Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology/ Diploma in Textile Chemistry/ Diploma in Knitting Technology

Programme Code: DDT/ DTC/ DKT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: First	Scheme: S4

Sr. No.	Course Title		Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Actual Contact Hr./Week CL	TL	LL	Self Learning (Term Work + Assignm)	Notional Learning Hrs/We	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Practical FA-PR Max	Min	SA-PR Max	Min	SLA Max	Min	Total Marks
1	Business Communication		BC	AEC	C234101		4	1	0	1	6	3	3	30	70	100	40	25	10	0	0	25	10	150
2	Maths & Statistics		BMS	AEC	C234102	6	4	2		2	8	4	3	30	70	100	40	25	10	0	0	25	10	150
3	Basic Science	Physics	BSC	DSC	C231103	2	2	0	2	1	5	5	1.5	30	35*#	100	40	25	10	25@	10	25	10	250
		Chemistry				2	2	0	2	1	5				35*#			25	10	25@	10	25	10	
4	Textile Fibers		TF	DSC	C231104	3	3	1	0	2	6	3	3	30	70	100	40	25	10	0	0	25	10	150
5	Workshop Practices for Textile		WPT	SEC	C235105	2	0	0	4	0	4	2	0	0	0	0	0	50	20	50@	20	0	0	100
6	Personality Development		PD	AEC	C234106	2	2	1	0	1	4	2	0	0	0	0	0	25	10	0	0	25	10	50
7	Yoga and Meditation		YAM	VEC	C236107	1	1	0	1	0	2	1	0	0	0	0	0	25	10	0	0	25	10	50
	Total					18	18	5	9	8	40	20		120	280	400		225		100		175		900

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 - Dsecipline Sepcific Courses Core, DSE - Dsecipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

S. B. PAWAR	H. V. RAMTEKE	A.P. MODGEKAR	DR. G. R. ANDHORIKAR
CDC IN-CHARGE	HoD, DTT	HOD, DTC	PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Chemistry

Programme Code: DTC	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Second	Scheme: S4

Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Actual Contact Hr./Week CL	TL	LL	Self Learning (Term Work + Assignm)	Notional Learning Hrs/We	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Based on LL & TL Practical FA-PR Max	Min	SA-PR Max	Min	Based on Self Learning SLA Max	Min	Total Marks
1	Pretreatment Technology	PT	DSC	X231201	1	3	0	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
2	Technology of Dyeing Natural Fibres	TDNF	DSC	X231202	3	3	0	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Fundamentals of Yarn and Fabric Forming	FYFM	GE	X233204	2	2		3	1	6	3	3	30	70	100	40	25	10	25	20	25	10	175
4	General Engineering	GE	GE	C233203		2				2	1	1.5	15	35*#	50	20							50
5	Testing of Fibers and Yarns	TFY	DSC	C231205		2		2	1	5	2.5	3	30	70	100	40	25	10	25	10	25	10	175
6	Textile Colour and Design	TCD	DSE	C232206	2	1		3	1	5	2.5						25	10	25	10	25	10	75
7	Fundamentals of ICT	ICT	SEC	C235207	1	0		2	1	3	1.5								25	10			25
8	Traditional Textiles	TT	VEC	C236208	4	1	1	2	1	5	2.5								25	10	25	10	50
	Total				13	14	1	18	7	40	20		135	280	450		125		175		150		900

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 - Descipline Sepcific Courses Core, DSE - Descipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

S. B. PAWAR
CDC IN-CHARGE

A.P. MODGEKAR
HOD, DTC

DR. G. R. ANDHORIKAR
PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Chemistry

Programme Code: DTC	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Third	Scheme: S4

Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	CL	TL	LL	Self Learning (Term Work + Assignm)	Notional Learning Hrs/We	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	FA-PR Max	Min	SA-PR Max	Min	SLA Max	Min	Total Marks
1	Technology of Dyeing Synthetic Fibres	TDSF	DSC	X231301	0	3	0	3	1	7	3.5	3	30	70	100	40	50	20	25	10	25	10	200
2	Technology of Printing Natural Fibres	TPNF	DSC	X231302	3	3	0	3	1	7	3.5	3	30	70	100	40	50	20	25	10	25	10	200
3	Conventional Finishing Technology of Textiles	CFT	DSC	X231303		3		3	1	7	3.5	3	30	30	100	40	50	20	25	10	25	10	200
4	Computer Colour Matching and Database Preparation	CCM	DSE	X232204	0	2		3	1	6	3	3	15	35	50	20	25	10	0	0	25	10	100
5	Testing of Fabrics and Garments	TFG	DSC	C231305		2		2	1	5	2.5	3	30	70	100	40	25	10	25	10	25	10	175
6	Social & Life Skills	SLS	VEC	C236306	0	0		2	1	3	1.5						25	10	25	10	0	0	50
7	Seminar I	SEM	INP	C237307	0	0		2	0	2	1								25	10			25
8	Indistrial Visit - I	IV	SEC	C235308	0	0	0	2	1	3	1.5								25	10	25	10	50
	Total				3	13	0	20	7	40	20		135	275	450		225		175		150		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
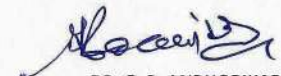
Note:

