

GUJARAT TECHNOLOGICAL UNIVERSITY

TEXTILE TECHNOLOGY (29)

KNITTING TECHNOLOGY

SUBJECT CODE: 2162909

B.E. 6th SEMESTER

Type of course: Engineering

Prerequisite: Students should have knowledge of basic fabric formation methods.

Rationale: Knitting technology covers different knitted fabric formation techniques and requirements of machineries for the same and some of the important application areas of these fabrics.

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			
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1.	Introduction of knitting, classification, general idea about related terms and comparison of warp and weft knitting with weaving with respect to production and properties	4	9.52
2.	Introduction to Weft Knitting : Circular weft knitting – <ul style="list-style-type: none"> • Knitting cycle and basic elements of knitting. Essential elements of knitting machine – yarn supply arrangement, loop forming arrangement and fabric take down mechanism. • Passage of yarn through different parts of circular weft knitting machine. • Study of elements of knitting machines such as : creel, yarn feeding, loop forming mechanism, take down motion, stop motions etc. • Primary weft knitted structures-plain, rib, interlock, purl and structures based on them. Properties and manufacturing processes of different types of knitted fabrics. • Different types of principal stitches such as knit, miss, held loop, drop or press-off stitch and their representation and their influence on fabric properties • Structural modifications commonly used in weft knitting, laying in, plating, open work structure • Recent developments in knitting processes such as Relative Technology (Relanit) for circular knitting machines, knitting of 	22	52.38

	<p>fleecy and plush fabrics, striper and loop transfer mechanism, concept of electronic jacquards.</p> <ul style="list-style-type: none"> • Types of defects and their remedial measures for weft knitted fabrics. • Requirements for yarn quality. • GSM and production calculations. <p>Flat knitting –</p> <ul style="list-style-type: none"> • Basic elements and their functions. • Different types of machines and their operations for various stitches like miss, tuck, transfer and drop stitch <p>Socks and Gloves Knitting –</p> <ul style="list-style-type: none"> • Different types of machines with their principles of working used for above mentioned items. 		
3.	<p>Introduction to Warp Knitting :</p> <ul style="list-style-type: none"> • Knitting cycle and basic elements of knitting. Essential elements of knitting machine – yarn supply arrangement, loop forming arrangement and fabric take down mechanism. • Warp preparation for warp knitting. • Passage of yarn through different parts of warp knitting machine. • Studies of different structures like single, two guide-bar and multi guide-bar (Tricot, Raschel) structures. • Different weft insertion techniques like Terry technique, Sinker pile fabrics, fall plate, cut press techniques. • Manufacturing of Net fabric. • Types of defects and their remedial measures for warp knitted fabrics. • Requirements for yarn quality. • GSM and production calculations. 	16	38.09

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. Knitting Technology by Prof. D. B. Ajgaonkar.
2. Circular Knitting by Dr. Chandrashekhar Iyer.
3. Knitting Technology by Mr. D. Spenser.
4. Warp Knitting by Dr. S. Raz.
5. Flat Knitting by Dr. S. Raz.
6. Textile Mathematics, Vol. 3, by Booth J E, Textile Institute, Manchester, 1977.

7. Knitted Fabric Primer by Reichman Charles, Lancashire J B and Darlington K D, National Knitted outwear Association, New York, 1967.
8. Circular Knitting by Iyer C, Mammel B & Schach W, Meisenbach Bamberg.

Course Outcome:

After learning the course the students should be able to:

1. Develop different qualities of weft knitted fabrics.
2. Develop different qualities of warp knitted fabrics.
3. Describe the causes for fabric defects and produce quality knitted fabrics.
4. Select the yarn as per the requirements of fabrics.

List of Experiments:

1. To study the path of yarn through plain knitting machine.
2. To study the different knitting elements including the cam system.
3. To study the driving mechanism of plain knitting m/c.
4. To study the cloth take-up mechanism of plain knitting m/c.
5. To study the rib knitting m/c including arrangement of dial and cylinder needles, cam system and driving mechanism.
6. To study the Interlock knitting m/c including arrangement of dial and cylinder needles, cam system and driving mechanism.
7. To study cam system of V - bed rib knitting m/c.
8. To study driving mechanism of V - bed rib knitting m/c.
9. Preparation of Fabric sample (rib, circular, half cardigan and full cardigan) in V-bed rib knitting machine.
10. To study the effect on loop length with the change in cam setting in flat knitting machine.
11. To study the effect of variation in yarn input tension on the loop length in V-bed rib flat knitting machine.
12. To study plain, rib and Interlock knitted fabrics (course per inch, wales per inch, loop length etc.)
13. Knitted fabric analysis.

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 a yarn feeding system on weft knitting machine.
2. Develop a thread stop motion on weft knitting machine.
3. Develop a design cam used on warp knitting machine.

Major Equipment:

Weft Knitting Machine
Warp Knitting Machine

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.