



## Veermata Jijabai Technological Institute (V.J.T.I)

(Central Technological Institute, Maharashtra State, INDIA)

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**Programme: Diploma in Textile Manufacture (DTM)**

**Semester: IV**

**Implemented from: 2017**

COURSE CODE	COURSE	GR	TEACHING SCHEME (HRS/WK)				EXAMINATION SCHEME												
			L	T	P	CR	PAPER HRS	TH		IST	TOTAL		PR*		OR*		TW		TOTAL MARKS
								Max	Min		Max	Min	Max	Min	Max	Min			
176TM41	Yarn Manufacture III	C	3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175
176TM42	Fabric Manufacture III	C	3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175
176TM43	Cloth Structure II	C	3	3	-	6	3	80	32	20	100	40	-	-	-	-	25	10	125
176TM44	Textile Chemistry II	C	3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175
176TM45	Nonwoven and Knitting	C	3	1	0	4	3	80	32	20	100						25	10	125
176TM46	Computer Aided Textile Design	C	1	0	3	4	-	-	-	-	-	-	-	-	-	-	25	10	25
<b>TOTAL</b>			<b>16</b>	<b>4</b>	<b>12</b>	<b>32</b>	<b>-</b>	<b>400</b>	<b>-</b>	<b>100</b>	<b>500</b>	<b>-</b>	<b>150</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>150</b>	<b>-</b>	<b>800</b>

Abbreviations: B – Basic; C – Core; A – Applied; M – Management; L – Theory Lecture; T – Tutorial; P – Practical; TH – Theory Paper; MST – Mid-Semester Tests; PR – Practical Exam; OR – Oral Exam; TW- Term Work.

Student Contact Hours per week (Formal Teaching): 33 Hours

Theory, Practical and Tutorial periods are of 60 minutes duration

Total Marks 800

\* Indicates assessment by External Examiner.

**NOTE:** a) During Summer Break after IV semester (i.e. between IV and V Semester), students have to undergo mandatory 6 weeks industrial training in large or medium scale industries relevant to the branch or discipline of engineering. This training would be evaluated during V semester.

b) Students have to prepare report of training, which will be evaluated during V semester.

  
**Curriculum Coordinator**

  
**Head**  
**Diploma in Textile Manufacture**

  
**Dean - Diploma**



DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FOURTH
COURSE TITLE	YARN MANUFACTURE- III
COURSE CODE	176TM41

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min			
3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175

**Course Objectives:**

Students must be able to,

1. State the objects of the speed frame and describe in detail its construction and working.
2. Understand the process of ring spinning and describe in detail the construction and working of the ring frame.
3. Calculate speeds, draft and production of speed frame and ring frame.

**Course Outcomes:**

Student should be able to

CO1	Recall the objects of the speed frame and the function of its operating parts.
CO2	Describe the construction and working of the various mechanisms on the speed frame like the differential motion, the building mechanism and compare the conventional speed frame with the modern speed frames.
CO3	Apply the formulae for the calculation of change places, draft, speed and production on the speed frame.
CO4	Recall the objects of the ring frame and the function of its operating parts.
CO5	Describe the construction and working of the various parts on the ring frame like the balloon control rings, spindle, ring and travellers, the chain building mechanism, comparison of the conventional ring frame with the modern ring frames with the study of compact spinning.

CO6	Apply the formulae for the calculation of draft, speed and production on the ring frame.
CO7	Plan and perform experiments related to speed frame and ring frame.
CO8	To apply engineering knowledge for calculating speeds of various parts of machines, use of engineering tools for dismantling and setting of parts safely.

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
<b>1</b>	<b>Speed frame - Introduction</b>	<b>7</b>	<b>16</b>				
	1.1 Introduction to the operation, principles, objects and study of the various parts of the speed frames.	2	8	CO1	100%		
	1.2 Concept of flyer and bobbin leading frames. Construction of the creel, drafting system and flyer. Spinning triangle and flyer inserts.	5	6	CO2		100%	
<b>2</b>	<b>Speed frame – Construction and working</b>	<b>11</b>	<b>12</b>				
	2.1 Concept of Twisting and winding. Introduction to the building mechanism, differential motions and swing motion on speed frame.	3	8	CO1	100%		
	2.2 Construction and working of the differential motion and building mechanism. Change places for processing different cottons and hanks on speed frame. Important features of modern speed frames.	8	6	CO2		100%	
<b>3</b>	<b>Calculations on Speed frame</b>	<b>6</b>	<b>12</b>				
	3.1 Speed frame drive and calculations related to speed, draft and production. Calculations on the change places on the speed frame.	6	12	CO3			100%

