GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3172911
Semester: VII
Subject Name: Knitting Technology

Type of course: Professional Core Course

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

Rationale **:** Knitting is the technology for the production of the knitted fabric which are very popular nowadays for the apparel purposes because of its own advantages and benefits. Also going to be use for the technical textile applications because of its properties and the production rate.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No	Content	Total Hrs
1	Introduction to knitting, Knit structure- its unique features and applications, comparison of knitting with weaving with respect to production and properties, Different knitting terminologies, classification, Representation of a knit structure, laddering in a knit structure.	4
2	Basic knitting elements of weft knitting machine (Needle bed, Sinker, Cam, Needles), Different types of needles used in knitting, Knitting actions of all needles, Comparison of all needles.	3
3	**Circular weft knitting:** Introduction to Weft Knitting, 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. Knitting cycle and basic elements of knitting. Essential elements of knitting machine – yarn supply arrangement, loop forming arrangement and fabric take down mechanism.	4
4	Basic weft knit structures- plain, rib, interlock and purl, Properties and manufacturing processes.	4
5	Different types of principal stitches such as knit, miss, held loop, drop or press-off stitch, float stitch, tuck stitch and their representation and their influence on fabric properties. Structural modifications commonly used in weft knitting, laying in, plating, open work structure.	3
6	Recent developments in knitting processes such as Relative Technology (Relanit) for circular knitting machines, knitting of fleecy and plush fabrics, striper and loop transfer mechanism.	2

7	Types of defects and their remedial measures for weft knitted fabrics, Requirements for yarn quality, GSM and production calculations.	2
8	**Flat knitting:** Basic elements and their functions, Different types of machines and their operations for various stitches like miss, tuck, transfer and drop stitch. **Socks and Gloves Knitting:** Different types of machines with their principles of working used for above mentioned items.	3
9	**Warp Knitting:** Introduction to Warp Knitting, comparison of weft and warp knitting, warp knit structure, application of warp knit structures, loop formation in a warp knit structure, Warp preparation for warp knitting.	2
10	**Warp knitting machine Raschel and Tricot:** Passage of yarn through different parts of warp knitting machine, Elements of warp knitting machine (Needle, sinker and guide bar), Swinging and shogging motion of guide bar, Sequence of loop formation in Raschel and Tricot warp knitting machine. Warp knit fabric representation, lapping plan and diagram.	6
11	**Studies of different warp knit structures like**: Structures and properties of Single guide bar construction (Pillar stitch, 1 X 1, 2 X 1 and other Tricot lap open/ close loop, Atlas construction), Structures and properties of two guide bar construction (Two bar tricot, Locknit, Reverse lockint, Satin, Raised loop, Sharkskin, Queenscord), Net structures, Double needle bed warp knit- pile fabric.	6
12	Types of defects and their remedial measures for warp knitted fabrics, Requirements for yarn quality. GSM and production calculations. Modern developments – whole garment production.	3

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	25	30	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:

1. Knitting Technology By, David J Spencer, Woodhead Publishing Limited, 2001.
2. Knitting Technology D. B. Ajgaonkar Universal Publishing Corp., Bombay, India, 1998.
3. Knitting Technology 3rd Edition, D J Spencer, Woodhead Publishing, April 2001.
4. Fundamentals and Advances in Knitting Technology – Sadhan C. Ray, Woodhead Publishing, 2015.

5. Circular Knitting by Dr.ChandrashekharIyer, Mahajan Publishers, Ahmedabad.
6. Circular Knitting by Iyer C, Mammel B &Schach W, Meisenbach Bamberg, 1992.
7. Warp Knitting by Dr. Shmuel Raz ,MelliandTextilberichte, Heidelberg, January 1987.
8. Advances in Knitting Technology By K. F. Au, Woodhead Publishing Limited, 2011.

Course Outcome:

Sr. No	CO Statement	Marks % weightage
CO-1	Describe the knitting process, various elements use in circular weft and warp knitting machine and its importance.	35
CO-2	Describe the various weft and warp knitted structures and its properties, applications of knitted fabrics.	35
CO-3	Compare the knitting and weaving fabric structure, characteristics and manufacturing process.	10
CO-4	Calculate the production of knitting machine.	10
CO-5	State the latest developments in knitting technology.	10

List of Experiments:

1. To study the passage of the yarn through circular weft knitting machine.
2. To study the construction and working of the different knitting elements for weft knitting machine.
3. Analysis of the Plain, Rib, Purl and Interlock structure (course per inch, wales per inch, loop length etc.).
4. To study the driving mechanism of circular weft knitting machine.
5. To study the cloth take up mechanism of circular weft knitting machine.
6. To study the arrangements of cylinder and dial needles, cam system and driving mechanism for the production of rib structure.
7. To study the arrangements of cylinder and dial needles, cam system and driving mechanism for the production of Interlock structure.
8. Analysis the changing of stitch cam setting and its effect on loop length and fabric properties.
9. To study the yarn passage through the warp knitting machine.
10. To study the working of the different knitting elements used in warp knitting machine.
11. Production calculation of knitting machine.
12. Find the various applications of weft and warp knitted fabric based on its properties.
13. Preparation of different types of knitted Fabric.

Major Equipment: Circular weft knitting machine, Flat bed knitting machine, Raschel and Tricot warp knitting machine.

List of Open Source Software/learning website: Any Search Engine, NPTEL, Swayam portal etc.