Final

Programme Name : Diploma in Textile Chemistry																								
Programme Code: DTC													With effect from : 2023-24											
Duration of Programme: 6 Semester													Duration:15 Weeks											
Semester: Fourth													Scheme: S4											
Learning Scheme													Assessment Scheme											
Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Acutal Contact Hr./Week			Self Learning (Term Work	National Learning Hrs/We	Credits	Paper Duration	Theory				Based on LL & TL Practical				Based on Self Learning		Total Marks
													FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
						CL	TL	LL					Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
1	Garment Manufacturing & Processing Technology	GPT	DSC	X231401	0	3	1	0	1	5	2.5	3	30	70	100	40	0	0	0	0	50	20	150
2	Technology of Printing Synthetic Fibres	TPSF	DSC	X231402	3	3	1	3	1	8	4	3	30	70	100	40	50	20	50	20	25	10	225
3	Specialty Finishing Technology of Textiles	SFTT	DSC	X231403	3	3	0	3	1	7	3.5	3	30	70	100	40	50	20	50	20	25	10	225
4	Ecofriendly Textile Processing	ETP	DSE	X232404	2	3	1	0	1	5	2.5	3	30	70	100	40	0	0	0	0	25	10	125
5	Chemicals and Auxiliaries Evaluation	CAE	DSE	C232405	1	3	1	3	1	8	4	3	30	70	100	40	25	10	25	10	25	10	175
6	Seminar - 1	SEM	INP	C237406	1	2	0	0	1	3	1.5	0	0	0	0	0	0	0	50	20	0	0	50
7	Indistrial Visit II	IV-II	INP	C235407	4	0	0	3	1	4	2	0	0	0	0	0	0	0	25	10	25	10	50
	Total				14	17	4	12	7	40	20		150	350	500	200	125	50	200	80	175	70	1000

Abbrevations : CL - Class Learning, TL: Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA- Summative Assessment, IKS - Indian Knowledge Skills, SLA - Self Learning Assessment

Legends: # - External Assessment, @ - Internal Assessment, * Online Examination

Note:

1. FA-TH repersents average of two class tests of 30 marks each conducted during the semester
2. If candidate is not securing minimum passing marks in FA-PR then the candidate shall be declared 'Fail' in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then candidate shall be declared 'Fail' and will have to repeat and resubmit SLA work.
4. Notional learing hours for the semester are (CL + TL + LL+ SL)hrs * 15 weeks
5. 1 credit is equivalent to 50 notional hours.
6. Self Learning hours shall not be reflected in Time Table

Course Category: DSC - Discipline Sepcific Courses Core, DSE - Discipline Specific Elective, G E - Generic Elective, AEC - Ability Enhancement Course, SEC - Skill Enhancement Course, VEC - Value Education Course, INP - Project and Community

S. B. PAWAR
CDC IN-CHARGE

A.P. MODGEKAR
HOD, DTC

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES ★ MUMBAI

DR. G. R. ANDHORIKAR
PRINCIPAL. SIMMT

Program Name : Diploma in Textile Technology

Program Code : DTT

Semester : Fourth

Course Title : Spinning of Other Fibers and Texturising

Course code : T231401

I. RATIONAL

This course is designed to prepare students to apply basic knowledge of manufacturing of other fibres such as woollen, worsted, silk, linen, viscose, polyester, nylon etc. and to produce quality yarns in respective categories. Filament yarn manufactured by melt spinning technique needs to be texturized. Texturizing process is necessary to incorporate artificial deformations in the structure of yarn to enhance comfort properties of fabric made of these yarns. This course is designed to developed the knowledge based related to the spinning of other fibres and texturing.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Apply the knowledge of spinning process of various fibres.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning.

CO1- Use of manufacturing process for woollen yarn.
CO2- Use of manufacturing process for worsted yarn.
CO3- Use of manufacturing process for silk and linen yarn.
CO4 - Use of manufacturing process for viscose rayon yarn.
CO5 - Use of manufacturing process for polyester and nylon yarn.
CO6 - Use of texturing machineries for texturing of filament yarn.

IV. TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category	Learning Scheme					Credits	Assessment Scheme												Total Marks
				Actual Contact Hrs/ week			SLH	NLH		Paper Duration (hrs)	Theory				Based on LL and TSL Practical				Based on SL		
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
T231401	Spinning of other Fibers and Texturing	SOFT	DSC	2	1	3	1	7	3.5	3	30	70	100	40	25	10	50	20	25	10	200

Total IKS hours for semester: 2Hrs.

Abbreviations: CL- Class room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:

FA-TH represents average of two class tests of 30 marks each conducted during the semester.

1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
4. One credit is equivalent to 30 Notional hrs.
5. * Self learning hours shall not be reflected in the Time Table.
6. * Self learning includes micro project/ assignment/ other activities.

IV. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr. No.	Theory Learning Outcomes (TLOs) aligned to Cos	Learning content mapped with Theory Learning Outcomes (TLOs) and (Cos)	Suggested Learning Pedagogies.
	SECTION-I		
Unit I- Woollen spinning	**TLO 1.1** . Classify the woollen fibres **TLO 1.2** Draw flow chart for manufacturing woollen yarn. **TLO 1.3** . Elaborate on Woollen spinning- process sequence with objectives of each process and their working principles. **TLO 1.4** Draw schematic diagram of woollen carding machine and explain function of each element. **TLO 1.5** . Explain the working of woollen ring frame with the help of a neat diagram.	**1.1** Classification of wool fibres **1.2** Flow chart for manufacturing woollen yarn. **1.3** Woollen spinning- process sequence with objectives of each process and their working principles. **1.4** Woollen carding machine-Objectives, construction and working, passage of material. **1.5** Woolen ring spinning. - Objectives, construction and working, passage of material.	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.
Unit – II **Worsted spinning**	**TLO 2.1** Draw flow chart for manufacturing worsted yarn. **TLO 2.2** Compare woollen and worsted yarn.	**2.1** Flow chart for manufacturing worsted yarn. **2.2** Difference between the flow charts of woollen and worsted yarn. **2.3** Worsted spinning - process sequence with	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.

	TLO 2.3 Elaborate on Worsted spinning- process sequence with objectives of each process and their working principles. **TLO 2.4** Elaborate construction and working, passage of wool on worsted carding machine. **TLO 2.5** Elaborate construction and working, passage of wool on gill box and comber.	objectives of each process and their working principles. **2.4** Worsted carding: - Objectives, construction and working, passage of material, **2.5** Gilling and combing: -- Objectives, construction and working, passage of material.	
Unit – III **Silk and Linen spinning**	**TLO3.1** Classify the silk **TLO 3.2** Explain Sericulture – Cultivation of cocoon **TLO 3.3** Elaborate on Sequence of processes for manufacturing of silk yarn. **TLO 3.4** Describe Silk degumming **TLO 3.5** Explain Reeling process **TLO 3.6** State the Properties and applications of silk yarn.	**3.1** Classification of silk **3.2** Sericulture – Cultivation of cocoon **3.3** Sequence of processes for manufacturing of silk yarn. **3.4** Silk degumming **3.5** Reeling **3.6** Properties of silk yarn. **3.7** Flow chart for manufacturing of Linen yarn with objectives of each process **3.8** Properties and applications of Linen yarn.	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.
SECTION-II			
Unit – IV **Regenerated fibres spinning**	**TLO 4.1** Classify the man-made fibres. **TLO 4.2** Draw and understand the flow chart of Manufacturing process of Viscose rayon . **TLO 4.3** State the Physical & chemical properties of Viscose rayon. **TLO 4.4** State the Uses of Viscose rayon. **TLO 4.5** Draw and understand the flow chart of Manufacturing process of Cuprammonium Rayon:	**4.1 Man-Made fibre** :- Classification of man-made fibres. **Regenerated Fibers –** **4.2 ViscoseRayon:** Manufacturing process, **4.3** Physical & chemical properties. **4.4** Uses of Viscose rayon. **4.5 Cuprammonium Rayon:** Manufacturing process,	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.

	TLO 4.6 State the Physical & chemical properties. **TLO 4.7** state the Uses of Cuprammonium rayon	**4.6** Physical & chemical properties. **4.7** Uses of Cuprammonium rayon	
Unit – V- **Polyester and Polyamide spinning**	**Synthetic Fibers** **TLO 5.1** Draw and understand the flow chart of Manufacturing process of Polyester Fibres: **TLO 5.2** State the Physical & chemical properties of polyester . **TLO 5.3** State the Uses of polyester **TLO 5.4** Draw and understand the flow chart of Manufacturing process of Polyamide fibres: **TLO 5.5** State the Physical & chemical properties, Nylon 6 & Nylon 6 6, **TLO 5.6** Sate the Uses of Nylon 6 & Nylon 6,6.	**Synthetic Fibers** **5.1 Polyester Fibres:** Manufacturing process, **5.2** Physical & chemical properties. **5.3** Uses of polyester **5.4 Polyamide fibres:** Manufacturing process, **5.5** Physical & chemical properties, Nylon 6 & Nylon 6 6, **5.6** Uses of Nylon 6 & Nylon 6,6.	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.
Unit – VI **Texturizing.**	**TLO 6.1** Differentiate between spun yarn and filament yarn . **TLO 6.2** Explain objectives of texturizing. **TLO 6.2** Select type of texturizing machine for given type of synthetic yarn. **TLO 6.3** Elaborate functions of various elements of false twist texturizing. **TLO 6.4** Elaborate functions of various elements of air texturizing. **TLO 6.5** Select parameters on texturizing machine for	**6.1** Compare spun yarn and filament yarn. **6.2** Objectives of texturizing. **6.3** Classification of textured yarn **6.4** Types of texturizing, different methods of texturizing. **6.5** False twist texturizing. **6.6** Draw texturing **6.7** Air texturizing. **6.8** Parameters of texturizing machine	Chalk-Board , Laptop, projector, PPTs, Video, Demonstrations, Industrial Visit etc.

	producing a given quality of textured yarn. **TLO 6.6** Elaborate functions of various elements of Stuffer box texturizing.	affecting properties of textured yarn. **6.9** Stuffer box texturing.	

1. SUGGESTED PRACTICAL/EXERCISES

The practical/exercises/tutorials in this section are psychomotor domain LOs (i.e. sub- components of the COs), to be developed and assessed in the student to lead to the attainment of the competency.

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr. No.	Laboratory Experiment / Practical Title / Tutorial Title	No. of Hours	Relevant Cos
LLO 1 Draw the flow chart showing the manufacturing process of woollen yarn.	1	*Draw and understand the flow chart showing the manufacturing process of woollen yarn.	3	CO1
LLO 2 Draw the flow chart showing the manufacturing process of worsted yarn..	2	*Draw and understand the flow chart showing the manufacturing process of worsted yarn.	3	CO1
LLO 3 Compare the woollen yarn and worsted yarn.	3	Differentiate between the woollen yarn and worsted yarn.	3	CO1
LLO 4 Draw the line diagram of woollen carding machine.	4	*Use of woollen carding machine to understand the passage of material through the machine	3	CO1
LLO 5 Identify the various parts of the woollen carding machine.	5	Use of woollen card machine to identify the various parts of the machine	3	CO1
LLO 6 Draw the line diagram of Worsted carding machine.	6	*Use of worsted carding machine to understand the passage of material through the machine	3	CO2
LLO 7 Draw the line diagram of worsted comber machine.	7	*Use of worsted Comber machine to understand the passage of material through worsted combing machine.	3	CO2
LLO 8 Identify the various parts of the worsted comber machine.	8	Use of worsted comber machine to identify the various parts of the machine.	3	CO2
LLO 9 Draw the flow chart showing the manufacturing process of silk yarn.	9	*Draw and understand the flow chart showing the manufacturing process of silk yarn.	3	CO3
LLO 10 Draw the flow chart showing the manufacturing	10	*Draw and understand the flow chart showing the manufacturing process of	3	CO3

process of Linen yarn..		Linen yarn.		
LLO 11 Draw the flow chart showing the manufacturing process of Viscose rayon yarn..	11	*Draw and understand the flow chart showing the manufacturing process of Viscose rayon yarn.	3	CO4
LLO 12 Draw the flow chart showing the manufacturing process of polyester yarn..	12	*Draw and understand the flow chart showing the manufacturing process of Polyester yarn.	3	CO5
LLO 13 Draw the flow chart showing the manufacturing process of Nylon 6 yarn..	13	*Draw and understand the flow chart showing the manufacturing process of Nylon 6 yarn.	3	CO5
LLO 14 Draw the flow chart showing the manufacturing process of Nylon 66 yarn..	14	*Draw and understand the flow chart showing the manufacturing process of Nylon 66 yarn.	3	CO5
LLO 15 Draw the line diagram of False twist texturing machine.	15	*Use of false twist texturing machine to understand the passage of material through the machine.	3	CO6
LLO 16 Draw the line diagram of Air jet texturing machine.	16	*Use of Air jet texturing machine to understand the passage of material through the machine.	3	CO6
LLO 17 Draw the line diagram of Draw texturing machine.	17	Use of Draw texturing machine to understand the passage of material through the machine.	3	CO6
LLO 18 Draw the line diagram of Stuffer box machine.	18	Use of Stuffer box texturing machine to understand the passage of material through the machine.	3	CO6
Note – 1. Perform any 12 tutorials/practical out of 18 and ensure that all units are covered. 2. Take tutorial in a batch size of 20 to 30 students.				

