



SARVAJANIK UNIVERSITY
Sarvajani College of Engineering and
Technology
Bachelor of Engineering



B E III Textile Technology: Semester – VI

Subject Name: Principles of Textile Processes

Subject Code: BTTT14601

Type of course: Professional Elective Course II

Prerequisite (if any):

Student should have knowledge of entire spinning and weaving process as well as construction and working of spinning and weaving machines.

List of Courses where this course will be prerequisite:

All spinning and weaving subjects dealing with production, performance and quality of Textile products.

Rationale:

Basic knowledge of various principles used in design and construction of spinning and weaving machines, help achieving desired quality of yarn and fabrics and optimize process.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
3	0	0	3	60	25	15	-	-	100

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

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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

w.e.f. AY 2022-23



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Content:

Sr. No.	Content	Total Hrs
	SPINNING	
1	Evaluation of Blow-Room Cleaning efficiency: Factors affecting cleaning efficiency, optimization, Evaluation of Blow-Room Cleaning efficiency	3
2	Theory of cylinder load and transfer efficiency on card: calculation of Transfer rate, Factors affecting cylinder loading, measurement & Derivation of cylinder loading	3
3	Fiber configuration: Fibre configuration in card sliver & drawn sliver, Hook formation theory, Technique to investigate fibre configuration, fiber straightening and hook removal theory	3
4	Drafting Force: Factors affecting drafting force, derivation of equation for drafting force, Numerical	3
5	Foster's theory of perfecting drafting	1
6	Fractionation efficiency of Comber: importance, Derivation, Significance of fibre acceleration behind top comb & its influence on short fibre removal & long fibre loss	3
7	Equation for computing roving content on speed frame	1
8	Ballooning theory: Theory of circularly Polarized standing waves, Equation for Traveller speed, Equation of Yarn Tension at any radius in the balloon, spinning Tension: Balloon Tension, Winding Tension	4
9	Optimization of yarn content on Ring bobbin: Factors affecting, Features of DPM Cam	2
	YARN PREPARATORY & WEAVING	
10	Sizing – Control of size pick up % ,significance, calculation & factors affecting it stretch control, significance, calculation & factors affecting it & Norms	3

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11	Study interrelationship between shedding and beating	2
12	Sley kinematics - Derivation of equations for sley velocity & acceleration, force, torque and power required to drive the sley.	3
13	Picking- Velocity of shuttle and factors affecting it, relationship between shuttle velocity, loom speed and weft insertion rate, acceleration of shuttle during picking, factors leading to uniform acceleration, Alacrity of picking mechanism, Power required for picking.	5
14	Shuttle checking and theory of retardation	2
15	Design of negative let off motion and its limitations	1
16	Air jet loom – theory of weft propulsion , velocity and acceleration of pick ,tension profile of weft yarn, air index	2
17	Projectile loom - Torsion rod picking and its mechanics, velocity and acceleration of picker and projectile. Calculation of energy stored in torsion rod of a gripper propulsion system,	2
18	Rapier loom- displacement, velocity and acceleration of rapier	2
		45

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	10	5	10	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.

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Reference Books:

Sr. No	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Technology of Carding,	R. Chattopadhyay	NCUTE		
2	Yarn Production Theoretical Aspects	Grossberg	The Textile Institute- CRC press ISBN - 978-1870372039	1999	
3	Principles of Weaving	R. Marks and A.T.C Robinson	Textile institute , Manchester ISBN - 0-900-739797	1986	
4	Weaving: Conversion of Yarn to Fabric	P.R.Lord and M.H. Mohamed	Merrow pubg.Co England ISBN - 0-900-54178-4	1988	
5	Mechanism of Weaving	Fox Thomas W	Universal pubg.co, Mumbai ISBN- 81-85027-00-5	1993	



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6.	Weaving: Machines Mechanisms Management	Talukdar, M.K. Sriramulu P.K. Ajgaonkar, D.B.	Mahajan Publisher pvt ltd.Ahmedabad ISBN - 81-85401-16-0	1998	
7	Hand Book of Weaving	Adanur, Sabit	CRC Press,USA	2000	
8	Textile Mechanisms in Spinning and Weaving Machines	Nagarajan Ganapathy	Woodhead Pub.Ltd, New Delhi ISBN - 978-93-580308-45-6	2015	
9	Weaving: Technology & Operations	Allan Ormerod	CRC Press ISBN - 978-1870812764	1998	
10	Principles of Fabric Formation	Banerjee Prabir Kumar	CRC Press,USA ISBN – 9781138837690 9780367268435	2017 2019	
11	Principles of Woven Fabric Manufacturing	Abhijeet Majumdar	CRC Press- ISBN - 9780367574192	2020	
12	Mechanics and Calculations of Textile Machinery	Gokarneshan N	Woodhead Pub.Ltd ISBN - 978-08-570-9104-8	2013	

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Course Outcomes: After learning the course the students should be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Calculate & optimize blow room cleaning efficiency	7
CO-2	Calculate transfer efficiency & reduced load on card cylinder and calculate Drafting force & understand perfect drafting	24
CO-3	Compute Fractionating efficiency of comber & roving content on speed frame	9
CO-4	Derive balloon tension and winding tension, & optimize yarn content on ring bobbin also understand design of DPM Cam	13
CO-5	Understand importance of size pick up and stretch control at sizing and its calculation	7
CO-6	Analyse & study Interrelationship between various mechanisms of power loom: ,shuttle picking, acceleration & retardation theory, Power for picking, sley kinematics sley velocity and acceleration, Limitations of let off motion	28
CO-7	Understand picking mechanism on shuttleless looms: Projectile, Rapier and Air jet and study velocity and acceleration of profile weft on these looms.	12

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO-1	2	3	1	3	1	1	2	2	1	2	1	1	3	3	3
CO-2	2	3	1	3	1	1	2	2	1	2	1	1	3	3	3

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CO-3	2	3	1	3	1	1	2	2	1	2	1	1	3	3	3
CO-4	2	3	1	3	1	1	2	2	1	2	2	1	3	3	3
CO-5	3	3	3	2	2	0	1	2	1	1	2	2	3	3	1
CO-6	3	3	2	3	3	0	0	1	1	1	2	2	3	3	2
CO-7	3	3	2	3	3	0	0	1	0	1	2	3	3	3	2
Rationale*	3	3	2	3	3	0	1	2	1	1	2	2	3	3	2

Rationale*: Principles used in design and construction of spinning and weaving machines help achieving desired quality of yarn and fabrics and optimize Textile process. The study of the subject leads to achievement of various PO.

List of Open learning website: NPTEL, Swayam portal

List of Open Source Software: : <https://nptel.ac.in> , Google or any search Engine

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