



# GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Bachelor of Engineering

Level: UG

Branch: Textile Technology

Subject Code : BE03029031

Course / Subject Name : Fabric Manufacturing Techniques - I

w. e. f. Academic Year:	2024-25
Semester:	3
Category of the Course:	PCC

<b>Prerequisite:</b>	Basic knowledge of science subjects like physics, chemistry and mathematics.
<b>Rationale:</b>	Fabric is final end product of mainline textile activity. The yarn is required to pass through preparatory processes before actual fabric making starts. So preparatory is very significant for the success of fabric formation process.

### Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Understand the objectives, process & basics functions of winding process.	R,U
02	Apply technology of winding to develop suitable packages.	U,A,E,C
03	Analyse the fundamental difference in various winding systems.	U,A,E
04	Identify and analyze package faults & their causes of winding process.	U,A,E
05	Calculate the production and efficiency of winding and pirn winding processes.	U,A,E

\*Revised Bloom's Taxonomy (RBT)

### Teaching and Examination Scheme:

Teaching - Learning Scheme (in Hours per Semester)					Total Credits = TH/30	Assessment Pattern and Marks					Total Marks
L	T	P	PBL*	TH		Theory		Tutorial / Practical			
						ESE (E)	PA (M)	PA/ (I)	PBL (I)	ESE (V)	
45	0	30	45	120	04	70	30	20	30	50	200

Where L = Lecture, T= Tutorial, P= Practical, TW/SL = Term-Work / Self-Learning, TH = Total Hours, ESE = End-Semester Examination, PA = Progressive Assessment

### Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Brief idea about different ways of fabric formation. Classification of fabrics. Introduction of weaving process, sequence of warp and weft yarn preparation process for weaving, Introduction of knitting and its classification, Introduction to nonwoven process and its Classification	8	14



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2.	Objects and passage of material through winding machine, warping machine, two/multi cylinder sizing machine, Objects and passage of material through shuttle loom, airjet, water jet, rapier and projectile loom	9	19
3.	Winding: Objects of winding; Different bobbins (a) before winding; (b) after winding; Winding machines classification; Types of winders, Basic components of a winder; Different types of winding: parallel, random, precision, stepped precision; Package building, Winding parameters & their optimization;	8	19
4.	Winding: Yarn tension & tensioning devices; Yarn clearing, yarn faults, yarn clearing devices: Mechanical yarn clearers or Slub catchers- Fixed blade, Swinging blade type, Electronic yarn clearer- photo-electric detection, Capacitance detection, Concept of clearing curves and setting of electronic clearers, methods of yarn traversing & package drive; Yarn joining by knotting & Splicing; Package faults, remedies & Calculations related to production, efficiency etc.; Automatic winding machines.	12	29
5.	Weft Preparation: Methods of Weft Preparation; Object of Pirn Winding, Types of Pirn winding machines; Build of pirn; Drive, Traversing, advancing, Automatic pirn winder; Calculations related to production, efficiency etc.	8	19
<b>Total</b>		<b>45</b>	<b>100</b>

## Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
25	30	20	15	5	5

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

## References/Suggested Learning Resources:

### (a) Books:

1. Fundamentals of Yarn Winding, by Milind Koranne
2. Yarn Preparation Vol I & II, by R. Sengupta
3. An Introduction to Winding and Warping by M. K. Talukdar.
4. Handbook of Weaving, by Sabit Adanur
5. Modern Preparation & Weaving Machinery, by A. Ormerod
6. Weaving: Conversion of yarn to fabric, by Lord and Mohammed.



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## (b) Open source software and website:

1. <https://nptel.ac.in>
2. World Wide Web, Google Search Engine etc.

## Suggested Course Practical List:

1. Prepare chart of fabric formation and related processes.
2. Prepare a sketch and identify important parts of Autoconer Warp winding machine.
3. Prepare a sketch and identify important parts of Super speed Warping machine.
4. Prepare a sketch and identify important parts of Multi cylinder Sizing machine.
5. Prepare a sketch showing passage of warp/ fabric through shuttle loom machine and identify important parts.
6. Prepare a sketch showing passage of warp/ fabric through shuttleless loom and identify important parts.
7. Study package build on drum & precision driven winding machines.
8. Study of different types of tensioner.
9. Study of different types of yarn clearer.
10. Study of Thread stop motion, drive and calculation of winding machine.
11. Study passage of material and important parts of pirn winder.
12. Study traverse and drive mechanism on pirn winding machine.
13. Study of production calculation of winding and pirn winding machine.

## List of Laboratory/Learning Resources Required:

Winding Machine, Pirn Winding, Direct Warping Machine, Sectional Warping Machine, Sizing Machine, Shuttle loom, Air jet loom, water jet loom, Rapier loom, projectile loom, warp and weft knitting machine, nonwoven machine etc.

## Suggested Project List:

### Suggested Activities for Students:

1. Collection and identification of various type of fabric
2. Visit to weaving unit and preparing report
3. Visit to knitting unit and preparing report

## • List of suggested activities for Problem Based Learning:

Sl. No.	Name of the activity	No. of hours	Evaluation Criteria
1.	Industry/Research laboratory visit	Visit = 5h, Report preparation = 5h Total = 10h	Based on report submitted. Report should contain observations and calculations



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			based on industry/ lab data.
2.	Assignment writing. Numericals based assignment is preferable.	5 assignments of 2h each. Total = 10h	Based on the assignment submitted.
3.	Self learning on-line course	Minimum duration of the course should be 10h.	Examination based assessment at the end of course. Based on the certificate produced.
4.	Poster/chart/power point preparation on technical topics	Duration = 6 h	Based on poster/chart preparation and presentation skills
5.	Technical Video based learning related to the subject	Duration of video = 5h Report preparation = 5h Total = 10h	Report /presentation based on the video learning outcomes.
6.	Working/non-working model on technical topics	Working = 12 h Non- working = 8 h	Based on inter department/external evaluation
7.	Industrial exposure for 2-3 days to observe and provide tentative solutions on society/environment/health/any other issue	Duration = 15 h for industrial exposure  Problem identification and tentative solution = 10 h Total = 20 h	Based on evaluation of critical problems and solutions
8.	Group Discussion on emerging/trending technical topics based on subject	Duration = 1 h each	Based on performance in group discussion, technical depth, knowledge etc.
9.	Real world case studies-based learning	Duration of data collection/study = 5h Report preparation = 5h Total = 10h	Based on in-depth study, technical depth, data collected, fact finding, etc.

- All records pertaining to the evaluation and assessment of self-learning activities must be properly maintained and preserved at the institute level. These records should be made available to the university upon request.
- Institutes are encouraged to utilize digital platforms, such as Microsoft Teams, for effective record-keeping and to ensure transparency in the evaluation and assessment of self-learning activities.

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