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 - Descipline Sepcific Courses Core, DSE - Descipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

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PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
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

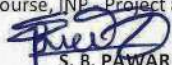|					Learning Scheme								Assessment Scheme											
r. No	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./Week			Self Learning (Term Work)	Notional Learning Hrs/Week	Credits	Paper Duration	Theory				Based on LL & TL Practical				Based on Self Learning SLA		Total Marks
						CL	TL	LL					FA-TH Max	SA-TH Max	Total Max	Total Min	FA-PR Max	FA-PR Min	SA-PR Max	SA-PR Min	Max	Min	
1	Garment Processing Technology	GPT	DSC	X231401	0	3	1	0	1	5	2.5	3	30	70	100	40	0	0	0	0	25	10	125
2	Technology of Printing Synthetic Fibres	TPSF	DSC	X231402	3	3	0	3	1	7	3.5	3	30	70	100	40	50	20	50	20	25	10	225
3	Specialty Finishing Technology of Textiles	SFTT	DSC	X231402	3	3	0	3	1	7	3.5	3	30	70	100	40	50	20	50	20	25	10	225
4	Textile Processing Machineries	TPM	DSC	X231204	2	3	1	0	1	5	2.5	3	30	70	100	40	0	0	25	10	25	10	150
5	Chemicals and Auxiliaries Evaluation	CAE	DSE	C232205	1	3	1	0	1	5	2.5	3	30	70	100	40	0	0	25	10	25	10	150
6	Ecofriendly Textile Processing	ETP	DSE	C232206	2	2	1	0	1	4	2						0	0	25	10	25	10	50
7	Seminar II	SEM	INP	C237207	1	1	0	2		3	1.5								25	10			25
8	Indistrial Visit II	IV	SEC	C235208	4	1	0	2	1	4	2								25	10	25	10	50
	Total				16	19	4	10	7	40	20		150	350	500		100		225		175		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.

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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 - Descipline Sepcific Courses Core, DSE - Descipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

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Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Chemistry

Programme Code: DTC	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Fifth	Scheme: S4

					Learning Scheme									Assessment Scheme												
Sr. No.	Course Title	Abbrevation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./Week			Self Learning (Term Work)	Notional Learning Hrs/	Credit	Paper Duration (hrs.)	Theory				Based on LL & TL Practical				Based on Self Learning SLA		Total Marks
						CL	TL	LL					FA-TH Max	SA-TH Max	Total Max	Min	FA-PR Max	Min	SA-PR Max	Min	Max	Min	
1	New Generation Fibres Technology	NGFT	DSC	X231501	1	3	1	3	1	8	4	3	30	70	100	40	25	10	25	10	25	10	175
2	Sustainable Textiles	ST	DSC	X231502	1	3	1	0	1	5	2.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Process and Quality Control in Textile Processing	PQC	DSC	C231503	0	3	1	0	1	5	2.5	3	30	70	100	40	25	10	25	10	25	10	175
4	Pollution and Effluent Treatment	PET	DSE	X232504	2	3	1	0	1	5	2.5	3	30	70	100	40	25	10	25	20	25	10	175
5	Technical Textiles	TT	DSC	C231505	2	3	1	0	1	5	2.5	3	30	70	100	40	0	0	25	10	25	10	150
6	Merchandising Management	MM	DSE	C232506	0	2	1	0	1	4	2						25	10	25	10	25	10	75
7	Seminar III	SEM	INP	C237507	0	1		2		3	1.5								25	10			25
8	Industrial Visit III	IV	SEC	C235508	0	1	1	2	1	5	2.5								25	10	25	10	50
	Total				6	19	7	7	7	40	20		150	350	500		125		200		175		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 - Descipline Sepcific Courses Core, DSE - Descipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

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CDC IN-CHARGE	HOD, DTC		PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Chemistry

Programme Code: DTC	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Sixth	Scheme: S4

Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./Week CL	TL	LL	Self Learning (Term Work + Assign)	Notional Learning Hrs/	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Total Min	Based on LL & TL Practical FA-PR Max	FA-PR Min	SA-PR Max	SA-PR Min	Based on Self Learning SLA Max	SLA Min	Total Marks
1	Industrial Project	IP	INP	C237601				4		4	2						200	80	100	40			300
2	Seminar IV	SEM	INP	C237602					2	2	1						100	40	50	20	50	20	200
3	Industrial Training Report	ITR	SEC	C237603				30		30	15						200	80	100	40			300
4	Essence of Indian Constitution	EIC	VEC	C236604	2				2	2	1								50	20	50	20	100
5	Industry 4.0 in Textiles	I4T	VEC	C236605	2				2	2	1								50	20	50	20	100
	Total			#REF!	4	0	0	34	6	40	20		0	0	0		500		350		150		1000

