



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Textile Manufacturing Technology

Subject Code : DI04029091

Subject Name : Knitting Technology

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Professional Elective - II

Prerequisite:	Basic knowledge of textile fiber, yarn formation, fabric construction and loop formation, weft and warp knitting technology.
Rationale:	Knitting technology has been playing a very important role in textile industry. Due to continuous research and development, new inventions have taken place in the area of knitting. New technologies and equipment have entered the market, to produce better quality fabric at cheaper costs. Knitting is second most popular technique of fabric formation and its unique feature of extensibility of fabric and other favorable properties are in good demand. It not only produces fabrics and shaped garments for apparel and household purposes but also for various technical end applications. Knitting is comparatively simpler and faster technique of fabric formation. The aim of this course is to develop the competency of operating such knitting technological equipment used in the industry. This course is important for textile engineers as liking for knitted textile is increasing day by day due to better comfort provide by knitted textile as compared to woven textile. This course covers all aspects of weft and warp knitting technology and design.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Compare warp and weft knitting techniques.	R,U,A
02	Knit using latch, beard and compound needles.	R,U,A
03	Use knowledge of weft knitting to produce different weft knitted structures.	R,U,A
04	Select needles to maintain weft knit quality.	R,U,A
05	Use knowledge of warp knitting to produce different warp knitted structures.	R,U,A

*Revised Bloom's Taxonomy (RBT)



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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE(E)	PA(M)	PA(I)	ESE(V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1. Basics of Knitting technology	1.1 Introduction to knitting. 1.2 Comparison of woven and knitted fabric structure and Properties. 1.3 Reasons for growth of knitting. 1.4 Basic terms and definition used in knitting-stitch, stitch length, Stitch density, course, wale. 1.5 Principle of weft knitting. 1.6 Principle of warp knitting. 1.7 Comparison of weft and warp knitting 1.8 Classification of weft and warp knitting machines.	6	13%
2. Knitting Needles	2.1 Spring Beard needle-Construction, knitting action, Advantage & disadvantage. 2.2 Latch needle- Construction, knitting action, Advantage & disadvantage. 2.3 Compound needle-Construction, knitting action, Advantage & disadvantage.	4	9%
3. Weft Knitting	3.1 Yarns used for weft knitting. 3.2 Passage of material through simple circular weft knitting machine. 3.3 Circular weft knitting machine elements: <ul style="list-style-type: none"> • Needle cylinder. • Construction and function of sinker. • Cam system. 3.4 Knitting cycle in weft knitting by latch needle. 3.5 Weft knitting structural elements: Needle loop, Sinker loop, Face loop stitch, Reverse loop stitch, Technical face side, Technical back side, Close loop, Open loop. 3.6 Formation of various weft knitted Stitches: Knit, Tuck, Miss or Float.	16	36%



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	<p>3.7 Design features and properties of various weft knitted Structure.</p> <ul style="list-style-type: none"> • Basic weft knitted structures: Plain, Rib, Interlock, and Purl. <p>3.8 Non-jacquard double jersey structure: Single pique, Double Pique, Ponto-de- roma, Milano Rib, Gabardine, Poplin.</p> <p>3.9 Ornamentation of weft knitted structure:</p> <ul style="list-style-type: none"> • Single jersey structures: Horizontal stripes, Twists, Fancy Yarns. • Double jersey structure. <p>3.10 Derivatives of weft knitted structure :</p> <ul style="list-style-type: none"> • Single jersey structure: Knit and Float; Knit and Tuck; Knit, Float and Tuck (Accordian type structure). • Double jersey: Rib structures: Half cardigan, Full cardigan, Interlock structures: Eight lock. <p>3.11 Production of circular weft knitting machine.</p>		
4. Needle Selection and Quality of Weft Knit Design	<p>4.1 Needle selection for weft knit design. Non-Jacquard, Jacquard.</p> <p>4.2 Use of computer in designing and patterning.</p> <p>4.3 Quality of weft knit fabrics.</p> <p>4.4 Test for weft knit quality.</p> <p>4.5 Weft knitted fabric defects causes and remedies.</p>	6	13%
5. Warp Knitting	<p>5.1 Yarns used for warp knitting, yarn preparation for warp knitting.</p> <p>5.2 Wrap knitting machine elements.</p> <p>5.3 Knitting cycle in warp knitting by beard needle.</p> <p>5.4 Needle bar mechanism, Guide bar swinging mechanism, Guide bar shogging mechanism, Pattern mechanism for warp knit design-pattern chain links-chain link notations and preparation.</p> <p>5.5 Warp knitted structural elements: open lap, closed lap, underlap, overlap, swinging, shogging.</p> <p>5.6 Warp knitted structure, properties and their representation: Full tricot, Locknit, Reverse locknit, Satin, Loop raised, Queen's cord, Atlas and pillar, Sharkskin, Tulle, Morquissette, Voile.</p> <p>5.7 Production of circular warp knitting machine.</p>	13	29%
	Total	45	100