## SECTION-II

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
4	<b>Ring frame - Introduction</b>	7	16				
4.1	Introduction to the operation, principles, objects and study of the various parts of the ring frame.	2	8	CO4	100%		
4.2	Construction of different types of creels, drafting arrangements, top roller weighting and fibre guiding devices. Construction of the different types of ring, travellers and spindles.	5	6	CO5		100%	
5	<b>Ring frame – Construction and working</b>	11	12				
5.1	Function traverse motions, thread guides, separators, balloon control rings, spindles, ring, traveller and traveller clearers	3	8	CO4	100%		
5.2	The machine drive and the working of the builder motion. Automation and latest developments in ring frame. Introduction and principles of compact spinning.	8	6	CO5		100%	
6	<b>Calculations on Ring frame</b>	6	12				
6.1	Ring frame drive and calculations related to speed, draft and production. Calculations of traveller speed and twist per inch in yarn.	6	12	CO6			100%
		<b>48</b>	<b>80</b>				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).							

*Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

### List of Practicals/Assignments/Tutorials:

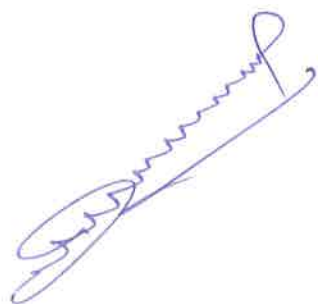
Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1		To study the passage of cotton through speed frame.	3	CO7
2		To study the gearing diagram on speed frame and calculations regarding speed, draft, production, change places, etc.	3	CO7 & CO8
3		To study the sun and planet differential motion on speed frame.	3	CO7 & CO8
4		To study the swing motion and cone drum construction on speed frame.	3	CO7
5		To study and set the building mechanism on speed frame.	3	CO7 & CO8
6		To study the passage of cotton through ring frame.	3	CO7
7		To study the gearing diagram on the ring frame and calculations regarding speed, draft, twist, production, change places etc.	3	CO7 & CO8
8		To set the lappets, setting of ring rail, spindle gauging and thread wire setting on ring frame.	3	CO8
9		To study the chain building mechanism on ring frame.	3	CO7 & CO8
10	A	To study the lappets, rings, travellers and spindles on ring frame.	3	CO7
	B	To compare the conventional and modern ring frame.		
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term				

**Text Books:**

Sr. No.	Author	Title	Publisher and Edition
1	William Scott B, Taggart	Cotton Spinning	Wentworth Press
2	Werner Klein	Ring Spinning- Volume 4	The Textile Institute

**Reference books and Websites:**

Sr. No.	Author	Title	Publisher and Edition
1	Dr A R Khare	Elements of ring frame and doubling	Sai book centre
2	J E Booth	Textile Mathematics- Vol 2	The Textile Institute
3	<a href="http://www.rieter.com/en/rikipedia/articles/fibre-preparation/">http://www.rieter.com/en/rikipedia/articles/fibre-preparation/</a>		
4	<a href="http://www.nptel.ac.in">www.nptel.ac.in</a>		



DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FORTH
COURSE TITLE	FABRIC MANUFACTURE III
COURSE CODE	176TM42

#### TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME					EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		MS <sup>1</sup>	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min			
3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175

#### Course Objectives:

Students must be able to,

- 1) Understand the process of manufacturing of fabric using dobbies and jacquard.
- 2) Understand the principle used in different types of dobbies and jacquards.
- 3) Understand the working and Construction of different types of dobbies and jacquard.
- 4) Understand the principles used in automatic looms. Also understand the construction and working of different mechanism on automatic looms.
- 5) Understand the principle, working and constructions of different mechanisms of drop box looms and weft replenishment systems

#### Course Outcomes:

Student should be able to

CO1	Understand the principles, working, construction and settings on used in different types of dobbies.
CO2	Understand the principles, working, construction and settings on used in different types of Jacquards.
CO3	Understand construction working and settings of different mechanisms on automatic looms.
CO4	Understand the principle, working and construction of weft replenishments methods used on automatic looms.