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Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology/ Diploma in Textile Chemistry/ Diploma in Knitting Technology

Programme Code: DDT/ DTC/ DKT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: First	Scheme: S4

						Learning Scheme								Assessment Scheme										
Sr. No.	Course Title		Abbrev ation	Cours e Type	Course Code	Total IKS hr. for Sem.	Acutal Contact Hr./Week			Self Learning (Term Work + Assignm	Notiona l Learnin g Hrs/We	Credits	Paper Duratio n (hrs.)	Theory				Based on LL & TL Practical				Based on Self Learning SLA		Total Marks
							CL	TL	LL					FA-TH Max	SA-TH Max	Total Max	Min	FA-PR Max	Min	SA-PR Max	Min	Max	Min	
1	Business Communication		BC	AEC	C234101		4	1	0	1	6	3	3	30	70	100	40	25	10	0	0	25	10	150
2	Maths & Statistics		BMS	AEC	C234102	6	4	2		2	8	4	3	30	70	100	40	25	10	0	0	25	10	150
3	Basic Science	Physics	BSC	DSC	C231103	2	2	0	2	1	5	5	1.5	30	35*#	100	40	25	10	25@	10	25	10	250
		Chemistry				2	2	0	2	1	5				35*#			25	10	25@	10	25	10	
4	Textile Fibers		TF	DSC	C231104	3	3	1	0	2	6	3	3	30	70	100	40	25	10	0	0	25	10	150
5	Workshop Practices for Textile		WPT	SEC	C235105	2	0	0	4	0	4	2	0	0	0	0	0	50	20	50@	20	0	0	100
6	Personality Development		PD	AEC	C234106	2	2	1	0	1	4	2	0	0	0	0	0	25	10	0	0	25	10	50
7	Yoga and Meditation		YAM	VEC	C236107	1	1	0	1	0	2	1	0	0	0	0	0	25	10	0	0	25	10	50
	Total					18	18	5	9	8	40	20		120	280	400		225		100		175		900

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CDC IN-CHARGE	HoD, DTT	HOD, DTC	PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles

Learning and Assessment Scheme

Programme Name : Diploma in Textile Technology

Programme Code: DTT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Second	Scheme: S4

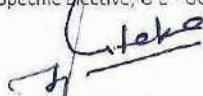|					Learning Scheme									Assessment Scheme										
Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Acutal Contact Hr./Week			Self Learning (Term Work + Assignm	Notional Learning Hrs/We	Credits	Paper Duration (hrs.)	Theory				Based on LL & TL Practical				Based on Self Learning SLA		Total Marks
						CL	TL	LL					FA-TH Max	SA-TH Max	Total Max	Min	FA-PR Max	Min	SA-PR Max	Min	Max	Min	
1	Spinning Preparatory Processes	SPP	DSC	T231201	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
2	Weaving Preparatory Process	WPP	DSC	T231202	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Fundamentals of Wet Processing	FWP	DSE	T233203	2	2		3	1	6	3	3	30	70	100	40	25	10	25	10	25	10	175
4	General Engineering	GE	GE	C233204		2				2	1	1.5	15	35*#	50	20							50
5	Testing of Fibers and Yarns	TFY	DSC	C231205		2		2	1	5	2.5	3	30	70	100	40	25	10	25	10	25	10	175
6	Textile Colour and Design	TCD	DSE	C232206	2	1		3	1	5	2.5						25	10	25	10	25	10	75
7	Fundamentals of ICT	ICT	SEC	C235207				2		2	1								25	10			25
8	Traditional Textiles	TT	SEC	C235208	4	1	1	2	2	6	3								25	10	25	10	50
	Total				12	12	3	18	7	40	20		135	280	450		125		175		150		900

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

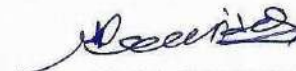Legends: # - External Assessment, @ - Internal Assessment, * Online Examination

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5. 1 credit is equivalent to 50 notional hours.

6. Self Learning hours shall not be reflected in Time Table

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

S. B. PAWAR
CDC IN-CHARGE

H.V. RAMTEKE
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DR. G. R. ANDHORIKAR
PRINCIPAL. SIMMT

Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology

Programme Code: DTT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Third	Scheme: S4

Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./Week			Self Learning (Term Work + Assignm)	Notional Learning Hrs/We	Credits	Paper Duration (hrs.)	Theory				Based on LL & TL Practical				Based on Self Learning SLA		Total Marks
						CL	TL	LL					FA-TH Max	SA-TH Max	Total Max	Min	FA-PR Max	Min	SA-PR Max	Min	Max	Min	
1	Yarn Forming Processes	YFP	DSC	T231301	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
2	Fabric Forming Processes	FFP	DSC	T231302	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Fabric Structue - I	FS1	DSC	T231303	2	2	1	3		6	3	3	30	70	100	40	25	10	25	20			150
4	Weft Knitting Technology	WKT	DSC	T231304		2		3	1	6	3	3	30	70	100	40	25	10	25	10	25	10	175
5	Testing of Fabrics and Garments	TFG	DSC	C231305	2	2		2	1	5	2.5	3	30	70	100	20	25	10	25	10	25	10	175
6	Social and Life Skills	SLS	VEC	C236306	3			2	1	3	1.5								25	10	25	10	50
7	Seminar - I	SEM	INP	C237307	1			2	1	3	1.5								25	10	25	10	50
8	Industrial Visit - I	IV	INP	C237308				2	1	3	1.5								25	10	25	10	50
	Total				12	10	3	20	7	40	20		150	350	500		125		200		175		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.

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

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Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology

Programme Code: DTT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Fourth	Scheme: S4

Sr. No	Course Title	Abbrev ation	Cours e Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./Week CL	TL	LL	Self Learni ng (Term Work)	Notional Learning Hrs/Week	Credits	Paper Dur atio n	Theory FA-TH Max	SA-TH Max	Total Max	Min	Based on LL & TL Practical FA-PR Max	Min	SA-PR Max	Min	Based on Self Learning SLA Max	Min	Total Marks
1	Spinning of other Fibers and Texturing	SOFT	DSC	T231401	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
2	Dobby, Jacquard and Drop-box	DJD	DSC	T231402	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Fabric Structue - II	FS2	DSC	T231403	2	2	1	3	1	7	3.5	3	30	70	100	20	25	10	25	10	25	10	175
4	Non Woven and Speciality Fabrics	NWSF	DSC	T231404		2	1		1	4	2	3	30	70	100	40			25	10	25	10	150
5	Woven and Knit Garment Manufacturing	WKGM	DSE	T232405		3	1			4	2	3	30	70	100	40			25	10			125
6	Quality Control in Textiles	QCT	DSE	T232406		2	1		1	4	2								25	10	25	10	50
7	Seminar - II	SEM2	INP	C237407				3	1	4	2						25	10	25	10	25	10	75
8	Industrial Visit - II	IV2	INP	C237408				2	1	3	1.5						25	10	25	10	25	10	75
	Total				6	13	6	14	7	40	20		150	350	500		125		200		175		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:

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4. Notional learing hours for the semester are (CL + TL + LL+ SL)hrs * 15 weeks

5. 1 credit is equivalent to 50 notional hours.

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

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Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology

Programme Code: DTT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Fifth	Scheme: S4

Sr. No.	Course Title	Abbreviation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./W CL	TL	LL	Self Learning (Term Work)	Notional Learning Hrs/	Credit	Paper Dura tion (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Based on LL & TL Practical FA-PR Max	Min	SA-PR Max	Min	Based on Self Learning SLA Max	Min	Total Marks
1	Modern Methods of Yarn Forming	MMYF	DSC	T231501	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
2	Modern Methods of Fabric Forming	MMFF	DSC	T231502	2	2	1	3	1	7	3.5	3	30	70	100	40	25	10	25	10	25	10	175
3	Fabric Structure and Cad	FSC	DSC	T231503	2	1	1	3	1	6	3						25	10	25	10	25	10	75
4	Warp Knitting Technology	WPKT	DSC	T231504		2	1	2	1	6	3	3	30	70	100	40			25	20	25	10	150
5	Technical Textiles	TT	DSE	C232505		2	1			3	1.5	3	30	70	100	40			25	10			125
6	Merchandising Management	MM	DSE	C232506		2	1		1	4	2	3	30	70	100	40			25	10	25	10	150
7	Seminar - III	SEM3	INP	C237507				3	1	4	2						25	10	25	10	25	10	75
8	Industrial Visit - III	IV3	INP	C237508				2	1	3	1.5						25	10	25	10	25	10	75
	Total				6	11	6	16	7	40	20		150	350	500		125		200		175		1000

Abbreviations : CL - Class Learning, TL: Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA- Summative Assessment, IKS - Indian Knowledge Skills, SLA - Self Learning Assessment
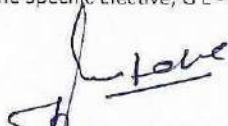
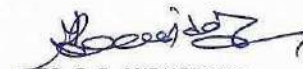**Legends:** # - External Assessment, @ - Internal Assessment, * Online Examination

Note:

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4. Notional learing hours for the semester are (CL + TL + LL+ SL)hrs * 15 weeks

5. 1 credit is equivalent to 50 notional hours.