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Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
30	30	20	10	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. Knitting Technology, D.B. Ajgaonkar , Universal Publishing corporation, Mumbai ISBN 10 818502734X ISBN 13 9788185027340
2. Knitting Technology, David. J. Spencer , Pergamon Press ISBN, 0080247628
3. Fundamentals and Advances in Knitting Technology Sadhan Chandra Roy, Woodhead Publishing India in Textile ISBN-10: 9789380308166,ISBN-13: 978-9380308166
4. Knitting Fundamentals, Machines, Structures and Developments, N. Anbumani , New Age International Publications ,Jan 2006 ISBN-10. 8122419542 ISBN-13. 978-8122419542
5. Warp Knitting Production, Dr. S.Raz, Publisher: Melliand, ISBN 10: 3871505633 ISBN 13: 9783871505638
6. Advances of Knitting Technology Au, K F, Woodhead Publishing ,ISBN: 9780081017173

(b) Open source software and website:

1. http://en.wikipedia.org/wiki/Warp_knitting
2. www.to-knit-knitting-stitches.com/related-knitting-websites.
3. <https://archive.nptel.ac.in/courses/116/102/116102008/>
4. <https://archive.nptel.ac.in/courses/116/102/116102056/>
5. <https://www.slideserve.com/adrian-gonzales/warp-knitting-basics>
6. <https://www.slideshare.net/88azmir/weft-knitting>
7. <https://www.textileblog.com/category/knitting/>
8. <https://www.slideshare.net/slideshow/weft-knitting-250311292/250311292>
9. <https://www.fibre2fashion.com/industry-article/8087/weft-knitted-fabrics-and-derivatives>
10. <https://textilestudycenter.com/fundamentals-warp-knitting/>

Suggested Course Practical List:

1. Identify the important features of knitting.
2. Describe the principle of warp and weft knitting.
3. Compare warp and weft knitting technology.
4. Demonstrate the working of latch, beard and compound needle.
5. Describe the weft knitting cycle by latch needle.



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6. Demonstrate the cam system for weft knitting machine to produce different weft knitted stitches.
7. Draw the design of the different primary based weft knitted structures.
8. Draw the design of the following weft knitted structures. (a) Single pique (b) Double pique (c) Ponto-de-roma (d) Milano Rib (a) Gabardine (b) Poplin.
9. Develop design of the derivatives of single and double jersey structure.
10. Identify the weft knitted fabric defects.
11. Describe the wrap knitting cycle by beard needle.
12. Demonstrate the working of needle bar motion, shogging and swinging motions of warp knitting machine.
13. Develop the design and chain link of the following warp knitted structure. (a) Full tricot (b) Locknit (c) Reverse locknit (d) Satin (e) Loop raised (f) Queen's cord (g) Atlas and pillar (h) Sharkskin (i) Tulle (j) Morquissette (k) Voile.
14. Calculate the production of weft knitting machine.

List of Laboratory/Learning Resources Required:

Sr.No. Equipment Name:

1. Circular Weft Knitting machine
2. Tricot Warp Knitting machine

Suggested Project List:

- a) **Sample collection:** Collect the sample of different weft and warp knitted fabric and prepare a chart with specifications.
- b) **Knitting Needles:** Collect sample of different types of needle and prepare a report on construction and knitting action of needles.
- c) **Weft Knitting:** Prepare a chart or small model of basic weft knitting machine, Create wire models of basic weft knitted structure and different types of stitches with important features.
- d) **Needle Selection and Quality of Weft Knit Design:** Prepare a report on needle selection and quality parameters of weft knit design.
- e) **Knitted fabric defects analysis:** Prepare a report on identification of various defects observed in knitted fabric, provide reasons for those defects and suggest possible remedies to avoid them.
- f) **Warp Knitting:** Prepare a report on warp knitting machine elements and knitting cycle, Create wire models of warp knitted structure with chain link notation.

Suggested Activities for Students:

- a) Collection of different warp and weft knitted fabric samples.
- b) Prepare a report on circular weft knitting machine element and weft knitting cycle.
- c) Prepare a report on warp knitting machine element and warp knitting cycle.



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- d) Visit a nearby knitting unit, and prepare a report with suitable machinery sketches.
- e) Present a seminar on any of relevant topic of the knitting technology.
- f) Prepare chart of different warp and weft knitted structure design, properties and application.
- g) Prepare internet based assignment on course topic wise.
- h) Explore library/internet facilities for preparing report on weft and warp knitting techniques.
- i) Literature survey of weft and warp knitting technology.

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