VIi - SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

Self-Learning

Following are some suggestive self-learning topics:

- Collect the different fibres/filaments used in the industry and identify the techniques for the production of the same.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Woollen yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Worsted yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Silk yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Linen yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Viscose yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Polyester yarn with input and output from each process.
- Prepare a flow chart diagram showing the sequence of processes for manufacturing of Nylon yarn

with input and output from each process.

- Draw the labled diagram of False twist texturing.
- Draw the labled diagram of Air jet texturing.

Activities

- Industrial visit to various spinning plants of other fibres such as Silk, Linen, Polyester, Nylon etc.

VIII. LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

Sr. No	Equipment Name with Board Specifications	Relevant LLO Number
1	Woollen card	1,3,4,5
2	Worsted card	2,3,6,7
3	False twist texturing	15,17
4	Air jet texturing	16

IX. SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied Cos	Learning Hours	R-Level	U-Level	A–Level	Total Marks
1	I	Woollen spinning	CO1	5	3	3	5	11
2	II	Worsted spinning	CO2	5	2	4	6	12
3	III	Silk and Linen spinning	CO3	5	2	4	6	12
4	IV	Regenerated fibres spinning	CO4	6	4	4	7	15
5	V	Polyester and polyamide spinning	CO5	4	2	3	5	10
6	VI	Texturizing	CO6	5	2	3	5	10
				30	15	21	34	70

X. ASSESSMENT METHODOLOGY /TOOLS

Formative assessment (Assessment for Learning)

Mid Term Test,
Micro Projects and
assignments Rubrics
Each practical will be assessed considering 60% weightage to process and 40% weightage to product.

Summative Assessment (Assessment of Learning)

End Term Examination
Laboratory
Performance

XI. SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Lifelong learning	PSO-1	PSO-2	PSO-3
CO1	3	1	-	2	-	-	2	3	-	1
CO2	3	1	1	2	-	-	2	3	1	2
CO3	3	1	1	2	-	-	2	3	1	2
CO4	3	2	2	-	-	-	2	3	2	-
CO5	3	2	2	-	-	-	1	3	2	-

Legends: - High: 03, Medium: 02, Low: 01, 0: No mapping

PROGRAM SPECIFIC OUTCOMES (PSO's)

(What s/he will continue to do in the textile technology specific industry soon after diploma programme)
PSO 1: Perform spinning, weaving, and knitting using various relevant technologies.
PSO 2: Perform designing and garmenting using various relevant technologies.
PSO 3: Maintain various textile machines to produce various types of quality textiles at optimum cost.

XII. SUGGESTED LEARNING RESOURCES / BOOKS

Sr. No.	Author	Title	Publisher
1	Allan Brearly & John A. Iredale	Woolen Spinning	WIRA, Headingley Lane, Leeds, UK , ISBN 0-90082-010-1
2	Allan Brearly	Worsted spinning	Sir Isaac Pitman & Sons Ltd
3	Mr. Rao & Mr. Talole	A Guide to Crimping and Texturising	Mantra Publications
4	A.A. Vaidya	Synthetic Fiber Production	Prentice Hall of India Pvt. Ltd, ISBN 0- 87692-578-6
5	Mishra S.P.	A Textbook on Fibre Science and Technology	New age International, 2014 ISBN-13:978-8122412505
6	Moorthy, H.V.Srinivas	Introduction to Textile Fibres	
7	Salvotra K.R.	Spinning of man-made fibres and blends	Textile Association of India. 2014
8	Cook J., Gordon	Handbook of Textile fibres-Animal fibres	Marrow Publications Co. Limited. 2014 ISBN 0 87692-578-6
9	Cook J., Gordon	Handbook of Textile fibres-Animal fibres	Marrow Publications Co. Limited. 2014 ISBN 0904095401

XIII. LEARNING INTERNET AND PORTALS

Sr. No.	Links / Portals	Description
1	https://www.woolmarklearningcentre.com/program-library/wool-education-program/worsted-and-woollen-spinning/	Woollen spinning
2	https://www.textilesphere.com/2019/12/worsted-and-woolen-spinning.html	Woollen and worsted spinning
3	https://www.textilesphere.com/2020/05/yarn-texturing.html	Yarn texturing
4	https://in.video.search.yahoo.com/search/video;_ylt=Awr1QaV3AJJnVAIASpy7HAx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=texturing+of+yarn&fr2=piv-web&type=E210IN714G0&fr=mcafee#id=2&vid=c5e2c990be02f492a5f3e11d05d70384&action=view	Polyester yarn production
5	https://in.video.search.yahoo.com/search/video;_ylt=AwrKBHvOAZJnFAIAYpi7HAx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=spinning+of+silk+yarn&fr2=piv-web&type=E210IN714G0&fr=mcafee#id=2&vid=a9244c78a151f444c20d1a35f2ba7743&action=view	Silk yarn production
6	https://in.video.search.yahoo.com/search/video;_ylt=AwrKBHvOAZJnFAIAYpi7HAx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=spinning+of+silk+yarn&fr2=piv-web&type=E210IN714G0&fr=mcafee#id=5&vid=556af017c52e3b5072ead4aabf105868&action=view	Silk yarn production
7	https://in.video.search.yahoo.com/search/video;_ylt=AwrKBxxUAJJn6gEAcr.7HAx.;_ylu=Y29sbwNzZzMEcG9zAzEEdnRpZAMEc2VjA3BpdnM-?p=wool+spinning&fr2=piv-web&type=E210IN714G0&fr=mcafee#id=2&vid=dd47c621b493d4c3c6dac4ad1b15ea60&action=view	Spinning of wool

S. No.	Name & Designation	Institute	Contact No.	Email
1.	Mrs. S. V. Raut Lecturer	Sasmira's Institute of Man-made Textiles, Worli, Mumbai	9892542736	saritaraut@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES MUMBAI

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES

PRINCIPAL

Program Name : Diploma in Textile Technology

Program Code : DTT

Semester : Fourth

Course Title : Dobby Jacquard and Drop- box

Course code : T231402

I RATIONALE

The ornamentation of fabric is done by the constant variation in number of warp threads in the top and bottom lines of shed in successive picks, so as to conceal certain threads to form an effective pattern on the face or back of the fabric. This is accomplished by means of Dobbies and Jacquard.
The ornamentation of fabric is also done by the introduction of more than one colour, count or quality in the warp or weft or both. The ornamentation in the weft is done by means of multiple box motion.
This subject intends to impart knowledge and skills in the area of ornamentation of fabrics when the fabric is manufactured by the use of Dobbies, Jacquard and multiple box motion other special mechanisms.

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:
"Weave different types of fabrics using different types of yarns and equipment".

III COURSE LEVEL LEARNING OUTCOMES (COS)

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

(a) Use dobby mechanism to produce fancy fabric.
(b) Explain Principals of Highspeed Dobbies
(c) Use Weft Selection Mechanism to produce a weft pattern fabric.
(d) Use jacquard mechanism to produce fabric with intricate design.
(e) Explain Principals of Highspeed Jacquard
(f) Use of other methods to produce fancy fabrics

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

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				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
T231402	Dobby Jacquard and Drop-box	DJD	DSC	2	1	3	1	7	3.5	3	30	70	100	40	25	10	50	20	25	10	200

Total IKS hours for semester: 2 Hrs.

Abbreviations: CL- Classroom Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS- Indian Knowledge System, SLA- Self Learning Assessment
Legends: @InternalAssessment, #ExternalAssessment, *#OnLine Examination, @$Internal Online Examination

Note:

FA-THrepresentsaverageoftwoclasstestsof30marks each conducted during the semester.

1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.*15 Weeks
4. Onecreditisequivalentto30Notionalhrs.
5. *Self -learning hours shall not be reflected in the Time Table.
6. *Self-learning includes microproject/assignment/other activities.

V THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Unit No		Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics	Teaching Ads
		SECTION I		
1	**TLO 1.1**	**Unit–I Dobby Mechanism** Describe The limitation of the given type of shedding mechanism. And classify dobbies	1.1 Limitations of tappet shedding Type of dobbies. Classification and Scope of dobby, uses of dobby.	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation.
	TLO 1.2	Explain the working of the given type of bobbies with relevant sketch	1.2 Study of construction and working of double lift dobby, Keighley dobby, climax dobby. Double lift dobby,	
	TLO 1.3	Mark the Methods of pegging for the given type of dobbies.	1.3 Method of lattice pegging for right hand dobbies and left hand dobbies	
	TLO 1.4	Explain the fitting and setting of dobbies and its defects	1.4 Mounting and setting of climax dobby on loom, and causes of jack-missing and stitching.	
	TLO 1.5	Describe with Sketch the working of the given type of cross border dobbies.	1.5 Study of two cylinders cross border dobby,	
2.	**TLO 2.1**	**Unit– II Highspeed Dobbies** Explain principals of negative cam dobies	2.1 Northrop negative cam dobby. Staubli cam negative dobby.	Improved Lecture using PPT, Tutorial, Assignments,
	TLO 2.2	Estimate average RPM, Reed space and Picks of loom shed	2.2 Positive cam Dobbies. Paper pattern dobbies, electronic dobbies	

	TLO 2.3	understand the terms mention in Fabric analysis sheet	2.3 Rotary dobbies for highspeed loom Mechanical and electronic selection	Demonstration, Simulation.
3	**TLO 3.1**	**Unit-III Weft Selection Methods** Explain weft selection by drop box	3.1 Objective and type of Drop box motion. Study of Drop-box motions, timing and setting on silk loom.	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation
	TLO 3.2	Describe and prepare program for weft selection	3.2 Pick-and-Pick loom 2 X 1, 4 X 1. Pick at will box motion on silk loom 2 X 2, 4 X 4. Cow burn and pecs Box motion Pattern cards Chain preparation for 2 X 1, 4 X 1, 2 X 2, 4 X 4	
	TLO 3.3	Describe Modern weft selection methods	Modern weft selection Mechanism	

		SECTION II		
4	TLO 4.1	**Unit VI Jacquard** Explain Classification Scope and sizes of jacquard.	4.1 Scope of Jacquard shedding Requirements of Jacquard Shedding Different Parts of Jacquard Classification of jacquard, sizes of Jacquard, figuring capacity of Jacquard. Systems of harness mounting , Norwich system & London	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation.
	TLO 4.2	Describe working principles of given type of jacquard with neat Sketches.	4.2 Principles of jacquard shedding, Study of system. Single lift jacquard, Timing of single lift jacquard, drive for single lift jacquard.. Double lift single cylinder jacquard. Independent drive for double lift single cylinder jacquard. Double lift double cylinder jacquard, chain drive for double lift Jacquard, jacquard mounting. Timing of double lift jacquard. Open-shed jacquard, centre shed jacquard	
5	TLO 5.1	**UNIT V-Jacquard designing and Special jacquards** Explain Process of jacquard designing	5.1 Process of jacquard designing Piano card cutter method of card cutting, card lacing. Casting out of Jacquard	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation.
	TLO 5.2	Identify first hook of jacquard	5.2 Tie-up, first or leading hook in Jacquard.	
	TLO 5.3	Explain Special jacquards	5.3 Cross border jacquard, Vincenzi jacquard, Verdol jacquard, self-twilling jacquard Electronic jacquard	
6	TLO 6.1	**Mechanism for Special fancy effect**	6.1 Lappet Weaving Scope and Principle of lappet weaving	Improved

	Explain Lappet weaving TLO 6.2 Explain Leno Weaving TLO 6.3 Explain Terry Weaving	6.2 Leno weaving Scope and different Mechanism 6.3 Tery weaving Principal and different mechanisms of terry weaving		Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation.