CO5	Plan and perform experiment on dobbies and jacquards.
CO6	Plan and perform experiments on automatic looms and weft replenishments systems.

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	<p><b>Dobby:</b>            Scope and limitations, Types of Dobbies, Keighley dobbie – its working, construction, setting. Different methods of pegging lags Dobby pattern pegs and lags. Different methods of pegging lags Dobby pattern pegs and lags. Development in dobbies- cam dobbie, paper cam dobbie, their construction and working. Features of Modern electronic dobbies, Staubli electronic cam dobbie, their construction, working and settings.</p>	10	16	CO1	40%	40%	20%
2	<p><b>Jacquards:</b>            Scope and limitations. Different parts of jacquards and their importance. Principle and working of jacquards ( Single lift single cylinder, Double lift single cylinder, Double lift double cylinder) and their limitations. Drive to the jacquard, System of harness mounting, Different types of harness ties, Piano card cutting machine. Casting out in jacquards, Modern fine pitch and course pitch jacquards, their construction and working. Double cloth jacquard its working and construction, Cross border Jacquard its working and, construction, Introduction to electronic jacquards, Electronic jacquards- its construction, working and settings. Developments in electronic jacquards.</p>	14	24	CO2	40%	40%	20%



**SECTION II**

Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
3	<p><b>Automatic looms :</b>                      Classification of looms – Automatic looms and Non-automatic looms , Types of automatic looms – Cop changing looms and shuttle changing looms, Salient features and requirements advantages of automatic looms. Compare cop changing over shuttle changing mechanism.</p> <p>Centre Weft fork mechanism: Principle, working and construction</p> <p>Types of feelers – Mechanical, Electrical, Optical and Electronics type, Working and construction of Mechanical, Electrical, Optical and Electronics feelers.</p> <p>Automatic weft replenishment -Pirn changing, mechanisms – Northrob, Ruti. Pirn changing mechanism on automatic loom its construction and working,                      Automatic Let- off motion- Working, construction of Bartlett, Ruti, Roper, Semi-positive let- off motion its working and construction.                      Study of different types of warp stop motion its working and construction – Mechanical and Electrical warp stop motion. Northrob warp stop motion, its working, construction and setting.</p>	14	26	CO3	40%	40%	20%
4	<p><b>Weft Patterning:</b>                      Conventional methods of weft patterning and their limitations, Cowburn and pecks multiple box, its construction and working. Different types of multiple box mechanisms, card saving device, Simple pattern chain and problems based on the pattern chains.</p>	10	14	CO4	40%	40%	20%
		<b>48</b>	<b>80</b>				

**Legends:** R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).

*Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

**List of Practicals/Assignments/Tutorials:**

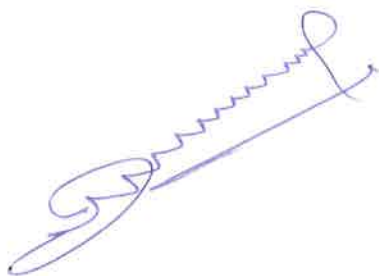
Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1		To study Keighley Dobby – construction, working, timing and setting of keighly doobby.	3	CO5
2		To study cam doobby – construction, working, timing, pick-finding device.	3	CO5
3		To study single lift single cylinder jacquard, Double lift single cylinder jacquard and double lift double cylinder Jacquard.	3	CO5
4		To study cross-border jacquard and Double cloth Jacquard.	3	CO5
5		To study Cowburn and Peck box motion – construction, working, timing, setting, card saving device.	3	CO6
6		To study Northrop 2x1 weft mixing box motion.	3	CO6
7		To study Pick –at – will mechanism on Zang loom.	3	CO6
8		To study drop-box motion on Zang loom.	3	CO6
9		To study pegging lattices and paper card punching.	3	CO5
10		To study Jacquard card punching and lacing techniques.	3	CO5
* Minimum 8 and maximum 12 experiments sessions to be included in a course in a term				

**Text Books:**

Sr. No.	Author	Title	Publisher and Edition
1	K T Aswani	Fancy weaving Mechanism	Mahajan Publishers, 1990
2	R. Marks, A. T. C. Robinson	Principles of weaving	The Textile Institute, Manchester
3	Talukdar, Sriramulu and Ajsaonkar	Weaving- Mechanism and Management	Mahajan Publishers Pvt. Ltd., Ahmedabad,1998