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

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Sasmira's Institute of Man-made Textiles
Learning and Assessment Scheme
Programme Name : Diploma in Textile Technology

Programme Code: DTT	With effect from : 2023-24
Duration of Programme: 6 Semester	Duration:15 Weeks
Semester: Sixth	Scheme: S4

Sr. No.	Course Title	Abbrevation	Course Type	Course Code	Total IKS hr. for Sem.	Total Contact Hr./We CL	TL	LL	Self Learning (Term Work + Assignm	Notional Learning Hrs/	Credits	Paper Duration (hrs.)	Theory FA-TH Max	SA-TH Max	Total Max	Min	Based on LL & TL Practical FA-PR Max	Min	SA-PR Max	Min	Based on Self Learning SLA Max	Min	Total Marks
1	Industrial Project	IP	INP	C237601				4		4	2						200	80	100	40			300
2	Seminar IV	SEM4	INP	C237602					2	2	1						100	40	50	20	50	20	200
3	Industrial Training Report	ITR	INP	C237603				30		30	15						200	80	100	40			300
4	Essence of Indian Constitution	EIC	VEC	C236604	2				2	2	1								50	20	50	20	100
5	Industry 4.0 in Textiles	I4T	VEC	C236605	2				2	2	1								50	20	50	20	100
	Total				4	0	0	34	6	40	20		0	0	0		500		350		150		1000

Abbrevations : CL - Class Learning, TL: Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA- Summative Assessment, IKS -

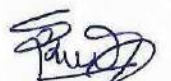Indian Knowledge Skills, SLA - Self Learning Assessment

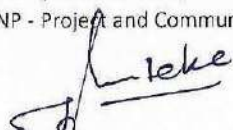Legends: # - External Assessment, @ - Internal Assessment, * Online Examination

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.

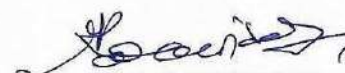6. Self Learning hours shall not be reflected in Time Table

Course Category:DSC - Descipline Sepcific Courses Core, DSE - Descipline Specific Elective, G E - Generic Elective, AEC - Ability Enhasment

Course, SEC - Skill Enhasment Course, VEC - Value Education Course, INP - Project and Community

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DR. G. R. ANDHORIKAR
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Science

Program Name: Diploma in Textile Technology / Diploma in Textile Chemistry / Diploma in Knitting Technology

Program Code: DTT / DTC /DKT

Semester: First

Course Title: Basic Science

Course code: C231103

I RATIONALE

This subject intended to use principles of Physics and chemistry in the field of textiles Physics is a foundational science that underpins many aspects of the textile industry. It provides the tools and principles necessary for understanding and optimizing the behaviour of materials and products, leading to improvements in the quality and efficiency of textile processes. In conclusion, physics is integral to the textile industry, from selecting and testing materials to optimizing processes and developing innovative products. It equips professionals in this field with the knowledge and skills needed to produce high-quality textiles efficiently and sustainably.

Chemistry is a basic science course which is essential to all engineering courses. This course gives **knowledge and develops orientation about why and how structural changes occur.** In textile chemistry, various chemicals are used during processing. Knowledge of different parameters like pH, oxidizing and reducing agents is very essential. It correlates the structure of categorized chemicals with their utility in generating and maintaining textile processing parameters and conditions.

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:

"**Solve broad-based textile technology related problems applying principles of physics and Chemistry**"

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:

CO 1 Use basic instrument to measure the physical quantities in various situation and apply principles of optics to solve textile engineering problems.

CO 2 Apply the principles of Heat and elasticity to solve Textile engineering problems.

CO 3 Apply principle of Surface tension and viscosity to prepare solutions required in textile industries.

CO 4 Understand the basic concept of atom and formation of molecules and calculation of Molecular weight, preparation of standard solution which can be used for doing analysis.

CO 5 Importance of maintaining pH in industry and role of different oxidizing and reducing agents, salts, acids in industry.

CO 6 Importance of Organic compounds.

IV TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category	Learning Scheme						Assessment Scheme										
				Actual Contact Hrs/ week			SL H	NL H	Credits	Paper Duration (hrs)	Theory				Based on LL and TL				Based on SL		Total Marks
															Practical						
				CL	LL	TL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
C231103	Basic Science	BSC	DSC	4	4	2	10	5		1.5	30	70	100	40	50	20	50 @	20	50	20	250

Total IKS hours for semester: 6 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: @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. NotionalLearninghoursforthesemesterare(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 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 1.1.1 Describe the concept of given physical quantities with relevant unit of measurement. TLO 1.1.2 Differentiate between Scalar and Vector quantities with examples. TLO 1.1.3 Explain various systems of units and its need for the measurement of the given physical quantities and conversion of units in different systems. TLO 1.1.4 Explain the working of ancient instruments to measure weight distance time Explain the procedure of measuring the dimension of given object by using vernier calliper and screw gauge. TLO 1.2.1 Describe the phenomena of light propagation in different medium TLO 1.2.2 Describe the light Propagation given type of optical fiber	**Unit I: Measurement and optics.** **Measurement** 1.1.1 Unit, physical quantities: fundamental and derived quantities and their units Systems of unit: CGS, MKS, FPS and SI 1.1.2 Scalar and vector physical quantities 1.1.3 Measurements of physical quantities like Length, Weight, Time, Temperature Conversion factor for inter-conversion of units in different systems of units 1.1.4 Ancient Indian measurement methods Application of vernier callipers, Application of vernier calliper , screw gauge **Optics** 1.2.1 Refraction of monochromatic light, Snell's law, refractive index, refraction through prism, prism formula (no derivation).Interference: Principle of superposition of waves, phenomena of interference, conditions for interference of light. 1.2.2 Optical Fiber: Introduction to optical fiber, total internal reflection, critical angle, structure of optical fiber, numerical aperture, types of optical fibers and applications. Polarization: Polarization by reflection- Brewster's law, applications of polarization in	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.

