism, Features of modern water jet loom advantages & problems. Weft waste on jet loom.	8	14.29
7.	Rapier loom: Tip & loop transfer, Rapier heads design, study of weft velocity on rapier. Functional description of flexible rapier weaving machine.	6	10.71

8.	Brief study of multiphase principles along with problems. Introduction to triaxial weaving.	2	3.57
9.	Selvedges: Need, various selvedges used on shuttleless loom.	3	5.36
10.	Recent Developments.	3	5.36

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	20	20	5	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create 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. Weaving: Machines, Mechanisms & Management Talukdar, Sriramulu & Ajgaonkar
2. Handbook of Weaving Sabit Adanur
3. Weaving: Technology and Operations A.Ormerod & W.S.
4. Shuttleless Looms, P A Khatwani & A K Gupta NCUTE Publications.
5. Weaving: Conversion of Yarn to Fabric - Lord & Mohammed
6. Principles of Weaving - Marks & Robinson

Course Outcome:

After learning the course the students should be able to:

1. Explain mechanism and design of Shuttleless looms.
2. Calculate the production of fabric.
3. Explain various latest weaving machines.
4. Manufacture fabric by using weaving machines depending upon the requirements.

List of Experiments:

(A) AIRJET LOOM

1. Study of warp yarn passage through loom.
2. Study of different parts of loom.
3. Study of Shedding motion.
4. Study of Picking mechanism.
5. Study of Beat-up motion.
6. Study of let-off mechanism.
7. Study of Cloth take-up mechanism.
8. Study of air supply system to the loom.

9. Study of Stop motions on loom.
10. Study of Weft accumulator.

(B) RAPIER LOOM

1. Study of warp yarn passage through loom.
2. Study of different parts of loom.
3. Study of Shedding motion.
4. Study of Picking mechanism.
5. Study of Beat-up motion.
6. Study of let-off mechanism.
7. Study of Cloth take-up mechanism.

(C) SULZER PROJECTILE LOOM

1. Study of warp yarn passage through loom.
2. Study of different parts of loom.
3. Study of Shedding motion.
4. Study of Picking mechanism.
5. Study of Beat-up motion.
6. Study of let-off mechanism.
7. Study of Cloth take-up mechanism.

(D) Calculations pertaining to above looms.

(E) Fabric formation on above looms.

Design based Problems (DP)/Open Ended Problem: 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 any one mechanism of rapier loom.
2. Develop any one mechanism of airjet loom.
3. Develop any one mechanism of projectile loom.

Major Equipment:

Rapier Loom
Airjet Loom
Projectile Loom
Waterjet Loom

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.