VI.LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

(LLO)	Practical / Tutorial / Laboratory Learning Outcome	Sr. No.	Laboratory Experiment / Practical Title / Tutorial Title	No. of Hours	Relevant COs
LLO 1.1	Identify different parts of Climax dobby	1	Use climax dobby to dismantling all the parts and refit as per standard setting	3	CO1
LLO 2.1	Study Single lift dobby to understand Construction and working of machine	2	Use Single lift dobby to understand Construction and working of machine	3	CO1
LLO 3.1	Transfer lifting plan on wodden lattice for given design for left hand &right hand dobbies	3	Use wooden lattice chain for reproduction of given design on the fabric by preparing relevant peg plans for right hand and left hand dobby	3	CO1
LLO 4.1	Study of construction and working of Cam Dobby	4	Use Northrop Cam Dobby to understand Construction and working of machine	3	CO2
LLO 5.1	Study of Cross border Dobby and setting Pattern of cross border weave	5	Use Cross boarder Dobby to understand Construction and working of machine	3	CO4
LLO 6.1	Study of 2 x1 Drop box loom	6	Use 2 x1 Drop box loom a. Dismantling its component. Refitting the all components with relevant timing and setting. b. c. Prepare card chain for given weft pattern.	3	CO4
LLO 7.1	Study of 4 x 4 pick at will Drop box loom	7	Use 4 x 4 pick at will Drop box loom a. Dismantling its component b. Refitting the components with relevant timing and setting. Prepare card chain for given weft pattern	3	CO4
LLO 8.1	Study of single lift single cylinder jacquard to demonstrate the function of various parts	8	Use single lift single cylinder jacquard to demonstrate the function of various parts	3	CO4

LLO 9.1	Study of double lift double cylinder Jacquard to demonstrate the function of various parts	9	Use double lift double cylinder Jacquard to demonstrate the function of various parts	3	CO5
LLO 10.1	Transfer lifting plan on wooden lattice for given jacquard design	10	Use trace paper to transfer design on point paper	3	CO5
LLO11.1	Transfer lifting plan on paper cards for given Jacquard design	11	Use piano card cutting machine to prepare cards for given design	3	CO5
LLO12.1	Study leno weaving to construct leno fabrics	12	Use leno weaving to construct leno fabrics	3	CO5
LLO13.1	Study of terry loom to construct terry fabrics.	13	Use Terry loom to construct Terry fabrics	3	CO5
LLO14.1	Study lappet mechanism to construct lappet design.	14	Use Lappet loom to construct lappet design	3	CO5
	Note – 1. Take any 15 tutorials out of 25 and ensure that all units are covered. 2. Take tutorial in a batch size of 20 to 30 students. 3. Give students 10 problems to solve on each unit.				

VII - SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

1. SUGGESTED STUDENT ACTIVITY1.

Other than the classroom and laboratory learning, following are the suggested student related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

(a) Student should collect different fabric sample available in market and collect information about draft design and denting plan. They should determine number of heald and lags required each sample.

(b) Student should Draw Diagrams Of different dobby jacquard looms loom timings circle on card board showing timings of shedding Picking and beat up on it.

(c) Student Collect fabrics samples of various lappets, leno and terry designs and gather information about them on internet in the form of Photograph video and prepare power point presentation

(d) Student should Collect fabrics samples of various Weft patterns and decide program of weft selection

(e) Do internet survey to study the development of shedding mechanism

2. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

(a) Massive open online courses (***MOOCs***) may be used to teach various topics/sub topics.

(b) ***'L' in item No. 4*** does not mean only the traditional lecture method, but different types of teaching methods and media that are to be employed to develop the outcomes.

(c) About ***15-20% of the topics/sub-topics*** which is relatively simpler or descriptive in nature is to be given to the students for ***self-directed learning*** and assess the development of the COs through classroom presentations (see implementation guideline for details).

(d) With respect to item No.10, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***.

(e) Guide student(s) in undertaking micro-projects..

(f) Use animation and videos available on internet for better understanding of the subject area

(g) Use PPT available on internet for accelerated learning.

3. SUGGESTED ASSIGNMENTS

Only one assignment is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the assignments are group-based. However, in the fifth and sixth semesters, it should be preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for assignments, the number of students in the group should **not exceed three.**

The assignment could be industry, application based, internet-based, workshop-based, laboratory-based or field-based. Each assignment should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the assignment work and give a seminar presentation of it before submission. The total duration of the assignment should not be less than **16 (sixteen) student engagement hours** during the course. The student ought to submit assignment by the end of the semester to develop the industry oriented COs.

A suggestive list of assignments is given here. Similar assignments could be added by the concerned faculty.

(a) **Dobby Shedding:** Produce fabrics of different dobby design on dobby loom and prepare catalogue showing their design, peg plan , draft, denting order, method of pegging diagram and swatches of fabrics.

(b) **Jacquard shedding:** Prepare jacquard design using small motif and Produce fabrics of different Jacquard on jacquard loom

(c) **Box motion:** Collect the different patterned fabrics and analyse its weft pattern. Prepare card chain for the patter.

Other than the classroom and laboratory learning, following are the suggested student-related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should conduct following activities in group and prepare reports of about 5 pages for each activity, also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

VIII – LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1.	Climax Dobby mechanism with 16 heald shaft	1,3
2.	Single lift Dobby hand loom	2
3.	Cam Dobby	4
4.	Wodden Lattice, Pegs	3
5.	Single lift single cylinder jacquard	8
6.	Double lift double cylinder jacquard	9
7.	Piano card cutting machine	10
8.	Cards for jacquard design Point papers	10
9.	2x1 Drop box motion	7
10.	4 X 4 Drop box motion loom	8

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied Cos	Learning Hours	R- Level	U- Level	A– Level	Total Marks
1	I	**Dobby Mechanism**	CO1	08	04	06	06	15
2	II	**Highspeed Dobbies**	CO2	10	04	04	04	12
3	III	**Weft Selection Methods**	CO3	04	02	02	03	08
4	IV	**Jacquard**	CO4	10	04	06	06	15
5	V	**Jacquard Designing and special jacquard**	CO5	10	04	06	06	10
6	VI	**Mechanism for Special fancy effect**	CO5	3	01	02	02	10

X ASSESSMENT METHODOLOGY /TOOLS

Formative Assessment (Assessment for learning)

- Tests
- Rubrics for Cos Assignments
- Midterm Exams
- Self-learning
- Term work
- Seminar / Presentation

Summative Assessment (Assessment of Learning)

- End term Examination
- Micro-projects
- Tutorial performance

XI SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life long learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	2	1	1	1			-
CO2	3	1	1	2	1	1	1			-
CO3	2	2	1	1	2	1	2	3	2	3
CO4	3	1	1	2	1	1	1			-
CO5	3	1	1	2	1	1	1			-
CO6	2	2	1	1	2	1	2	3	2	3
Legends :- High : 03, Medium : 02, Low : 01 , 0 : No mapping										
PSO 1:Perform preparatory, colouration and finishing of textiles using various relevant technologies.										
PSO 2:Perform Quality evalution of textiles, fibres, yarns, Fabrics, Dyes and chemicals using various standerd Test										
PSO 3: Maintain Various Textile machines to produce various types of quality textiles at optimum and sustainable cost										

XII SUGGESTED LEARNING RESOURCES / BOOKS

S. No.	Title of Book	Author	Publication
1.	Weaving conversion of yarn to fabric	Lord P.R.	Woodhead publication ISBN:I 855734834
2.	Principle of weaving	Marks R Robbinson	The textile institute Manchester, 1976 ISBN 0-900739258
3.	Weaving machines Mechanisms, Management	Talukdar M.K, Ajgaonkar D.B. Sriramlu P.K	Mahajan Publisher Private Ltd, ISBN: 81-85401-16-0
4.	Cotton Yarn Weaving	R. N. Kanoongo P.R. Roy	
5.	Fancy weaving Mechanism	K.T. Aswani	Mahajan Publisher Private Ltd,
6	Weaving Mechanism	N.N. Banerji	Mahajan Publisher Private Ltd, I

XIII LEARNING WEBSITES AND PORTALS

Sr.No	Link / Portal	Description
1	○ https://www.slideshare.net/sheshir/process-sequence-ofweaving?next_slideshow=1 ○ https://www.textiletoday.com.bd/time-required-tying-process-wont-headacheanymore-weaving/ ○ https://www.textileschool.com/242/weaving-calculations/ ○ https://textilelearner.blogspot.com/2011/06/primary-motions-of-weavingloom_377.html ○ https://nptel.ac.in/courses/116/102/116102005/ ○ https://textilelearner.blogspot.com/2014/07/motions-and-their-functions-onweaving.html ○ https://textilelearner.blogspot.com/2013/09/different-types-of-sheddingmechanism_4.html ○ https://www.youtube.com/watch?v=KzXOo7r170s ➢ https://www.youtube.com/watch?v=6Y-mu7lskwg ○ www.nptel.ac.in/courses/116102005/29 ○ www.nptel.ac.in/courses/116102005/51 ○ www.nptel.ac.in/courses/116102005/52 ○ www.nptel.ac.in/courses/116102005/53 ○ www.nptel.ac.in/courses/116102005/32 ○ www.nptel.ac.in/courses/116102005/37 ○ www.nptel.ac.in/courses/116102005/42 ○ www.nptel.ac.in/courses/116102005/47 ○ www.nptel.ac.in/courses/116102005/34 ○ www.nptel.ac.in/courses/116102005/35 ○ https://en.wikipedia.org/wiki/Units_of_textile_measurement	

XIV COURSE CURRICULUM DEVELOPMENT COMMITTEEL:

Sr. No	Name	Institute	Mobile No.	Email
1.	Mr. H.V. Ramteke, Head of the Department (Textile Technology)	Sasmira's Institute of Manmade Textiles	9766306847	hoddmtt@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES

PRINCIPAL

Programme Name : Diploma in Textile Technology

Programme Code : DTT

Semester : Fourth

Course Title : Garment Processing Technology

Course Code : T237406

1. RATIONALE

Ready-made Garment sector is growing with the increasing demand from consumers. This course is floated to update the student about the present need of the industry, society and the Environmental issues. This course is developed so that the students will develop the attitude of garment processing alternatives and meet the customer's expectation in short span. This will further help them to solve broad based problems in the garment processing from environment viewpoint.

2. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

The aim of this course is to help the student to **"To develop the skill set of garment processing alternatives thereby meeting customer's expectation"** and attain the industry identified competency through various teaching learning experiences.

3. COURSE LEVEL LEARNING OUTCOME (CO'S)

The Theory and self learning assignments associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented CO's associated with the above mentioned competency:

CO1 - Identify the present and future potential of garment processing industry.
CO2 - Provide solutions in garment processing by suggesting the right type of machineries.
CO3 - Identify the different fashion washes and processes which can be carried on denims.
CO4 - Analyse and adopt the pretreatment options for desired preparation of garments.
CO5 - Analyse and adopt the dyeing & printing options for garments as per customer's expectation.
CO6 - Analyse and adopt the finishing options for garments as per customer's expectation.