		textile.	
2.	TLO 2.1.1 Convert the given temperature in different temperature scales. Describe the properties of the given good and bad conductors of heat. TLO 2.1.2 Relate the characteristics of the three gas laws. Determine the relation between specific heats for the given materials. TLO 2.2.1 Describe the meaning of elasticity and describe the different parameter to express elasticity TLO 2.2.2 Explain hooks law, Describe various elastic coefficients by using different apparatus TLO 2.2.3 Describe stress strain behaviour of wire. Yield point. breaking stress TLO 2.2.4 Describe work done and energy stored per unit volume of stretched wire with numerical examples.	**Unit 2 Heat and elasticity** Heat 2.1.1 Heat, temperature, temperature scales Modes of transfer of heat, good and bad conductors of heat, law of thermal conductivity 2.1.2 Boyle's law, Charle's law, Gay Lussac's law, perfect gas equation Specific heat of gas at constant pressure and volume (C_p and C_v), ratio of specific heats Elasticity 2.2.1 Definition of elasticity, deforming force, restoring force, elasticity. Stresses: Tensile, Bulk and Shear Stress. Strain: Tensile, Bulk and Shear Strain. 2.2.2 Elastic limit, Hook's law., Elastic coefficients:- Young's modulus, Bulk modulus and modulus of rigidity. Determination of Young's modulus by using Searle's apparatus. 2.2.3 Stress-strain diagram, behaviour of wire under continuously increasing load, yield point, ultimate stress, breaking stress, factor of safety. 2.2.4 Work done in stretching a wire and energy stored per unit volume of wire. Numerical examples.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.
3.	TLO 3.1.1 Describe the Theory of surface tension TLO 3.1.2 Describe the phenomena of surface tension with different examples and its application TLO 3.1.3 Describe the numerical expression of surface tension with examples TLO 3.2.1 Describe with sketches the structure of the relevant method of retting & extraction of the given type of bast fibres. TLO 3.2.2 Describe the measurement of viscosity by Poisseullies method TLO 3.2.3 Describe different concept of viscosity with numerical examples	**UNIT 3 Surface Tension:** 3.1.1 Cohesive and adhesive force, Molecular theory of surface tension, Surface tension definition and unit. 3.1.2 Angle of contact, capillarity and examples of capillary action, derivation of expression for surface tension by capillary rise method, examples of surface tension, and applications of surface tension. 3.1.3 Surface tension and surface energy. The relation $T = E/A$. Numerical examples. **Viscosity:** 3.2.1 Definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its CGS & SI unit 3.2.2 Determination of viscosity by Poisseullies method (No derivation) 3.2.3 Stoke's law of viscosity, concept of terminal velocity, determination of coefficient of viscosity by Stoke's	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.