**Reference books and Websites:**

Sr. No.	Author	Title	Publisher and Edition
1	P. R. Lord and M. H. Mohamed	Weaving : Conversion of yarn to fabric	Merrow publishing Co. Ltd., England, 2 <sup>nd</sup> edition, 1988
2		Automatic weaving	NCUTE Publications
3	<a href="http://nptel.ac.in/course.ph.p">http://nptel.ac.in/course.ph.p</a>		



DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FORTH
COURSE TITLE	CLOTH STRUCTURE- II
COURSE CODE	176TM43

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min			
3	3	-	6	3	80	32	20	100	40	-	-			25	10	125

**Course Objectives:**

Students must be able to,

1. Identify, classify advanced weaves like Terry pile structures, double cloth, Backed cloth, Extra warp and Extra weft, Damask and brocades, Tapestry structures.
2. Understand and design different advanced weave used in the manufacturing of woven fabrics.

**Course Outcomes:**

Student should be able to

CO1	Identify the different types of warp terry pile structures. Construct different warp terry pile structures.
CO2	Classify and construct Weft pile structures
CO3	Classify and construct Double cloth fabric
CO4	Identify and construct the different types of extra warp and extra weft structures
CO5	Classify and construct different types of Backed cloths
CO6	Classify and construct Gauze and leno structures, Madras Muslin, Damask and Brocades and Tapestry structures

CO7	Analysis of different weaves like Terry Pile structures (Warp and Weft Pile), Extra warp and Extra weft structures, Double cloth, backed Cloth, Leno weaves, Damask and brocades and Tapestry structures.
CO8	Design different weaves using Wonder weave software.

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
1	<p><b>Terry pile structure:</b>  <b>Warp Pile structures:</b>            Formation of standard pile structures to produce pile weaves on 3 picks, 4 picks, 5 picks, 6 picks. Terry ornamentation - Strips and check pattern. Special mechanism required for terry weaving. Figured terry fabrics. Warp pile fabrics produced with the aid of wire. All over and continuous pile structure. Warp pile fabrics produced on the face to face principle, special mechanisms required for face to face weaving, continuous pile structure. Velvet structure – fast pile, Moquettees</p>	10	16	CO1	40%	40%	20%
2	<p><b>Weft Pile structures:</b>            Classification of velveteen, All over or plain velveteen. Plain back velveteen, length of pile, density of pile, changing the density of pile, fast pile structure, twill- back velveteen, weft plushes, corded velveteen.</p>	04	08	CO2	40%	40%	20%
3	<p><b>Double cloths:</b>            Classification of double cloth, self stitched double, cloth, Reversible double cloth, beaming and drafting of self stitched double cloth, selection of suitable stitching positions, Wadded double cloth - Weft wadded double cloth, warp wadded double cloth. Center stitched double cloth, center warp stitching, center weft stitching. Interchanging double cloth - effect due to changes in the position of separating lift with continuous one and one colour arrangement.</p>	10	16	CO3	40%	40%	20%

SECTION II							
Unit & Sub-Unit	Topics/Sub-topics						
4	<b>Extra warp and Extra weft weaves:</b> Extra thread figuring fabrics: Extra Warp, Extra Weft. Combination weaves their construction and characteristics.	07	12	CO4	40%	40%	20%
5	<b>Backed Cloth:</b> Introduction, Types of Backed cloth, Weft – backed, Warp-backed, Methods of selection of warp ties and weft ties, Methods of stitching, Backed cloth wadded threads	07	12	CO5	40%	40%	20%
6	<b>Gauze and Leno weaves:</b> Leno weaving with flat steel doup with an eye. Double doup, counter leno, special lifts of standard ends, Russian Cords, net leno, Leno weaving with flat steel slotted doup. <b>Madras Muslin:</b> Introduction to Madras Muslin structure, Design, draft and peg plan of the same. Mechanisms required for producing these structures. <b>Damask:</b> Damask Reversible and non-reversible damask. Types of jacquards used for producing damask. <b>Brocades:</b> Figured warp rib brocade, constructional details of figured warp rib brocade.. <b>Tapestry Structures:</b> Simple weft faced tapestry - two weft tapestry structure.	10	16	CO6	40%	40%	20%
		<b>48</b>	<b>80</b>				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).							

*Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

**List of Practicals/Assignments/Tutorials :**

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1		Analysis of warp pile structures	3	CO7
2		Analysis of weft PileStructures	3	CO7
3		Analysis of Double cloth	3	CO7
4		Analysis of Extra Warp fabrics	3	CO7
5		Analysis of Extra Weft fabrics	3	CO7
6		Analysis of Backed cloth	3	CO7
7		Analysis of Gauzed , Leno , Damask, Brocades and Tapestry structures	3	CO7
8		Wonder weave CAD Software: i) Dobby Master ii) Jacquard Master	3	CO8
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term				

**Text Books:**

Sr. No.	Author	Title	Publisher and Edition
1	Grosicki	Watson's Textile Design & Colour	Woodhead, (Seventh Edition), 1977
2	Z. Grosicki	Watson's Advanced Textile Design: Compound woven structures	Woodhead Textile Series No. 2, 1975
3	Robinson and Marks	Woven cloth construction	The Textile Institute
4	N. Gokarneshan	Fabric Structure and Design	New Age International Publisher, New Delhi 2004
5	William Watson Longmans	Textile Design and colour: Elementary and Figured Fabrics	Green and co. London, edition second.

**Reference books and Websites:**

<b>Sr. No.</b>	<b>Author</b>	<b>Title</b>	<b>Publisher and Edition</b>
1	Jacque Wilson	Handbook of Textile Design	Woodhead Publishing Ltd. Edition 2001
2	W.S. Murphy	Textile Weaving and Design	Abhishek Publications, Chandigarh, 2000





DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FOURTH
COURSE TITLE	TEXTILE CHEMISTRY -II
COURSE CODE	176TM44

### TEACHING AND EXAMINATION SCHEME:

L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	0	3	6	3	80	32	20	100	40	50	20	-	-	25	10	175

### Course Objectives:

Students must be able to,

- 1) Basic understanding of ready for dyeing RFD concept.
- 2) Introduction and study of dyeing, printing and finishing.
- 3) Conceptual understanding of dyeing of natural as well as synthetic fibre.
- 4) study of different types of printing and finishing.
- 5) study of different machineries used for dyeing and printing
- 6) Study of finishes and value addition

### Course Outcomes:

Student should be able to

CO1	Acquire basic knowledge about RFD and Dyes
CO2	Understand the different dyes used for different fibre
CO3	Understand finishing and printing concept

CO4	Study the different styles and machineries used in printing and finishing
CO5	Study the basic value addition garment finishing
CO6	Study testing various fastness

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
<b>1</b>	<b>Introduction of dyes</b>	<b>04</b>	<b>8</b>				
	<b>1.1</b> Ready for dyeing, Classification of Dyes			CO1	30%	40%	30%
	<b>1.2</b> Principles of dyeing cotton, wool, silk, nylon, polyester, acrylic			CO1	30%	40%	30%
<b>2</b>	<b>Dyeing of fibre</b>	<b>12</b>	<b>16</b>				
	<b>2.1</b> dyeing of natural fibres like cotton with direct, reactive, vat, sulphur, Principles of dyeing wool/silk with acid, wool with acid, basic, metal complex and acid mordant dyes	06	8	CO1	30%	30%	40%
	<b>2.2</b> Principle of dyeing synthetic fibre Polyester with disperse dyes, Nylon with acid dyes and acrylic with basic dyes.	04	6	CO2	30%	30%	40%
	<b>2.3</b> Different machineries used in dyeing	<b>2</b>			20%	40%	40%
<b>3</b>	<b>Printing</b>	<b>10</b>	<b>16</b>				
	<b>3.1</b> Different methods of printing, Styles of printing, Ingredients of a printing paste, Importance of each ingredient, Direct style of printing with direct and reactive dyes. Printing of synthetics with disperse dyes,	5		CO3	30%	30%	40%
	<b>3.2</b> pigment printing Printing machines Flat bed, Rotary Screen printing machines, Transfer printing	3		CO3	30%	30%	40%

SECTION-II							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
4	<b>Finishing</b>	8	16				
4.1	Classification of finishes, starching, calendaring, water repellency, flame retardency, water proofing, crease recovery, dimensional stability ( Principle, Working, Chemicals)	8		CO4	20%	40%	40%
5	<b>Garment finishing</b>	7					
5.1	Brief outline of garment finishing. Different chemicals used and garment finishing machine.	5		CO5	20%	30%	50%
5.2	Enzyme washing (Biowashing) of garments	2		CO4	20%	40%	40%
6	<b>Testing</b>	7	12				
6.1	Testing of colour fastness of dyed and printed goods (Washing, Rubbing, Perspiration),	6		CO5	20%	40%	40%
6.2	Finishing efficiency of different finishes.	1		CO6	20%	40%	40%
		<b>48</b>	<b>80</b>				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).							