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Course Category	Learning Scheme					Credits	Assessment Scheme												Total Marks
			Actual Contact Hrs/ week			SLH	NLH		Paper Duration (hrs)	Theory				Based on LL and TSL Practical				Based on SL		
			CL	TL	LL					FA-TH		SA-TH		Total		FA-PR		SA-PR		SLA		
										Max		Max		Max	Min	Max	Min	Max	Min	Max	Min	
T237406	Garment Processing Technology	DSE	2	0	0	0	2	1	0	0		0		0	0	50	20	0	0	0	0	50

Total IKS hours for semester: 0 Hrs.

Abbreviations: CL- Class room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment

Legends: @Internal Assessment, #External Assessment, *#Online Examination,@$Internal Online Examination

Note:
FA-TH represents average of two class tests of 30 marks each conducted during the semester.

1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.*15 Weeks
4. One credit is equivalent to 30 Notional hours.
5. *Self-learning hours shall not be reflected in the Timetable.
6. *Self-learning includes micro-project/assignment/other activities.

V THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr. No.	Theory Learning Outcomes (TLOs) aligned to Cos	Learning content mapped with Theory Learning Outcomes (TLOs) and (Cos)	Suggested Learning Pedagogies.
		SECTION I	
1	TLO 1.1 Compose a flowchart to create a relevant process sequence to get desired effect on given garment. TLO 1.2 Propose garment processing plan for given garment with due justification. TLO 1.3 Formulate relevant processing method for reproducibility of an effect on the given garment. TLO 1.4 Explain the relevant ecological issues related to processing of given garment with due justification. TLO 1.5 Propose the scope of garment processing industry along with advantages and limitations.	**Unit - I Introduction to Garment Processing** 1.1 Introduction to garment processing industry, Need for garment processing, department layout, process flow. 1.2 Structure of the garment Industry, importance of garment processing, concept of garment and pre-garment processing,. 1.3 Fibre properties suitability for garment processing, garment construction, seam strength, shrinkage, etc.. 1.4 Issues related to garment processing like batch to batch variation, panel variation, reproducibility, processing faults, skilled labour, ecological considerations.. 1.5 Scope of garment processing industry, Sectoral demands of various garment categories, Advantages and limitations of garment processing in details.	Lectures, Presentations, Assignments, Practical, You- tube simulation, Flip classroom.
2.	TLO 2.1 – Explain with sketches, the working principle and mechanism of specified garment washing machine.	**Unit II – Garment processing machineries** 2.1 Introduction of Machineries used for garment processing, 2.2 Principle and working	Lectures, Presentations, Assignments, Practical, You- tube simulation, Flip

	TLO 2.2 - Describe with sketches, the working principle and mechanism of specified garment dyeing machine. TLO 2.3 – Propose the uses and unique features of given type of drier. TLO 2.4. – Explain with sketches, the working principle and procedure of given finishing machine. TLO 2.5 – Compare the features of the given two types of machines.	procedure of garment dyeing and washing machines, types of machines, end uses of machines, maintenance and advantages & limitations 2.3 Principle and working procedure of garment drying machines namely tumble drier, RF drier & hydro extractor, uses of machines, maintenance and advantages & limitations. 2.4 Principle and working procedure of garment tunnel finishing machines, spray booth system, types of machines, end uses of machines, maintenance and advantages & limitations. 2.5 Principle and working procedure of pressing and fusing machines, types of machines, end uses of machines, maintenance and advantages & limitations	classroom.
3.	TLO 3.1 - Describe the process sequence of given denim fabric with neat labelled sketches TLO 3.2 - Describe with sketches, the process to produce the specified effect on given denim. TLO 3.3 – Classify the washes on the basis of following parameters. TLO 3.4. – Justify the objectives of given type of wash and give its application. TLO 3.5 - Identify the faults and rectify denim washing defects in the given denim fabric with relevant solutions.	**Unit III – Denim wet processing** 3.1 Denim, indigo dye and properties. Chemistry and principles of denims and Jeans washing, Fashion washes on garments, process sequence, advantages and limitations of fashion washes. 3.2 Principle and objectives of stonewash on pigment padded/printed, denim garments. Process details, advantages and limitations. 3.3 Principle and objectives of acid wash, sand blasting of denim garments, Process details, advantages and limitations. 3.4 Principle and objectives of stoneless washes of denim garments like mud wash, chalk wash, enzyme wash & ion wash, Process details, advantages and limitations. 3.5 Problem of yellowing and remedial measures of denim washed garments during Stonewash, acid wash, cellulase	Lectures, Presentations, Assignments, Practical, You- tube simulation, Flip classroom.

		enzyme washes on denim garments in detail.	
		SECTION II	
	TLO 4.1 – Extend the understanding of processing in fabric and garment form. TLO 4.2 – Develop the process sequence possibilities for given type of garment. TLO 4.3 – Propose the process conditions and procedure for desizing of given type of garment. TLO – 4.4 Compose the process conditions and procedure for scouring of given type of garment. TLO – 4.5 Generate the process conditions and procedure for bleaching of given type of garment.	**Unit IV – Garment pretreatment process** 4.1 Introduction to processing of fabrics, principle difference in processing of fabric & garments, 4.2 Process sequence possibilities in garment pre-treatment processing. 4.3 Garment desizing, principle, working and methods with process formulation. 4.4 Garment scouring, principle, working and methods with process formulation. 4.5 Garment bleaching, principle, working and methods with process formulation.	Lectures, Presentations, Assignments, Practical, You- tube simulation, Flip classroom.
	TLO 5.1 – Identify the principle and procedure of garment dyeing using given class of dye. TLO5.2 – Generate a process for dyeing given garment using pigment. TLO 5.3 – Describe with sketch, the method to produce specified type of print on the given type of garment. TLO5.4 – Identify the given types of garment prints. TLO 5.5 – Explain the concept of specified digital print and enlist its features.	**Unit V – Garment coloration (Dyeing & Printing)** 5.1 Principles of garment dyeing, Garment dyeing with Direct dyes, Reactive dyes, Sulphur dyes and Vat dyes (step by step procedure). 5.2 Pigment dyeing by exhaust method of garments, its advantages and limitations (step by step procedure). 5.3 Pigment printing and Transfer printing of garments. 5.4 Concept of flock, plastisol, metallic, foil, pearl, khadi, high density, photochromic and puff printing, application method and uses 5.5 Introduction to digital printing, types of inks, different principle of digital printing, application method and uses.	Lectures, Presentations, Assignments, Practical, You- tube simulation, Flip classroom.
	TLO 6.1 Choose a relevant machine which is used for specified finishing process with justification.	**Unit VI – Garment finishing and Garment labels and care** 6.1 Different finishing methods and techniques, principle,	Lectures, Presentations, Assignments, Practical, You- tube

	TLO 6.2 Compare the features of given two types of garment finishes TLO 6.3 Explain with sketches, the mechanism of given type of crease resistant chemicals TLO 6.4 Identify given types of lables and their significance. TLO 6.5 Identify the given type of stain and their removal method with justification. TLO 6.6 List the properties of the given solvents used in drycleaning.	method, advantages and limitations. Different general finishes like Soft finish, moisture management finish and wrinkle free & wash-n-wear garment finish, its objective, method of application and end uses. 6.2 Different specialty finishes like water repellent finish, Anti-microbial finish, UV protection finish and fragrance garment finish, its objective, method of application and end uses. 6.3 Types of labels, Garment labels; its objectives, importance, symbols used, its advantages and limitations. 6.4 Garment refurbishing; stains, its identification, types, chemicals used, methods adopted and industrial formulations. 6.5 Dry cleaning; objectives, chemicals & solvents used and procedure.	simulation, Flip classroom.

VI.LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

VII - SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

Other than the classroom, following are the suggested student-related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course:

- Market survey of different processed garments: compare their properties, uses, and prices.
- Library survey regarding new developments in garment processing and their application methods.
- Prepare a catalogue of different categories of garments with the help of standardized Harmonised System.
- Prepare MOOC's may be used for better understanding and clarity.
- Present seminar on relevant topics.
- Collect information from internet about different types of garment markets along with consumption patterns.

ASSIGNMENTS –

A suggestive list is given here. Similar ASSIGNMENTS could be added by the concerned faculty:

a. **Scope and future of Garment Industry:** Collect information / data from various sources for the last 25 years and analyze the fashion trends in garment industry in domestic as well as international markets.
b. **Denim Washes:** Classify various denim washes by visiting a denim washing unit and collect 10-15 samples of various types of denim washes.
c. **Dye and chemical cost:** Visit industry and collect at least five dyeing recipe, price of dyes and chemicals of any two dyeing methods and calculate dyeing cost. Present report.
d. **Garment Printing:** Collect information from various sources to prepare a comparative chart related to type of machine, machine cost, operational cost, features of print, dyes & chemicals required, etc. prepare a report and present.
e. **Short recordings:** Visit different garment processing units, observe the working operations of machines at various stages and capture videos. Then arrange the videos in proper sequenc and present a report of the same.
f. **Lables:** Collect samples of carelabels by visiting various garment units. Classify them according to their types and present the results.
g. **Dry cleaning :** Collect information of the different types of dry cleaning solvents used in dry cleaning od textiles. Highlight the features of each dry cleaning solvent and present the report.

VIII – LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied Cos	Learning Hours	R-Level	U-Level	A–Level	Total Marks
1	I	**Introduction to Garmen Processing**	CO1	07	02	3	6	11
2	II	**Garment processing machineries**	CO2	08	02	04	06	12
3	III	**Denim wet processing**	CO3	08	02	04	06	12
4	IV	**Garment pretreatment process**	CO4	07	02	3	6	11
5	V	**Garment coloration (Dyeing & Printing)**	CO5	08	03	04	06	13
6	VI	**Garment finishing and Garment labels and care**	CO6	07	02	3	6	11
				45	**16**	**20**	**34**	**70**

X ASSESSMENT METHODOLOGY /TOOLS

Formative Assessment (Assessment for learning)

- Assignments submission (Term work)

Summative Assessment (Assessment of Learning)

- End of Term examination – Viva-voce

XI SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life long learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	1	1	1	2	2	2	2
CO2	2	2	2	1	1	1	2	2	2	2
CO3	2	2	2	1	1	1	2	2	2	2
CO4	2	2	2	1	1	1	2	2	2	2
CO5	2	2	2	1	1	1	2	2	2	2
CO6	2	2	2	1	1	1	2	2	2	2

Legends: -High: 03, Medium: 02, Low:01,0: No mapping

PROGRAM SPECIFIC OUTCOMES (PSO's)
(What s/he will continue to do in the textile and related industry soon after diploma programme)

PSO 1: **Perform preparatory, Colouration and Finishing of Textiles using various relevant technologies.**

PSO 2: **Perform Quality evaluation of textiles, Fibres, Yarns, Fabrics, Dyes and Chemicals using various standard test methods.**

PSO 3: **Maintain various textile machines to produce various types of quality textiles at optimum and sustainable cost.**

XII SUGGESTED LEARNING RESOURCES / BOOKS

Sr. No.	Author	Title	Publisher
1	Garment Wet Processing Manual	R. Michael Tyndall	Compiled by RA104, AATCC
2	Denim & Jeans Fashion Washes	Prof. D. L. Shah	Executive Garment Processors Pvt. Ltd.
3	Denim: Manufacture, Finishing and Application	Paul R.	Woodhead Publication, Swaston, Cambridge 2015 ISBN: 9780857098436
4	Textile Printing	Miles L. W. C.	Society of Dyers & Colourist, UK, 1981 ISBN: 9780901956330
5	Introduction to Textile Finishing	Marsh J. T.	Chapman & Hall Publications, UK, 1966 ISBN: 9781114790087
6	Chemical Finishing of Textiles	Schindler W. D.	Woodhead Publications, Swaston, UK 2002, ISBN: 9781855739055
7	Functional Finishes for Textiles	Paul R.	Woodhead Publications, Swaston, UK, 2014 ISBN: 9780857098399
8	Fabric Care	Noemia D'Souza	New Age International Publishers, New Delhi, 1998, ISBN: 9788122411430
9	Encyclopaedia of Garment Printing	Freshner, Scott	US Screen Print Industries, 1985 ISBN: 97809933493001

Program Name : **Diploma in Textile Technology**

Program Code : **DTT**

Semester : **Fourth**

Course Title : **Fabric Structure - II**

Course code : **T231403**

I RATIONAL

Fabrics are produced to serve certain end uses. These end uses determine the properties and the quality of the fabric that it should possess. The quality of fabric depends on its functional and aesthetic properties. These in turn are governed by raw material selection, yarns used, fabric construction, structure and texture and ornamentation of fabric.
In this course advance methods of fabric design and structure and their production on the loom is discussed at length. Methods of ornamenting the fabric with attractive figures are discussed in this course. Elaborate and intricate woven structures are extensively used in various areas like ladies' dress materials, furnishing fabric, upholstery. Pile structures are used in furnishing industry extensively. This course encompasses detail study of various pile structures like terry structures, velvets, moquette, Velveteen, Corduroy etc.

