



SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and
Technology
Bachelor of Engineering



B E IV Textile Technology: Semester –VII

Subject Name: MODERN WEAVING TECHNOLOGY

Subject Code: BTTT14701

Type of course: BSC/ESC/HSM/PCC/PEC/OEC/MD Professional Elective IV

Prerequisite (if any): Students should have knowledge of basics of textile and preparatory processes for warp and weft yarns meant for weaving.

List of Courses where this course will be prerequisite: Courses related to Textile Wet Processes.

Rationale: Shuttleless weaving systems are replacing old type shuttle looms at a very fast rate. Students of Textile Technology are supposed to have knowledge and skill regarding Shuttleless Looms and their principles of working to produce good quality of fabrics.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	2	4	60	25	15	30	20	150

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

BSC: basic science course /ESC: Engineering Science Course /HSM: Humanities and management /PCC: Professional Core course /PEC: professional Elective course /OEC: Open Elective course/ MD: mandatory non-credit course



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Content:

Sr. No.	Content	Total Hrs
1	<p>Drawbacks of a shuttle loom, Basic principle of the shuttle less system, Functional principles of shuttle less weft insertion</p> <p>Projectile loom: Partially guided solid carrier i.e. projectile or gripper, Types of projectiles and projectile guides, torsion picking mechanism, projectile brake system, cam beat-up mechanism, cycle of operation in projectile loom, Typical velocity and acceleration profiles of picker shoe along with a velocity profile of gripper</p> <p>Rapier Loom: Fully guided solid carrier i.e. rapier system of weft insertion – Flexible and Rigid system and their cycle of operation, Rapier heads design, study of weft velocity on rapier. Functional description of flexible rapier weaving machine.</p>	15
2	<p>Basic concepts of fluid carrier i.e. Air Jet and Water Jet</p> <p>Air Jet: Yarn insertion Systems, Principles of Air Jet filling insertion, Types of nozzles and guides, Performance of yarns in air jet insertion, Functional characteristics of modern Air Jet weaving machines.</p> <p>Water Jet: 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.</p>	15
3	<p>Multi Phase Looms: Introduction, classification. Principles of shedding, picking and beat-up mechanisms. Features of Multi Phase Looms.</p>	5
4	<p>Other Fabric Formations Techniques:</p> <p>Principle, Structure and Application of Narrow Weaving, Circular Weaving, Triaxial Weaving, Braiding and 3D Woven Fabric.</p>	10

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	Calculation of production and efficiency of all the shuttleless looms.	
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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	25	5	0	0

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:

Sr no	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Principles of weaving	Marks A.T.C. & Robinson	The Textile Institute	1976	

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2	Weaving: machines, mechanisms, management	Prof. D. B. Ajgaonkar, Prof. Sriramalu & Prof. M. K. Talukdar	Mahajan Publishers Private Ltd., Ahmedabad	1998	
3	Principles of Woven Fabric Manufacturing	Abhijit Majumdar	CRC Press ISBN-13 978-1498759113	2016	
4	Handbook of Weaving	Adanur Sabit	CRC Press 9780429135828	2020	
5	Weaving Technology and Operations	A Ormerod and W S Sondhelm.	The Textile Institute, ISBN-13: 978-1870812764	1998	

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6	Textile Mathematics:	J. E. Booth	The Textile Institute	1977	(Volume III)
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Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand basic concepts and process of weaving.	15
CO-2	Explain various motions of Projectile and Rapier shuttleless looms.	25
CO-3	Explain various motions of Air Jet, Water Jet and Multi Phase shuttleless looms.	35
CO-4	Understand working of Narrow Weaving, Circular Weaving, Triaxial Weaving, Braiding and 3D Woven Fabric. Explore areas of application of these varieties of fabrics.	20
CO-5	Calculate the production and efficiency of weaving process.	5

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Mapping with POs:

	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
CO-1	3	2	0	1	0	0	1	1	1	1	1	1	1	3	3
CO-2	3	2	0	1	0	0	1	1	2	2	3	3	3	3	3
CO-3	3	2	0	1	0	0	1	1	2	2	3	3	3	3	3
CO-4	3	2	1	2	1	1	1	1	2	2	3	3	3	3	3
CO-5	3	2	2	2	1	1	1	1	2	2	3	3	3	3	3
Ration ale*	3	2	1	2	1	1	1	1	2	2	3	3	3	3	3

Rationale*: Since it covers the details of all the important processes of shuttleless fabrics formation, it is matching reasonably good with almost all the POs as well as PSOs.

List of Open learning website: <https://nptel.ac.in>, brochures and manuals of machine manufacturer, World Wide Web, Google Search Engine etc.

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FOR LAB SESSIONS:

List of Experiments:

1. Study of different selvedge formation on shuttleless loom.
2. Study of weft measuring device of shuttleless loom.
3. Study of E-shedding in shuttleless weaving.
4. Study of Electronic let off and Electronic take up system in shuttleless weaving.
5. Study of cam beat up mechanism of shuttleless loom.
6. Study of different parts and passage of warp and weft yarn through Air Jet loom.
7. Study of Shedding and Picking mechanism of Air Jet loom.
8. Study of let-off and cloth take-up mechanism of Air Jet loom.
9. Study of air supply system of Air Jet loom.
10. Study of different parts and passage of warp and weft yarn through Rapier loom.
11. Study of Shedding, Picking and Beat-up mechanisms of Rapier loom.
12. Study of let-off and cloth take-up mechanism of Rapier loom.
13. Study of different parts and passage of warp and weft yarn through Projectile loom.
14. Study of Shedding, Picking and Beat-up mechanisms of Projectile loom.
15. Study of let-off and cloth take-up mechanism of Projectile loom.
16. Study of Water Jet picking system and their settings.
17. Calculations pertaining to shuttleless looms.
18. Study of Production of braided cords/ropes.
19. Study of Production of narrow and circular woven fabric.
20. Report of the Industrial visit.

Major Equipment Needed: Shuttleless looms

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