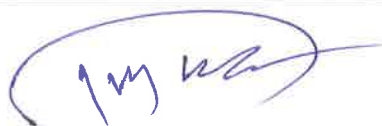
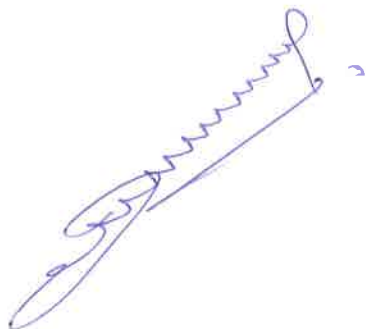
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**List of Practicals /Assignments/Tutorials:**

<b>Sr. No.</b>	<b>Practical/Assignment</b>	<b>Approx. Hours</b>	<b>CO</b>
1	Dyeing of cotton with Direct dye and aftertreatments	3	CO7
2	Dyeing of cotton with cold brand reactive colours	3	CO7 & CO8
3	Dyeing of cotton with hot brand reactive colours	3	CO7 & CO8
4	Dyeing of cotton with vat dye	3	CO7
5	Dyeing of cotton with sulphur dye.	3	CO7 & CO8
6	Dyeing of wool, silk with acid dye	3	CO7
7	Dyeing of polyester with disperse dye	3	CO7 & CO8
8	Dyeing of nylon with acid dyes	3	CO8
9	Dyeing of acrylic with basic dyes	3	CO7 & CO8
10	Testing of washing fastness, rubbing fastness	3	CO7

**Reference books and Websites:**

Sr. No.	Author	Title	Publisher and Edition
1	Dr. V.A. Shenai	Technology of dyeing	Sevak Publications, Mumbai, 1 edition, 1984
2	Dr. V.A. Shenai	Technology of finishing	Sevak Publications, Mumbai, 1 edition, 1990
3	Dr. V.A. Shenai	Technology of finishing	Sevak Publications, Mumbai, 2 edition, 1990
4	Dr. V.A. Shenai,	Chemistry of fibres	Sevak Publications, Mumbai, 1 edition, 1971
5	Dr. V.A. Shenai	Introduction to Textile finishing	J.T. Marsh, Chapman and Hall, 1 edition, 1984
6	Dr. V.A. Shenai	Principles and experimental dyeing	Sevak Publications, Mumbai, 1 edition, 1993



DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FOURTH
COURSE TITLE	NONWOVEN AND KNITTING
COURSE CODE	176TM45

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME					EXAMINATION SCHEME											
L	T	P	CR	PAPER HRS	TH		MS <sup>1</sup>	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min			
3	1	0	4	3	80	32	20	100	40	-	-	-	-	25	10	125

**Course Objectives:**

To apply the basic concepts of nonwoven and knitted fabric formation process to manufacture fabrics other than woven for different applications

**Course Outcomes:**

Student should be able to

CO1	Differentiate between different fabric forming techniques.
CO2	Describe the web formation and web bonding techniques.
CO3	Apply the knowledge of web formation, web bonding and finishing treatments for nonwoven product application.
CO4	Identify the weft and warp knitted structures.
CO5	Describe the elements and working of warp and weft knitting machines.
CO6	Calculate the production of warp and weft knitting machines
CO7	Determine the quality parameters of knitted fabric to develop defect free fabric
CO8	Analyse the nonwoven and knitted fabrics to find the fabric parameters