				method. Numerical examples	

<table>
<tr><td colspan="6" align="center">SECTION II</td></tr>
<tr>
<td>TLO 4.1</td>
<td colspan="2">Describe the structure of atom. Explain the concept of orbit & orbitals and can deduce the electronic configuration of elements. Understand the reason for bond formation.</td>
<td>4.1</td>
<td>Indian Chemistry, Philosophy of Atom by Acharya Kanad. Fundamental particles of an atom. Definition of Atomic Number, Atomic mass number, Isotopes and Isobars with suitable examples. Orbit and Orbital, shapes of different orbitals, Quantum Numbers, Pauli's Exclusion Principle, Hund's Rule, Aufbau's principle, Electronic configuration of elements up to atomic number 20.</td>
<td>Improved Lecture using PPT, Tutorial, Assignments, Demonstration and Simulation.</td>
</tr>
<tr>
<td>TLO 4.2</td>
<td colspan="2">Explain the different types of valency and bond formation.</td>
<td>4.2</td>
<td>Valency, Electrovalency and Co-valency. Three examples of both. Dulong-Petit's law, difference between atoms and molecules.</td>
<td></td>
</tr>
<tr>
<td>TLO 4.3</td>
<td colspan="2">Determine molecular weight and deduce empirical formula and molecular formula. Understand the meaning of solution, make solution of different concentrations. Explain different types of titrations and explain the role of suitable indicators in titration.</td>
<td>4.3</td>
<td>Molecular weight, molecular and empirical formula & empirical formula weight, Two numerical each on empirical formula and molecular formula, ways of expressing concentration of solution- Normality, Molarity, Molality, Mole fraction, % Composition, Strength of solution, Standard solution, types of standard solution and preparation of standard solution, Acidimetry-Alkalimetry, Role of indicators, Types of Titrations with 03 examples.</td>
<td></td>
</tr>
<tr>
<td>TLO 4.4</td>
<td colspan="2">Describe and Understand acid, base and electrolytes. Also understand the importance of pH in textile industry. Understand the difference between physical and chemical change.</td>
<td>4.4</td>
<td>Concept of acid-base, electrolytes-strong and weak electrolytes with definition and examples. Physical and Chemical change, Law of Conservation of mass, Reciprocal and multiple proportions. Reactant and product – definition and examples.</td>
<td></td>
</tr>
<tr>
<td>TLO 4.5</td>
<td colspan="2">Explain the different ways of chemical combination. Understand meaning of reactant and product.</td>
<td>4.5</td>
<td>Redox Reactions – oxidation, reduction, oxidizing and reducing agents, explanation with examples. Reversible and irreversible reactions. Exothermic and endothermic reactions. Neutralization and condensation reaction. Examples and explanation</td>
<td></td>
</tr>
<tr>
<td>TLO 4.6</td>
<td colspan="2">Explain the different types of chemical reactions Understand the role of oxidizing and reducing agents in textiles. Explain the role of salts in textile industry.</td>
<td>4.6</td>
<td>**Chemical reactions and uses of inorganic compounds in Textiles.** Two uses in textiles, two chemical properties and the chemical name common name and molecular formula :- Sodium hydroxide, Sodium Sulphate, Magnesium Sulphate, Sodium Nitrite, Sodium</td>
<td></td>
</tr>
</table>

				Hypochlorite, Sodium Sulphide, Sodium Sulphite, Sodium Nitrate, Potassium Dichromate, Sodium Carbonate, sodium hydrosulphite, sodium thiosulphate and sodium perborate.	
	TLO 4.7	Explain the role of oxidizing and reducing agents in textile industry. Understand the importance of acids in textile industry for various analysis.	4.7	**Applications of oxidizing and reducing agents in textiles:** Molecular Formulae, Chemical properties and applications of Hydrogen Peroxide, Potassium permanganate, Sodium hydrosulphite and Sodium sulphide in textiles. **Acids - sulphuric and hydrochloric acid:** Molecular formulae, uses, chemical reactions of Sulphuric acid and Hydrochloric acid.	
5	TLO 5.1	Understand the importance of carbon compounds.	5.1	Carbon compounds, catenation, properties of organic compounds. Homologous series, Functional group, classification of organic compounds.	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, and Simulation.
	TLO 5.2	Explain the preparation and chemical reactivity of methane, ethane and acetylene.	5.2	Aliphatic compounds: Alkanes, Alkenes and Alkynes. Preparation of methane from methyl iodide, Wurtz reaction.	
	TLO 5.3	Understand the structural formula of aromatic compounds. And chemical reactions.	5.3	Chemical Reactions-Chlorination of methane, Combustion reaction. Uses of methane, Preparation of ethane from ethyl alcohol. Ozonolysis of ethylene Uses of ethylene, Preparation of ethylene from calcium carbide. Hydrogenation reaction of ethane, Uses of acetylene Aromatic Compounds: Introduction, structural formulae of Benzene, Toluene, Naphthalene, and Anthracene. Sulphonation, nitration of benzene.	
	TLO 5.4	Explain the importance of organic compounds in dyestuff industry.	5.4	Significance of aromatic compounds in dyestuff industry	
	TLO 5.5	Understand the preparation of different types halogenated hydrocarbons.	5.5	Halogenated Hydrocarbons: General Formula and Classification. Mono-halogen derivative i.e. Methyl chloride –Preparation from methane, Chemical reaction, Action of NaOH, KCN.	
	TLO 5.6	Understand the reactions of di, tri, etc. halogenated hydrocarbons from textiles view point.	5.6	Dihalogen derivative-Only examples and structural formulae of Ethylidene dichloride and ethylene dichloride. Trihalogen derivative- Chloroform –Reaction with oxygen, Hydrogen /zinc dust and water, alcoholic KOH, uses. Tetra halogen derivative-Carbon tetrachloride Preparation from Methane	

