



SARVAJANIK UNIVERSITY
Sarvajnik College of Engineering and
Technology
Bachelor of Engineering



B E III Textile Technology: Semester – VI

Subject Name: Yarn Structure and Fabric Geometry

Subject Code: BTTT13602

Type of course: Professional Core Course

Prerequisite (if any): Basic Knowledge of yarn and fabric manufacturing process.

List of Courses where this course will be prerequisite: Nil

Rationale: The structural analysis of yarn properties and fabric geometry is very essential to develop abilities to understand structure – property relationship & to engineer the fabrics of required properties suitable for specific end uses.

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

311

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
1	YARN STRUCTURE Non ring spun staple yarns – Fundamental structural features of yarn – Structurally related performance of yarns	3
2	TWIST IN YARNS Definition of twist – Basic geometry of twisted yarns – Idealized helical yarn structure – Yarn diameter & Density -Yarn count & twist factor - Twist contraction – Contraction & Retraction factor – Packing of fibres in yarn – Idealized packing – Open-packing – Close packing- Deviation from Ideal forms – Concentrating factors – Disturbing factors – Schwarz Constant – Specific volume of yarns – Hamilton method -	10
3	MIGRATION Definition : Migration, Ideal Migration – observation of the paths of individual fibres, Parameters of Migration – Analysis by Correlogram, Experimental work of Morton & his Associates, Differential Migration – Calculations based on the above	10
4	Fabric density and specific volume.	01
5	Porosity, Permeability and all the equations related to fabric porosity	03
6	FABRIC COVER: fractional coverage, warp and weft cover factor, Actual fractional coverage, relationship between two measures of cover, SDF in different system, , condition for equal fractional coverage, maximum cover, Different Equations for fabric cover, Numericals	06
7	CRIMP: Definition, equation, effect of finishing process, crimp interchange, Effects of application of tensile load to a fabric.	04
8	FABRIC WEIGHT : equations for fabric weigh in different systems, weight factor, Numericals	03
9	GEOMETRY OF PLAIN WOVEN FABRIC: Geometrical model ,Pierce's equation for general case and all special cases, Numericals	05

312

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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	10	15	7	10	8

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.	Structural mechanics of Fibres, Yarns & Fabrics	Hearle J.W.S., Grosberg P & Backer S.	Wiley Interscience, New York,	1969.	
2	Textile Yarns	Goswami B C Martindale J G and Scardino F	Wiley Interscience Publisher, New York	1995	
3	Woven Cloth Construction	Marks & Robinson			
4	Watson’s Textile Design and Colour	Z. Grosicki			
5	Structural mechanics of fibres yarns and fabrics	Hearle J W S, Grosberg P and Backer	Wiley Interscience , New York	1969	

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6	Woven Textile Structure: Theory and Application,	B.K. Behera and P.K.Hari,	Woodhead Publishing series in Textile, U.K.		
7	Structure and Mechanics of Woven Fabrics,	Hu, Jinlian,	The Textile Institute,	2004	.

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

Sr. No.	CO statement	Marks % weightage
CO-1	Explain basics of structure and geometry for both spun and filament yarns.	7
CO-2	Establish relationship between structure and properties of yarn.	22
CO-3	Apply the yarn structure knowledge for understanding migration behavior during and after spinning.	22
CO-4	Calculate specific volume & porosity of fabric & can develop fabric for specific end uses	9
CO-5	Calculate Fabric Cover & use its knowledge in practice.	13
CO-6	Calculate Fabric weight ,crimp & understand its importance .Also understand behaviour of fabric on application of tensile load	16
CO-7	Understand Geometrical model of fabric & its importance in fabric engineering	11

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

Rationale* :

The knowledge of yarn structure, migrational behaviour and fabric geometry leads to the achievement of the various PO.

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

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