**Course Content:**

SECTION-I							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
<b>1</b>	<b>Introduction to Nonwovens</b>	<b>2</b>	<b>2</b>				
	<b>1.1</b> Definition, Properties, Classification, Raw-materials fibres, binding agents	2	2	CO1	40%	40%	20%
<b>2</b>	<b>Web formation techniques</b>	<b>4</b>	<b>8</b>				
	<b>2.1</b> Parallel laid webs, Cross laid webs, Random laid webs and Air laid webs.	4	8	CO2	20%	40%	40%
<b>3</b>	<b>Web bonding techniques</b>	<b>15</b>	<b>24</b>				
	<b>3.1</b> Thermal bonding – Hot calendaring – area bonding, point bonding and Embossing, Belt Calendaring, through air bonding, Ultrasonic bonding	4	6	CO2	20%	50%	30%
	<b>3.2</b> Chemical (Adhesive) bonding – Bonding Process, bonding methods - Saturation, Foam, Spray, Print and powder bonding.	3	4	CO2	20%	50%	30%
	<b>4.3</b> Polymer laid web formation: Principles, Physical properties of spun-bonded and Melt-blown nonwovens	2	4	CO2	20%	50%	30%
	<b>3.4</b> Mechanical bonding – Needle Punching looms: Classification, Needle types and characteristics, Factors affecting production Spunlace nonwoven (Hydroentanglement): Principles and Physical properties	6	10	CO2	20%	50%	30%
<b>4</b>	<b>Nonwoven Applications and Defects</b>	<b>3</b>	<b>6</b>				
	<b>4.1</b> Applications of thermal bonded, chemical bonded, polymer laid and mechanical bonded nonwovens. Major applications: Floor covering, Domestic Blankets, Industrial belts	2	4	CO3	20%	30%	50%
	<b>4.2</b> Nonwoven defects	1	2	CO3	20%	40%	40%

SECTION-II							
Unit & Sub-Unit	Topics/Sub-topics	Hours	Marks	CO	R Level	U Level	A Level
5	<b>Introduction to Knitting</b>	4	8				
5.1	Properties of Knitted Fabrics, Comparison of woven and knitted, Terms and Definitions, Classification of knitting machines, Comparison of Warp and Weft knitting	2	5	CO1	40%	40%	20%
5.2	Knitting Needle Types: Latch needle, Bearded Needle, Compound needle, Advantages and disadvantages of different needles	2	3	CO5	40%	40%	20%
6	<b>Warp &amp; Weft knitting: Stitches and structures</b>	8	12				
6.1	Principal stitches Weft Knitting: Knit, Purl, Tuck and Float (or miss), their notations and effects on fabric properties Principal stitches Warp Knitting: Tricot, Pillar, Inlay, Blind Alas and Twill stitch and their notations	4	6	CO4	20%	40%	40%
6.2	Basic Structures: Plain Single Jersey, Rib, Purl and Interlock, Properties and Symbolic notation – Graphic, Symbolic and Diagrammatic	4	6	CO4	20%	40%	40%
7	<b>Warp and Weft knitting machines</b>	10	14				
7.1	Plain Single Jersey Weft knitting machine – Knitting Elements and Operation Cycle	4	6	CO5	20%	50%	30%
7.2	Operation Cycle: Rib, Interlock and Purl knitting	3	4	CO5	20%	50%	30%
7.3	Warp Knitting Machines: Classification, Main Parts and Knitting elements, Tricot Machine Machine – Knitting cycle	3	4	CO5	20%	50%	30%
8	<b>Calculations and Fabric defects</b>	2	6				
8.1	Production calculation: Warp and Weft knit	1	4	CO6	20%	30%	50%
8.2	Knitted Fabric Defects	1	2	CO7	20%	40%	40%
		<b>48</b>	<b>80</b>				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).							

*Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*



**List of Practicals/Assignments/Tutorials:**

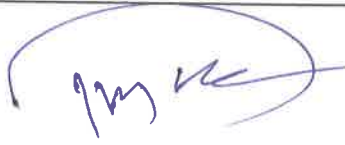
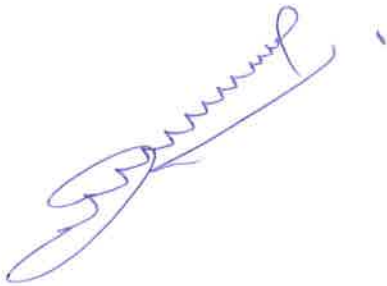
Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1	1 & 5	Identification of different fabric Samples	2	CO1
2	3	Analyze nonwoven fabric for i) fiber type and ii) manufacturing method	2	CO8
3	6	Identification of warp and weft knitted fabric samples	2	CO4
4	6	Analyze knitted fabric for i) structure and ii) stitch density	2	CO8
5	6	Analyze knitted fabric i) structure and ii) stitch density	2	CO8
6	6	Analyze knitted fabric i) structure and ii) stitch density	2	CO8
7	6	Analyze knitted fabric i) structure and ii) stitch density	2	CO8
* Minimum 8 and maximum 12 practicals/experiment sessions to be included in a course in a term				