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

"Develop compound fabric structures using principles of design."

III COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO 1 - Develop various extra thread designs corresponding to the given motif.
CO 2 - Develop various types of backed cloth designs as per the requirement of end use.
CO 3 - Develop various types of double cloth designs from the given specifications.
CO 4 - Develop various terry pile designs and corresponding given motifs.
CO 5 - Develop Velvet structures as per the requirement of end use.
CO 6 - Construct Velveteen structure as per required specification of end use.

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

(Abbreviation – MAS, Course Category – AEC, Paper duration – 3 hr)

Course Code	Course Title	Learning Scheme					Credits	Theory				Based on LL and TSL Practical				Based on SL		Total Marks
		Actual Contact Hrs/ week			SLH	NLH		FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
		CL	TL	LL				Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
T231403	Fabric Structure - II	2	1	3	1	7	3.5	30	70	100	40	25	10	25	10	25	10	175

Total IKS hours for semester: - 2 Hrs.
Abbreviations: CL- Class room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:
FA-TH represents average of two class tests of 30 marks each conducted during the semester.

1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
4. One credit is equivalent to 30 Notional hrs.
5. * Self-learning hours shall not be reflected in the Time Table.
6. * Self-learning includes micro project/ assignment/ other activities.

V THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr. No.	Theory Learning Outcomes (TLOs) aligned to Cos	Learning content mapped with Theory Learning Outcomes (TLOs) and (Cos)	Suggested Learning Pedagogies.
		SECTION I	
1	TLO 1.1 - Identify the fabric ornamented with extra threads. TLO 1.2 - Develop point paper design of intermittent and continuous extra warp figure. TLO 1.3 – Develop point paper design of intermittent extra weft figure. TLO 1.4 – Compare extra warp figure with extra weft figure. TLO 1.5 – Draw design from given draft and peg-plan. TLO 1.6 – Transfer free hand motifs on point paper and construct the detail weave of extra thread ornamentation corresponding to that motif suitable for weaving on loom.	**Unit – I Figuring with Extra Thread** 1.1 Principle of figuring with extra threads, methods of introducing extra threads, methods of disposing extra threads, comparison of extra warp and extra weft design. 1.2 Extra warp figuring –Continuous figuring with one extra warp, intermittent figuring with one extra warp, extra warp planting, stitching by means of special picks. 1.3 Extra weft figuring – continuous figuring with one extra weft, intermittent figuring with one extra weft, chintzing, stitching by means of special ends.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.
2.	TLO 2.1- Develop a point paper design of warp backed cloth for given specifications. TLO 2.2 - Develop a point paper design of reversible warp backed cloth for given specifications. TLO 2.3 - Develop a point paper	**Unit- II Backed cloth** 2.1 Concept of backed cloth, objectives of backing. 2.2 Weft backed cloth- reversible weft backed cloth; Methods of weft backing standard twill and hopsack weave.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.

	design of weft backed and reversible weft backed cloth for required parameters. TLO 2.4 - Develop a point paper design of wadded warp backed and wadded weft backed cloth for given specifications. TLO 2.5 - Develop a point paper design of interchanging warp backed and interchanging weft backed cloth for given specifications.	2.3 Warp backed cloth - reversible warp back cloth, Methods of warp backing of standard twill and hopsack weave, beaming and drafting of warp backed cloth, methods of warp backing standard weaves. 2.4 Interchanging backed cloth - treble wefted interchanging backed cloth. 2.5 Backed cloth with wadding threads -Weft backed warp wadded design. Warp backed weft wadded design	
3.	TLO 3.1 - Classify double cloths into different categories. TLO 3.2 - Construct a self-stitched double cloth design, draft, peg-plan and cross section for given specifications TLO 3.3 - Construct a wadded self-stitched double cloth design, draft, peg-plan and cross section for given specifications. TLO 3.4 – Develop centre stitched double cloth design, draft, peg-plan and cross section for given specifications TLO 3.5 - Develop a interchanging double cloth design corresponding to given motif.	**Unit-III Double cloth** 3.1 Classification of Double cloth. 3.2 Self-stitched double cloth - Construction of double cloth with changing boxes at one side, reversible double cloth, beaming and drafting of self-stitched double cloth, selection of suitable stitching positions, wadded double cloth, warp wadded double cloth and weft wadded double cloth. 3.3 Centre stitched double cloth – Centre warp stitched double cloth, centre weft stitched double cloth. 3.4 Interchanging double cloth-effect due to changes in the position of separating lift with continuous one and one colour arrangement.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.
SECTION II			
4	TLO 4.1 - Classify pile structures into different categories. TLO 4.2 - Draw standard weaves and corresponding cross sections for a terry structure on required number of picks. TLO 4.3 - Elaborate different special mechanisms required on terry loom. TLO 4.4 - Select construction particulars for required quality of terry fabric. TLO 4.5 - Develop different motifs	**Unit-IV Terry pile Structures** 4.1 Classification of pile structures 4.2 Concept of formation of terry pile. 4.3 Standard weaves for production of terry pile structure on 3 pick, 4 picks, 5 picks and 6 picks. 4.4 Special mechanisms required for terry weaving. 4.5 Construction particulars of a good quality terry fabric. 4.6 Terry ornamentation – Stripes, Checks, Combined stripes and	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.

	and corresponding detailed weaves of stripes, checks and figured terry fabrics.	checks, figured terry fabric.	
5	TLO 5.1 - Explain the principle of face-to-face weaving. TLO 5.2 - Explain different special mechanisms required for velvet loom. TLO 5.3 - Draw different designs, drafts and denting plans and corresponding peg-plans and cross sections for 'U' pile Velvet structures on single shuttle system. TLO 5.4 - Draw different designs, drafts and denting plans and corresponding peg-plans and cross sections for 'U' pile Velvet structures on double shuttle system. TLO 5.5 - Draw different designs, drafts and denting plans and corresponding peg-plans and cross sections for 'W' pile Velvet structures on single shuttle and double shuttle systems. TLO 5.6 - Draw different designs, drafts, denting plans, corresponding peg-plans and cross sections for 'U' pile Moquette structures on single shuttle system TLO 5.7 - Compare Velvet structures with Moquette structures.	**Unit-V** **Warp pile produced on Face-to-face weaving principle- Velvet** 5.1 Principle of face-to-face weaving. 5.2 Special mechanisms required for face-to-face weaving. 5.3 Velvet structures- 'U' pile structures on single shuttle system, double shuttle system, different designs, drafts and denting plans and corresponding peg-plan and cross sections for 'U' pile structures 5.4 Velvet structures- 'W' pile structures on single shuttle system, double shuttle system, different drafts and denting plans and corresponding peg-plan and cross sections for 'W' pile structures 5.5 Moquette structures – Design, draft, peg-plan and cross section of Moquette structures 5.6 Construction particulars of Velvets and Moquettes 5.7 Difference between Velvet and Moquette structures.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation
6	TLO 6.1 - Classify velveteen structures into different categories. TLO 6.2 - Develop designs, their cross section (before and after cutting) of all over plain back velveteen based on given pile weave. TLO 6.3 -Select construction particulars and pile weave to achieve given length of pile and density of pile. TLO 6.4 - Calculate density of pile (tuft/cm^2) of given velveteen. TLO 6.5 - Construct design and cross section of a velveteen having fast pile anchorage. TLO 6.6 - Develop designs, their cross section (before and after cutting) of all over twill back velveteen based on given pile weave.	**Unit VI –** **Weft pile structures-Velveteen** 6.1 Classification of velveteen. 6.2 Design and cross section (before and after cutting) of all over and plain back velveteen. 6.3 Length of pile. 6.4 Density of pile- Changing density of pile and expression for density of pile. 6.5 Fast pile structures- designs and corresponding cross sections. 6.6 Twill back velveteen- designs and corresponding cross sections. 6.7 Weft plushes- designs and corresponding cross sections. 6.8 Corded velveteen (Corduroy)- designs and corresponding cross	Improved Lecture, tutorial, Assignments, Demonstration, Simulation

	TLO 6.7 - Develop different designs, their cross section (before and after cutting) of all over corded velveteen (Corduroys).	sections.	

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr. No.	Laboratory Experiment / Practical Title / Tutorial Title	No. of Hours	Relevant COs
LLO 1.1 Observe the interlacement of each warp and weft threads and mark it on inch graph paper as design. LLO 1.2 Ascertain the repeat size of design. LLO 1.3 Draw draft, peg-plan and cross section from the design.	1	Use analysis tool kit to analyse the continuous Extra warp design sample to: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction. (i) Represent the design, draft, peg plan and denting order on point paper.	3	CO1
LLO 2.1 - Observe the interlacement of each warp and weft threads and mark it on inch graph paper. LLO 2.2 - Draw draft, peg-plan, cross section and repeat size from the design. LLO2.3–Estimate the warp colour pattern.	2	Use analysis tool kit to analyse the intermittent Extra warp design sample to: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction. (i) Represent the design, draft, peg plan and denting order on point paper.	3	CO1
LLO 2.1 - Observe the interlacement of each warp and weft threads and mark it on inch graph paper. LLO 2.2 - Draw draft, peg-plan cross section and repeat size from the design. LLO 2.3 – Estimate the weft colour pattern.	3	Use analysis tool kit to analyse the Extra weft design to: (i) Estimate the EPI, PPI, warp/weft-count, twist direction and warp pattern. (ii) Represent the design, draft, peg plan, denting order and cross section on point paper.	3	CO1
LLO 2.1 – Develop warp backed design on point paper using given specifications. LLO 2.2 - Develop warp backed weft wadded design on point paper using given specifications. LLO 2.3 – Draw draft, peg-plan and cross section of both designs.	4	Develop Warp backed design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same. Develop Warp backed weft wadded design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO2
LLO 5.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 5.2 Ascertain the repeat size of the design. LLO 5.3 Draw draft and peg-plan	5	Develop Weft backed design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same. Develop weft backed warp wadded design on point paper based on given	3	CO3

from the design.		specifications. Construct draft, peg-plan, cross section and denting order for the same.		
LLO 6.1 Construct self-stitched double cloth design corresponding to selected face and back weave. LLO 6.2 Draw design, draft and peg-plan.	6	Develop Self-stitched double cloth design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 7.1 Construct warp wadded self-stitched double cloth using selected face weave, back weave and warp pattern. LLO 7.2 Draw draft, peg-plan and cross section	7	Develop Warp wadded double cloth design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 8.1 Construct weft wadded self-stitched double cloth using selected face weave, back weave and weft pattern. LLO 8.2 Draw draft, peg-plan and cross section	8	Develop Weft wadded double cloth design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 9.1 Construct Centre warp stitched double cloth using selected face weave, back weave and weft pattern. LLO 9.2 Draw draft, peg-plan and cross section	9	Develop Centre warp stitched double cloth design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 10.1 Construct Centre weft stitched double cloth using selected face weave, back weave and weft pattern. LLO 10.2 Draw draft, peg-plan and cross section.	10	Develop Centre weft stitched double cloth design on point paper based on given specifications. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 11.1 Construct an interchanging double cloth using selected face weave, back weave and weft pattern. LLO 11.2 Draw draft, peg-plan and cross section.	11	Develop an interchanging double cloth design Corresponding to given motif. Construct draft, peg-plan, cross section and denting order for the same.	3	CO3
LLO 12.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 12.2 Ascertain the repeat size of the design. LLO 12.3 Draw draft and peg-plan from the design.	12	Use analysis tool kit to analyse Terry towel sample with stripe and checks to: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction. (i) Represent the design, draft, peg plan, denting order and cross section on point paper.	4	CO4
LLO 13.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 13.2 Ascertain the repeat size of the design.	13	Use analysis tool kit to analyse Terry towel sample with a figured pattern to: (ii) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction. (i) Represent the design, draft, peg plan,	4	CO4