**Text Books:**

Sr. No.	Author	Title	Publisher and Edition
1	J. Lunenschloss & W Albrecht	Nonwoven Bonded Fabrics	John Wiley & sons
2	P. Madhavamoorthi and Guruprasad Sunder Shetty	Nonwoven	Mahajan Publishers Pvt. Ltd.
3	N. Anbumani	Knitting: Fundamentals, Machines, Structures and Developments	New Age International Publishers
4	Prof. D. B. Ajgaonkar	Knitting Technology	Universal Publishing Corporation, Mumbai

**Reference books and Websites:**

Sr. No.	Author	Title	Publisher and Edition
1	S. J. Russell	Handbook of Nonwovens	Woodhead Publishing Limited
2	David J. Spencer	Knitting Technology a comprehensive handbook and technical guide	Woodhead Publishing Limited
3.	J. A. Smirfitt	An Introduction to Weft Knitting	Merrow Technical Library
4.	<a href="http://nptel.ac.in/courses/116102014/">http://nptel.ac.in/courses/116102014/</a>		
5.	<a href="http://nptel.ac.in/courses/116102008/">http://nptel.ac.in/courses/116102008/</a>		



DIPLOMA PROGRAMME	DIPLOMA IN TEXTILE MANUFACTURES
PROGRAMME CODE	DTM
SEMESTER	FOURTH
COURSE TITLE	COMPUTER AIDED TEXTILE DESIGNS
COURSE CODE	176TM46

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME				EXAMINATION SCHEME												
L	T	P	CR	PAPER HRS	TH		MST	TOTAL		PR		OR		TW		TOTAL MARKS
					Max	Min		Max	Min	Max	Min	Max	Min			
1	-	3	4	-	-	-	-	-	-	-	-	-	-	25	10	25

**Course Objectives:**

Students must be able to,

4. Understand the principle of design and colour theory.
5. Draw design based on principles of design and colour theory
6. Draw design in Wonder weave software.

**Course Outcomes:**

Student should be able to

CO1	Understand the principles of design. Study Indian textile designs
CO2	Understand and study principles of colour theory and draw designs based on these principles.
CO3	Study and draw design in available software.

**Course Content:**

Unit & Sub-Unit	Topics/Sub-topics	Hours	CO	R Level	U Level	A Level
1	<b>Design:</b> Elements and principles of design, units of design, natural, conventional and abstract forms. Study of Indian traditional designs and its characteristics Pertaining to textiles. Study of base designs- square, rectangle, diamond half drop, ogee and satin base arrangements. Composition of patterns and conditions to be observed in designing figured fabrics.	07	CO1	20%	20%	60%
2	<b>Colour:</b> Colour theory-additive and subtractive, modification of colours, Attributes of colour-hue, value Chroma contrast- simultaneous and successive. Principles of colour, Harmony chromatic, achromatic, monochromatic, analogous, complementary, triad characteristics and visual associations of colour. Guidelines for obtaining good colour harmony. Factors influencing apparent change of colour in woven and printed designs.	07	CO2	20%	20%	60%
3	A) Computer Aided dobby/Jacquard through CAD software B) Computer Aided printed textile designs through CAD software	02	CO3	20%	20%	60%
		<b>16</b>				
<b>Legends:</b> R- Remember, U – Understand, A – Apply and above levels (Blooms’s Revised Taxonomy).						

*Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.*

**List of Practicals/Assignments/Tutorials:**

Sr. No.	Unit	Practical/Assignment	Approx. Hours	CO
1		Drawing and painting patterns derived from nature and conventionalizing these forms (1 design), Colour theory (2 designs)  Colour Harmony ( 4 designs) , Colour wheel (1 design)	3	CO1
2		Preparation of suiting, shirting, dress material and sari border designs (18 designs). All over designs for jacquard-artist design-point paper design, woven fabric sample ( 3 designs)	3	CO2
3		Wonder weave CAD Software: <ul style="list-style-type: none"> <li>• Dobby Master</li> <li>• Jacquard Master</li> <li>• Printed designs</li> </ul>	3	CO3
Students will create designs based on the above and shall submit them for term-work.				