LLO 13.3 Draw draft and peg-plan from the design.		denting order and cross section on point paper.		
LLO 14.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 14.2 Ascertain the repeat size of the design. LLO 14.3 Draw draft, peg-plan and cross section from the design.	14	Use analysis tool kit to analyse velvet sample with 'U' pile: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction, tufts/inch^2. (ii) Represent the design, draft, peg plan, denting order and cross section on point paper.	5	CO5
LLO 15.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 15.2 Ascertain the repeat size of the design. LLO 15.3 Draw draft, peg-plan and cross section from the design.	15	Use analysis tool kit to analyse velvet sample with 'W' pile: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction, tufts/inch^2 (ii) Represent the design, draft, peg plan, denting order and cross section on point paper.	5	CO5
LLO 16.1 Observe the interlacement of each warp and weft and mark the design on inch graph paper. LLO 16.2 Ascertain the repeat size of the design. LLO 16.3 Draw draft, peg-plan and cross section from the design.	16	Use analysis tool kit to analyze Corduroy sample: (i) Estimate the EPI, PPI, warp/weft-count, colour pattern, twist direction, tufts/inch^2 (ii) Represent the design, draft, peg plan, denting order and cross section on point paper.	5	CO6
Note – 1. Perform any 15 tutorials/practical out of 16 and ensure that all units are covered. 2. Take tutorial in a batch size of 20 to 30 students. 3. Give students 10 problems to solve on each unit.				

VII - SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

- **Intermittent Extra Warp Design**: Develop point paper designs of intermittent Extra warp figure corresponding to the given motif. At least 4 designs to be produced corresponding to different motifs of your choice. Draw draft, peg-plan and cross section of each design so produced. Prepare a file of the analysis done.
- **Continuous Extra Warp Design**: Develop point paper designs of intermittent Extra warp figure corresponding to the given motif. At least 4 designs to be produced corresponding to different motifs of your choice. Prepare a file of the analysis done.
- **Extra warp and extra weft:** Collect various extra warp and extra weft figuring dress material samples from market and analyse them. Prepare a file containing fabric analysis with design, draft, peg-plan, cross section and construction particulars of each sample.
- **Portfolio of advance designs** - Prepare a portfolio containing different extra thread figuring, backed cloth and double cloth.
- **Portfolio of backed cloth designs** - Prepare a portfolio of various types of backed cloth designs, their construction particulars and end use.
- **Portfolio of double cloth designs** - Prepare a portfolio of various types of double cloth designs, their construction particulars and end use.

- **Portfolio of terry towels** - Prepare a portfolio of terry towels various designs, their construction particulars.
- **Portfolio of Velvet designs** - Collect various types of velvet samples from market and analyse them. Draw design, draft, peg-plan and cross section of all the samples collected and prepare a portfolio.
- **Portfolio of Velveteen designs** - Collect various types of velveteen samples from market and analyse them. Draw design, draft, peg-plan and cross section of all the samples collected and prepare a portfolio.
- **Power point presentation of pile structure:** - Prepare a power point presentation of all types of pile structures giving details of construction particulars, design, draft, peg-plan, cross section, tufts/inch, end uses.

ASSIGNMENTS –

- Each batch will collect samples extra thread figures.
- Students will prepare a power point presentation of Extra thread figuring.
- Students will prepare a power point presentation of Backed cloth.
- Students will prepare a power point presentation of Double cloth.
- Give seminar on various furnishing and terry towelling structures.
- Collect various samples of terry towels samples. Analise them and draw design, draft and peg-plan of them.
- Collect samples of velvets and velveteen. Find out the construction particulars of them and prepare a report.

VIII – LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1	Reflex type 1 inch counting glass, Neddle,12-inch steel ruler, Beesley's balance, Point Paper	All experiments
2	Crimp tester	All experiments
3	Continuous extra warp figuring sample	1
4	Intermittent extra warp figuring sample	2
5	Intermittent extra weft figuring sample	3
6	Warp backed cloth sample	4
7	Weft backed cloth sample	5
8	Terry towel sample with stripe design	8
9	Terry towel sample with checks design	9
10	Terry towel sample with geometric or natural motif	10
11	Velvet sample with 'U' pile	11
12	Velvet sample with 'W' pile	12
13	Velveteen sample, Corduroy sample	13

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied COs	Learning Hours	R-Level	U-Level	A–Level	Total Marks
SECTION I								
1	I	Figuring with extra thread figuring	CO1	06	2	4	4	10
2	II	Backed cloth	CO2	08	2	4	6	12
3	III	Double cloth.	CO3	10	3	4	6	13
SECTION II								
4	IV	Terry weaving	CO4	6	2	4	4	10
5	V	Velvet structures	CO5	9	2	4	6	12
6	VI	Weft pile structures - Velveteen	CO6	6	3	4	6	13
				30	14	24	32	70

X ASSESSMENT METHODOLOGY /TOOLS

Formative Assessment (Assessment for learning)

- Tests
- Rubrics for Cos Assignments
- Midterm Exams
- Self-learning
- Term work
- Seminar / Presentation

Summative Assessment (Assessment of Learning)

- End term Examination
- Micro-projects
- Tutorial performance

XI SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Lifelong learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	1	-	-	1	2	2	2
CO2	3	1	2	1	1	1	-	2	2	-
CO3	3	2	2	1	-	-	-	1	2	2
CO4	3	3	2	1	1	1	1	1	2	-
CO5	3	2	3	1	-	1	1	1	3	-
CO6	3	2	3	1	1	1	1	1	3	2
Legends: - High: 03, Medium: 02, Low: 01, 0: No mapping										
PSO 1: Perform spinning, weaving, knitting using various relevant technologies.										
PSO 2: Perform designing and garmenting using various relevant technologies.										
PSO 3: Maintain various textile machines to produce various types of quality textiles at optimum cost.										

XII SUGGESTED LEARNING RESOURCES / BOOKS

Sr. No.	Author	Title	Publisher
1	Marks & Robbinson, A.T.S.	Principle of Weaving.	The Textile Institute, Manchester,1976 ISBN: 0-900739258
2	Z. J. Grosicki	Watson's Advanced Textile Design.	WOOD HEAD PUBLISHING LIMITED, Cambridge England, **ISBN 1 85573 996 8**
3	N.Gokarneshan	Fabric Structure and Design	New age international (P) limited, New Delhi, ISBN (10) : 81-224-2307-8

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	http://textilesandfolklores.blogspot.com/2012/11/figuring-with-extra-warpweft-threads.html	Extra thread designs.
2	https://textilelearner.net/extra-warp-design-features-and-uses/	Extra thread designs.
3	https://textileschool4u.blogspot.com/2013/12/backed-fabrics.html	Backed cloth
4	https://www.slideshare.net/isarothossan/double-cloth-65179194	Double cloth
5	https://crimsonpublishers.com/tteft/fulltext/TTEFT.000595.php	Double cloth
6	https://en.wikipedia.org/wiki/Double_cloth	Double cloth
7	https://www.fibre2fashion.com/industry-article/6149/construction-of-double-cloth-jacquard-designs	Double cloth
8	https://www.sciencedirect.com/topics/engineering/pile-warp	Terry pile structures
9	https://textilelearner.net/flow-chart-of-terry-fabric-towel-manufacturing-process/	Terry pile structures
10	https://en.wikipedia.org/wiki/Velvet	Velvet
11	https://www.iwantfabric.com/blog/post/the-ultimate-guide-to-velvet-from-manufacturing-to-care	Velvet
12	https://en.wikipedia.org/wiki/Velveteen	Velveteen
13	https://en.wikipedia.org/wiki/Corduroy	Velveteen
14	https://tajvelvet.com/manufacturing-process/	Velveteen

XIV COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr. No.	Name & Designation	Institute	Contact No.	Email
1.	Mr. A. S. Deshmukh, Sr. Lecturer (Selection Grade).	Sasmira Institute, Worli, Mumbai	9833570740	asdeshmukh@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES

PRINCIPAL

Program Name : **Diploma in Textile Technology**

Program Code : **DTT**

Semester : **Fourth**

Course Title : **Nonwoven and Specialty Fabrics**

Course code : **T231404**

I RATIONAL

The application areas of industrial textiles cover a very broad range, from deep inside the human body to outer space. Industrial textiles are specially designed and engineered structures that are used in products, processes or services of mostly non-textile industries. It addresses the new and emerging technologies in textiles manufacturing. The rapid progress in industrial textiles will increase the demand for highly technically skilled people for both production and research and development. Hence this curriculum impart knowledge of manufacturing and applications of some important Industrial textiles like Nonwovens, Braided Textiles, Narrow fabrics, coated and laminated textiles and filtration textiles

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

Apply principles of garment manufacturing and processing in selection of raw materials, process control parameters and quality assurance procedures.

III COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1 – Identify different process for web formation
CO2 – Identify different process for web bonding
CO3 – Recommend various nonwoven products for different hygiene, safety, home, apprel and technical applications.
CO4 – Identify braided structure and recommends its products for various application
CO5 – Identify Coated and laminated structure and recommends its products for various application
CO6 – recommends filtration textile products for various application

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Course Category	Learning Scheme					Credits	Assessment Scheme											Total Marks
			Actual Contact Hrs/ week			SLH	NLH		Paper Duration (hrs)	Theory				Based on LL and TSL Practical				Based on SL		
			CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
										Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
T231404	Non Woven and Specialty Fabrics	DSC	2	1	0	1	4	2	3	30	70	100	40	0	0	0	0	25	10	125

Total IKS hours for semester: 0 Hrs.
Abbreviations: CL- Class room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:
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1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
4. One credit is equivalent to 30 Notional hrs.
5. * Self-learning hours shall not be reflected in the Time Table.
6. * Self-learning includes micro project/ assignment/ other activities.

V THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr. No.	Theory Learning Outcomes (TLOs) aligned to Cos	Learning content mapped with Theory Learning Outcomes (TLOs) and (Cos)	Suggested Learning Pedagogies.
		SECTION I	
1	TLO 1.1 Define given term. TLO 1.2 Draw flow chart for given manufacturing methods of nonwoven. TLO 1.3 Describe given laying method for web formation. TLO 1.4 Describe tasks of web laying machines TLO 1.5 Describe working principal of given web laying machines TLO 16 Describe principal of given method of web laying	**Unit – I Introduction and web forming process** 1.1 Introduction to nonwoven. Definition of nonwoven. 1.2 Applications of nonwoven **Web forming process** 1.3 Parallel laying, cross laying 1.4 Tasks of web laying machines 1.5 Web laying machines – camel back, counter current double belt laying, synchronous double belt laying, carriage laying 1.6 Air laying 1.7 Wet laying 1.8 Spun laying 1.9 Melt blown	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
2.	TLO 2.1 Explain type of web bonding process with the help of chart. TLO 2.2 Explain principal of given web bonding process TLO 2.3 Explain needle characteristics with the help of sketch.	**Unit – II Web Bonding Process** 2.1 Web bonding process. 2.2 Needling process – Principal, needle characteristics. 2.3 Stitch bonding process 2.4 Principle of hydroentanglement process. 2.5 Thermal bonding process 2.6 Chemical bonding process	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit

3.	TLO 3.1 Explain characteristics of nonwovens for given application. TLO 3.2 Explain re-utilization of nonwovens.	**Unit III – Nonwoven applications and re-utilization** 3.1 Hygiene 3.2 Safety 3.3 Cleaning and house hold 3.4 Home textiles 3.5 Apparel 3.6 Insulation 3.7 Filtration 3.8 Geo nonwoven 3.9 Agriculture 3.10 Automobile 3.11 Covering material 3.12 Re-utilization – utilization, long life, re-use	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
		SECTION II	
4.	TLO 4.1. Define given term. TLO 4.2 Draw and study *two-Dimensional Braiding.* TLO 4.3. Draw and study *three-Dimensional Braiding.* TLO 4.4 Describe working principal of given braiding machines TLO 4.5 Define Narrow fabrics and their types and application e principal of given method of web laying	***Braiding and narrow fabrics:*** 4.1 *Introduction and history* 4.2 *Two-Dimensional Braiding Diamond braid, regular braid, Hercules braid Circular braiding machine* 4.3 *Three-Dimensional Braiding rope manufacturing* 4.4 Application of braided fabrics 4.5 *Narrow Fabric Weaving and their types and applications*	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
5.	TLO 5.1. Define given term. TLO 5.2 study different production methods and products of coated textiles. TLO 5.3. study different production methods and products of laminated textiles .	**Coated and Laminated textile** 5.1 Introduction and Historical background definitions of Fabric coating Fabric lamination, Composite materials The technical scope of coated and laminated textiles 5.2 Production methods Introduction General principles of fabric coating, Laboratory and pilot coating and laminating, Calender coating, Rotary screen coating and And its products 5.3 Lamination, Flame lamination melt lamination Discussion of the various methods and and its products.	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
6.	TLO 5.1. Define Filtration TLO 5.2 study textile used in dry	Filtration Texxtiles	Chalk-Board Video

	filtration. TLO 5.3. study textile used in wet filtration	*6.1 Principles of Filtration , Filtration Equipment ,* *6.2 Textiles in Dry Filtration ,* *6.3 Textiles in Liquid Filtration Designing for Filtration*	Demonstrations Cooperative Learning Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

NA

VII SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

Self-Learning

Following are some suggestive self-learning topics:

- Collect information on developments of the nonwoven industry.
- Collect information on future perspectives of nonwoven industry.
- Collect information on developments of nonwoven manufacturing machines.
- Collect information on testing of nonwovens.
- Collect information on developments of Braided structure.
- Collect information on developments of Narrow fabrics
- Collect information on developments of Coated and laminated textiles
- Collect information on developments of Filtration fabrics

Micro project

- Collect photographs of nonwoven manufacturing machines. (Group of 4-5 students)
- Collect photographs of different products of nonwoven applications (Group of 4-5 students)
- Collect different samples of nonwovens (Group of 4-5 students)
- Develop product for application of nonwovens (Group of 4-5 students)
- Collection of braided textiles samples
- Develop product for application of Braided ropes (Group of 4-5 students)
- Collection of Narrow fabrics samples
- Develop labels
- Collection of samples of coated and laminated textiles.
- Collection of samples of filtration textiles(fibres yarns and fabrics)

VIII LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

NA

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied Cos	Learning Hours	R-Level	U-Level	A–Level	Total Marks
1	I	Introduction and web forming process	CO1	5	4	2	6	12
2	II	Web Bonding Process	CO2	6	6	2	6	14
3	III	Nonwoven applications and re-utilization	CO3	4	1	2	6	9
4	IV	Braiding and narrow fabrics:	CO4	5	4	2	6	12
5	V	Coated and Laminated textiles	CO5	6	6	3	6	15
6	VI	Filtration Textiles	CO6	4	1	2	5	8
				30	0	0	0	70

X ASSESSMENT METHODOLOGY /TOOLS

Formative assessment (Assessment for Learning)

Mid Term Test,
Micro Projects and
assignments Rubrics

Summative Assessment (Assessment of Learning)

End Term
Examination

XI SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Lifelong learning	PSO-1	PSO-2	PSO-3
CO1	2	3	1	1	-	1	2	3	1	2
CO2	2	3	2	1	1	2	2	2	2	2
CO3	2	2	2	1	3	1	2	2	3	1
CO4	2	3	1	2	2	1	2	3	1	2

CO5	2	3	2	2	2	2	2	2	2	2
CO6	2	2	2	2	3	1	2	2	3	1

Legends: - High: 03, Medium: 02, Low: 01, 0: No mapping

PROGRAM SPECIFIC OUTCOMES (PSO's)
(What s/he will continue to do in the textile Chemistry specific industry soon after diploma programme)

PSO 1: Perform Nonwoven Braiding, weaving, Coating, Lamination and filtration processes using various relevant technologies.

PSO 2: Execute designing and development of various textile products using various relevant technologies.

PSO 3: Maintain various textile machines to produce various types of quality textiles at optimum cost.

XII SUGGESTED LEARNING RESOURCES / BOOKS

Sr. No.	Author	Title	Publisher
1	Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes	Wilhelm Albrecht, Hilmar Fuchs, Walter Kittelmann	John Wiley & Sons, 2006 ISBN-3527605312, 9783527605316
2	Hand book of Nonwovens	Russell S	Woodhead publishing, India ISBN - 9781855736030
3	Hand book of Technical Textiles	A R Horrocks and S C Anand	Woodhead publishing ISBN 1 85573 385 4
4	Braiding technology for textiles-	Elsevier_	Woodhead publishing in textiles _ no. 158) (2015)
5	Wellington Sears Handbook of Industrial Textiles-	Sabit Adanur	TECHNOMIC (1995) (2)
6	Coated and Laminated Textiles	Walter Fung -	(Woodhead Publishing Series in Textiles)-Woodhead Publishing (2002)

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	https://www.scribd.com/document/446117262/Non-woven	Nonwoven
2	https://www.textiletoday.com.bd/types-non-woven-fabrics-manufacturing-processes-applications	Process and application
3	https://indextb.com/files/2024/2/f2c2d896-6162-4ba5-9313-0b5a77a8ce3d_Nonwoven%20Textile%20Roll%20Goods%20Manufacturing.pdf	Manufacturing
4	https://archive.nptel.ac.in/courses/116/102/116102014/	Nptl, nonwoven
5	https://www.textileschool.com/352/non-woven-fabrics/	Nonwoven fabrics
6	https://www.creditocean.net/the-ultimate-guide-to-braided-fabrics-types-features-and-applications	Braidding

7	https://textilelearner.net/braiding-and-braided-fabrics/	Braidding
8	https://www.textileworld.com/textile-world/nonwovens-technical-textiles/2022/01/woven-narrow-fabrics-for-applications-requiring-superior-properties/	Narrow fabrics
9	https://www.textilesphere.com/2019/12/coating-lamination-in-textiles.html	Coated and laminated textile
10	https://onlinelibrary.wiley.com/doi/10.1002/9781119325062.ch8	Filtration fabrics

XIV COURSE CURRICULUM DEVELOPMENT COMMITTEEL:

Sr. No	Name	Institute	Mobile No.	Email
1.	Mr. H.V. Ramteke, Head of the Department (Textile Technology)	Sasmira's Institute of Manmade Textiles	9766306847	hoddmtt@sasmira.edu.in
2.	Mr. S. S. Joglekar, Sr. Lecturer (Selection Grade).	Sasmira's Institute of Man- made Textiles, Worli, Mumbai	9833909871	shirishjoglekar@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES
PRINCIPAL

Program Name : **Diploma in Textile Technology**

Program Code : **DTT**

Semester : **Fourth**

Course Title : **Garment Manufacturing Technology**

Course code : **T232405**

I RATIONAL

Fabric produced in Mills is mainly used for producing men's, women's and children's wear. It is therefore important for textile engineers to understand the basic features of garments and its manufacturing and processing. Hence, they can take care of needs of garment manufacturing and processing while designing the fabric. In addition, this knowledge of garment manufacturing would also help textile engineers to get jobs in garment industry or set up their own garment manufacturing and processing unit. Students will also understand how to maintain quality while manufacturing garments. They will also understand different defects, their causes and remedies in garments.

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

"Apply principles of garment manufacturing and processing in selection of raw materials, process control parameters and quality assurance procedures."

III COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

CO1 – Apply the principle of marker planning to reduce fabric waste % of given garment batch.
CO2 – Apply principles of spreading and cutting to spread and cut fabric lay of given batch of garment efficiently.
CO3 - Apply principles of sewing to select type of stitch, seam, needle, sewing thread and sewing machine suitable for sewing given type of garment
CO4 - Understand Inspection of garments.
CO5 – Understand In-process inspection.
CO6 – Understand Final Inspection.

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Course Category	Learning Scheme					Credits	Assessment Scheme											Total Marks
			Actual Contact Hrs/ week			SLH	NLH		Paper Duration (hrs)	Theory				Based on LL and TSL Practical				Based on SL		
			CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
										Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
T232405	Garment Manufacturing Technology	DSE	2	1	3	1	7	3.5	3	30	70	100	40	25	10	0	0	25	10	150

Total IKS hours for semester: 0 Hrs.
Abbreviations: CL- Class room Learning, TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA-Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment
Legends: @ Internal Assessment, # External Assessment, *# On Line Examination, @$ Internal Online Examination

Note:
FA-TH represents average of two class tests of 30 marks each conducted during the semester.
1. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
2. If candidate is not securing minimum passing marks in SLA of any course, then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
3. Notional Learning hours for the semester are (CL+LL+TL+SL) hrs.* 15 Weeks
4. One credit is equivalent to 30 Notional hrs.
5. * Self-learning hours shall not be reflected in the Time Table.
6. * Self-learning includes micro project/ assignment/ other activities.

V THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr. No.	Theory Learning Outcomes (TLOs) aligned to Cos	Learning content mapped with Theory Learning Outcomes (TLOs) and (Cos)	Suggested Learning Pedagogies.
		SECTION I	
1	TLO 1.1 Explain sequence of various processes of garment manufacturing with the help of flow chart. TLO 1.2 Elaborate significance of marker planning and enlist various requirements of the same. TLO 1.3 Select suitable marker planning method for required garment batch.	**Unit – I Introduction to Garment Manufacturing** 1.1 Introduction to garment manufacturing industry in India 1.2 Flow chart for garment manufacturing. **Marker Planning** 1.3 Requirements of Marker planning. 1.4 Methods of marker planning 1.1 Methods of drawing and reproduction of marker	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
2.	TLO 2.1 Explain various objectives and requirements of spreading. TLO 2.2 Select suitable method of spreading for required garment batch. TLO 2.3 Elaborate various objectives and requirements of cutting. TLO 2.4 Select suitable cutting method for given garment batch. TLO 2.5 Describe various features of computer aided cutting.	**Unit – II Fabric Spreading and Cutting** **Spreading** 2.1 Objectives of spreading 2.2 Requirements of spreading. 2.3 Types of fabric. 2.4 Methods of spreading to form a lay. **Cutting** 2.5 Objectives of cutting. 2.6 Requirements of quality cutting. 2.7 Methods of cutting. a) Hand shears b) Straight knife c) Round knife	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit

		d) Band knife e) Notchers f) Drills g) Die cutting h) Laser cutting i) Ultrasonic cutting 2.1 Computer aided cutting.	
3.	TLO 3.1 Draw different types of seams and explain their characteristics. TLO 3.2 Select suitable seam for joining/stitching garment part in a given situation. TLO 3.3 Select suitable stitch type for joining/stitching garment part in a given situation. TLO 3.4 Use sewing machine for joining/stitching garments parts. TLO 3.5 Select type of needle for stitching given garment parts. TLO 3.6 Choose select thread for stitching given garment parts. TLO 3.7 Elaborate various causes and remedies of various sewing problems. TO 3.8 Select various components and trims for given garment stitching assignment. TLO 3.9 Use type of fusible interlining, fusing equipment and method of fusing for given garment. TLO 3.10 Select method of pressing form given garment.	**Unit III - Sewing, Fusing and Pressing** **Sewing** 3.1 Seam – definition, types of seam- Superimposed, Lapped seam, Bound seam, flat seam, decorative seam, edge neatening seams, addition of separate item, Belt loop and belt 3.2 Stitch – definition, intra looping, interloping, interlacing, lockstitch, chain stitch and hand stitch. 3.3 Sewing machine- Types of sewing machine, sewing machine feed mechanism, parts and their function. 3.4 Sewing machine needle – parts of needle, their function, needle size, types of needle. 3.5 Sewing threads- Fibre type, thread construction, thread finishes. 3.6 Sewing problems – Problems of stitch formation, formation of pucker, causes and remedies for the same. 3.7 Components and trims – Labels and motifs, linings and interlinings, laces, braids, elastics, buttons and zipper. **Fusing and Pressing** 3.1 Fusing and pressing – advantages of using fusible interlinings, requirements of fusing, fusing equipment, methods of fusing, welding and molding, purpose of pressing, methods of pressing.	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
		SECTION II	
4.	TLO 4.1 Explain given Terminology in garment quality. TLO 4.2 Explain inspection and type of	**Unit - IV Inspection** 4.1 Quality: Definition, Terminology, Quality	Chalk-Board Video Demonstrations

	inspection TLO 4.3 Explain Inspection loop with sketch. TLO 4.4 Explain given Fabric Inspection System TLO 4.5 Explain quality checks for given (Sewing Thread, Buttons, Interlining)	management, Quality Plan, Quality control, Inspection, Testing 4.2 Inspection: Type of Inspection, Inspection Loop, Fabric Inspection, Quality check for Sewing Thread, Buttons, Interlining	Cooperative Learning Site/Industry Visit
5.	TLO 5.1 Explain given defect its cause and remedy. TLO 5.2 Explain given sewing problem. TLO 5.3Explain Skip bundle sampling plan	**Unit - IV In- Process Inspection** 5.1 Definition 5.2 Possible Spreading, Cutting, Sewing, Seaming, Assembly, Pressing and Finishing defects their causes and remedies. 5.3 Sewing Problem: Stitch formation, Pucker and damage of fabric along seam line. 5.4 Skip bundle sampling plan	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit
6.	TLO 6.1 Explain given terminology. TLO 6.2 Determine given Sampling Plan from AQL Chart. TLO 6.3 Explain given principals of Modern tool of Quality Management. TLO 6.4 Select a care label for given garment batch.	**Unit - VI Final Inspection and Care labels** 6.1 Terminology: Sample, Lot or Batch, Lot or Batch Size, Percent Defective, Process Average, Acceptable Quality Level (AQL) 6.2 Determination of Sampling Plan from AQL Charts – Single and Double Sampling Plan. 6.3 Introduction to Modern tool of Quality Management (Basic Principal) – TQM, Lean Manufacturing **Care labeling** 6.4 Necessity of care labeling of apparels 6.5 Various care labeling symbols and their meaning.	Chalk-Board Video Demonstrations Cooperative Learning Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr. No.	Laboratory Experiment / Practical Title / Tutorial Title	No. of Hours	Relevant COs
LLO 1.1 Observe and note different body measurements and method of taking measurement.	1	* Use methods of taking body measurements and prepare measurement chart.	3	CO1
LLO 2.1 Trace Basic Bodice Block.	2	* Use patterning making methods to prepare Basic Bodice Block.	3	CO1
LLO 3.1 Trace Sleeve Block.	3	*Use patterning making methods to prepare Sleeve Block.	3	CO1
LLO 4.1 Trace collar block.	4	*Use patterning making methods to prepare different collar Block.	3	CO1
LLO 5.1 Trace working of round knife cutting machine.	5	* Use principles of cutting to study round knife machine	3	CO1
LLO 6.1 Trace working of lock stitch sewing machine.	6	* Use principles of sewing to study lock stitch sewing machine	3	CO3
LLO 7.1 Understand working of feed mechanism on sewing machine	7	Use principles of sewing to study Feed mechanism	3	CO3
LLO 8.1 Understand working of straight knife cutting machine	8	* Use principles of cutting to Straight knife cutting machine	3	CO2
LLO 9.1 Understand class I type of seams.	9	*Use principles sewing to stitch class I type of seams	3	CO3
LLO 10.1 Understand class I type of seams.	10	* Use principles sewing to stitch class II type of seams	3	CO3
LLO 11.1 Understand class III type of seams.	11	*Understand class III type of seams.	3	CO3
LLO 12.1 Understand class IV type of seams.	12	* Understand class IV type of seams.	3	CO3
LLO 13.1 Understand class V type of seams.	13	* Understand class V type of seams.	3	CO3
LLO 14. Understand class VI type of seams.	14	* Understand class VI type of seams.	3	CO3
LLO 15.1 Understand class VII type of seams.	15	*Use principles of weft knitting to analysis given Interlock fabric sample	3	CO3
LLO 16.1 Understand class VIII type of seams.	16	* Use circular Flat weft knitting machine to study passage of yarn.	3	CO3

Note: Out of above suggestive LLOs -

- '*' Marked Practical (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs is to be performed to achieve desired outcomes.

VII SUGGESTED MICRO PROJECTS / ASSIGNMENTS / ACTIVITIES FOR SPECIFIC LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

Self-Learning

Following are some suggestive self-learning topics:

- Collect information on recent developments in cutting machines along with their specifications.
- Collect information on recent developments in sewing machines.
- Collect photographs of different types of trims.
- Collect information on various brands and their products

Micro project

- Collect different types of Buttons. (Group of 4-5 students)
- Collect different types of laces. (Group of 4-5 students)
- Collect different types of labels. (Group of 4-5 students)
- Collect different types of motifs. (Group of 4-5 students)
- Collect different types of packing material (Group of 4-5 students)

VIII LABORATORY EQUIPMENTS / INSTRUMENTS / TOOL AND SOFTWARES REQUIRED.

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1	Pattern paper, pencil, French curve	LLO1
2	Lock stitch sewing machine, round knife cutting machine	LLO2
3	Sewing thread, sewing needle	LLO3

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table)

Sr. No.	Unit	Unit Title	Applied Cos	Learning Hours	R-Level	U-Level	A–Level	Total Marks
1	I	Introduction to Garment manufacturing	CO1	2	2	2	6	10
2	II	Fabric Spreading and Cutting	CO2	8	4	4	6	14
3	III	Sewing, Fusing and Pressing	CO3	4	4	2	6	12
4	IV	Inspection	CO4	6	4	2	6	12
5	V	In-process Inspection	CO5	6	4	2	6	12
6	VI	Final Inspection	CO6	4	2	2	6	10
				30	0	0	0	70

X ASSESSMENT METHODOLOGY /TOOLS

Formative assessment (Assessment for Learning)

Mid Term Test,
Micro Projects and
assignments Rubrics
Each practical will be assessed considering 60% weightage to process and 40% weightage to product.

Summative Assessment (Assessment of Learning)

End Term
Examination
Laboratory
Performance

XI SUGGESTED CO-PO MATRIX FORM

Course Outcomes Cos	Program Outcomes (Pos)							Program Specific Outcomes (PSOs)*		
	PO-1 Basic & Discipline specific knowledge	PO-2 Problem Analysis	PO-3 Design Development of solutions	PO-4 Engineering tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Lifelong learning	PSO-1	PSO-2	PSO-3
CO1	3	1	1	1	-	-	2	3	1	1
CO2	3	1	3	2	1	1	3	3	3	2
CO3	3	1	3	2	1	1	3	3	3	2
CO4	3	2	3	2	1	1	3	3	3	2
CO5	3	2	3	2	1	11	3	3	3	2
CO6	3	3	1	2	-	-	2	3	1	3

Legends: - High: 03, Medium: 02, Low: 01, 0: No mapping

PROGRAM SPECIFIC OUTCOMES (PSO's)
(What s/he will continue to do in the textile Chemistry specific industry soon after diploma programme)

PSO 1: Perform spinning, weaving, Knitting and garmenting processes using various relevant technologies.

PSO 2: Execute designing and development of various textile products using various relevant technologies.

PSO 3: Maintain various textile machines to produce various types of quality textiles at optimum cost.

XII SUGGESTED LEARNING RESOURCES / BOOKS

Sr. No.	Author	Title	Publisher
1	The Technology of Clothing Manufacture	Harold Carr and Barbara Lathan	Blackwell Science UK.
2	Sewing Lingerie	Singer	Cy De Cosse, UK
3	Garment Technology for Fashion Designer	Garry Cooklin	Blackwell Science UK.
4	Clothing for Moderns	Erain Mabel Clothing	Macmillan Publication New York
5	Pattern making for fashion designs	Armstrong, Helen Joseph	Harper Collins, LA ISBN : 9780136069348

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	http://www.garmentsmerchandising.com/flow-chart-of-garments-manufacturing-process/	Flow chart
2	https://textilelearner.blogspot.com/2012/02/process-flow-chart-of-garments.html	Flow chart
3	https://clothingindustry.blogspot.com/2018/01/fabric-spreading-garment-industry.html	Spreading
4	https://www.youtube.com/watch?v=xUNzIgMIgtU	Cutting
5	https://clothingindustry.blogspot.com/2018/01/methods-fabric-cutting.html	Cutting
6	https://clothingindustry.blogspot.com/2018/01/cutting-department-garment-industry.html	Cutting
7	https://www.youtube.com/watch?v=g4mf5RB_oUQ	Seams
8	http://fashion2apparel.blogspot.com/2017/04/different-types-seams-uses.html	Seams
9	https://clothingindustry.blogspot.com/2018/03/seam-classification-quality-seam.html	Seams
10	http://fashion2apparel.blogspot.com/2017/04/types-stitches-used-clothing.html	Stitch
11	http://www.garmentsmerchandising.com/types-of-stitch-used-in-garments/	Stitch

XIV COURSE CURRICULUM DEVELOPMENT COMMITTEEL:

Sr. No	Name	Institute	Mobile No.	Email
1.	Mr. S. S. Joglekar, Sr. Lecturer (Selection Grade).	Sasmira's Institute of Man- made Textiles, Worli, Mumbai	9833909871	shirishjoglekar@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES

PRINCIPAL

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	https://www.youtube.com/watch?v=Xr-uenk1A4g	FLOWCHART OF TEXTILE WET PROCESSING
2	https://www.youtube.com/watch?v=P4MrYXQ3DrQ	Textile Desizing, washing, scouring and bleaching
3	https://www.youtube.com/watch?v=Q7Mtv869vJs	Wet processing of textile Material
4	https://www.youtube.com/watch?v=1xPp21pUicI	Introduction to Textile Wet Processing-1
5	https://www.youtube.com/watch?v=8CxXvf7P-CU	Garment Dyeing 101: Everything You Wanted To Know
6	https://www.youtube.com/watch?v=EcPzVSusp34	C.P. Company Garment Dyeing
7	https://www.youtube.com/watch?v=gC0TmgQKHys	Introducing The Stone Island Garment Dyed Jacket Process
8	https://www.youtube.com/watch?v=8xk4gfULNwk	Different Types of Denim Jeans Washing Techniques
9	https://www.youtube.com/watch?v=3IPH0LHxFyw	Denim Washing Process
10	https://www.youtube.com/watch?v=TIEEdmhqNrc	Octopus printing machine
11	https://www.youtube.com/watch?v=oY8sQCb_WZw	Stryker - Automatic Screen Printing Press - M&R Screen Printing
12	https://www.youtube.com/watch?v=46-vlESJ8Ls	ProFinisher 144SHE Garment Form Finisher
13	https://www.youtube.com/watch?v=BfDskB3rlIo	Tunnel Finisher VEIT 8657
14	https://www.youtube.com/watch?v=lwPEk-X-O8o&t=189s	Knit Fabric Dyeing and Finishing Process - A to Z Explanation
15	https://www.youtube.com/watch?v=e06-glNxOTE	How Fabric is Dyed in a Massive and Eco-Friendly Way

XIV COURSE CURRICULUM DEVELOPMENT COMMITTEE

S. No.	Name	Institute	Contact No.	Email
1	Shri. Anand P. Modgekar HOD in Textile Chemistry	Sasmira, Mumbai	9869210958	hoddmtc@sasmira.edu.in

SASMIRA'S INSTITUTE OF MAN-MADE TEXTILES

PRINCIPAL