				its Uses.	
	TLO 6.1	Understand the organic hydroxyl compounds.	6.1	Introduction to alcohols and phenols, structural differences between alcohols and phenols.	Improved Lecture using PPT, Tutorial, Assignments, Demonstration, Simulation.
	TLO 6.2	Differentiate between alcohols and phenols. Structural formula and uses of alcohols.	6.2	Classification of alcohols. Structural formula of Methanol, Ethanol, Glycol, Glycerol. Uses of Alcohol	
	TLO 6.3	Give reactions and uses of Phenols.	6.3	Action of NaOH, Nitric acid on phenol. Uses of Phenol Difference between alcohols and phenols.	
	TLO 6.4	Understand the types of ethers and its uses in textiles.	6.4	Classification of ethers with examples.	
	TLO 6.5	Explain the preparation of dimethyl ether and give uses of ethers	6.5	Preparation of dimethyl ethyl by Williamson's synthesis and Continuous Etherification. And its uses.	
	TLO 6.6	Understand the examples of aldehydes &ketones and carboxylic acids with examples and explain the chemical reactions with suitable examples.	6.6	Definition, General formula, Preparation, types, uses and examples of aldehydes & ketones and carboxylic acids.	
	TLO 6.7	Understand the chemical reactions of esters with suitable examples and also understand the chemical reactions of amines with suitable examples.	6.7	Introduction, General formula of esters. Structural formula of Ethyl Acetate, Chemical Reactions – hydrolysis of ethyl acetate. Introduction, Classification of Amines, Diazotization and coupling reactions of aniline.	

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	Use Vernier caliper to measure the dimensions of given objects	1	Measure dimensions of given objects using vernier caliper	2	CO1
LLO 1.2	Estimate the error in measurement				
LLO 2.1	Use Screw gauge to measure the dimensions of given objects	2	Measure dimensions of given objects using micrometer screw gauge	2	CO1
LLO 2.2	Estimate the error in measurement.				
LLO 3.1	Determine Refractive index of prism by using spectrometer	3	Determine Refractive index of prism by using spectrometer	2	CO1
LLO 4.1	Determination of numerical aperture (NA) of given step index optical fibers	4	Determination of numerical aperture (NA) of given step index optical fibers	2	CO1
LLO 5.1	Determination of Joule's mechanical equivalent of heat by Joule's law	5	Determination of Joule's mechanical equivalent of heat by Joule's law	2	CO2
LLO 6.1	Verify boils law	6	Verification of Boyle's law using given apparatus	2	CO2
LLO 7.1	Determine %R.H.	7	Determine %R.H. by using Regnault's hygrometer	2	CO2
LLO 8.1	Use Travelling microscope to determine surface tension of given	8	Determine surface tension of given liquid by capillary rise method using travelling	2	CO3

	liquid		microscope		
LLO 9.1 Use Poisseullies method to determine Viscocity of given liquid.		9	Determine viscosity of given liquid by Poisseullies method	2	CO3
LLO 10.1 Use Stoke's method to determine viscosity of given liquid by		10	Determine viscosity of given liquid by Stoke's method	2	CO3
LLO 11.1 Use Boyle's law to Determination of pressure-volume relation		11	Determination of pressure-volume relation using Boyle's law.	2	CO2
LLO 12.1 Use Titremetry method to determine the normality of alkali		12	To determine the normality and strength of Sulphuric acid by using 0.1N NaOH.	2	CO4
LLO 13.1 Use Titremetry method to determine the normality of acid		13	To determine the normality and strength of sodium carbonate by using 0.1N HCl.	2	CO4
LLO 14.1 Use Titremetry method to determine the normality using Oxidising agent		14	To determine the normality and strength of Ferrous Ammonium sulphate using 0.1N potassium permanganate	2	CO4
LLO 15.1 Use Titremetry method to determine the normality of Oxidising agent		15	To determine strength of supplied potassium dichromate solution using sodium thiosulphate as an intermediate solution.	2	CO4
LLO 16.1 Use radical identification method to determine the given inorganic salt		16	Inorganic Salt Analysis:- Aluminum Sulphate, Magnesium Sulphate	2	CO5
LLO 17.1 Use radical identification method to determine the alkali metal salts.		17	Inorganic Salt Analysis:- Sodium Carbonate, Potassium Carbonate	2	CO5
LLO 18.1 Use functional group identification and MP method to determine the given organic compound.		18	Organic Salt Analysis: - Nitro benzene / o-Chloro phenol	2	CO6
LLO 19.1 Use functional group identification and MP method to determine the given organic compound.		19	Organic Salt Analysis: - Aniline / Benzene sulphonic acid	2	CO6

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)

Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. S/he ought to submit it by the end of the semester to develop the industry orientedCOs. Each micro-project should encompass two or more COs which are in fact, an integration of practicals, cognitive domain and affective domain LOs. The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The total duration of the micro-project should not be less than *16 (sixteen) student engagement hours* during the course.

In the first four semesters, the micro-project could be group-based. However, in higher semesters, it should 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. A suggestive list is given here. Similar micro-projects could be added by the concerned faculty:

   a. **Dimensional analysis:** Prepare chart on dimensions of fundamental and derived physical quantities and highlights the applications of dimensional analysis.
   b. . **Systems and units:** Prepare chart on comparison of systems of units for different physical quantities.
   c. **Optical Fiber and TIR:** Prepare models by using water and diode laser to demonstrate total internal reflection and the working of optical fiber.
   d. **Conductivity:** Collect different materials such as metal, plastics, glass etc. and prepare models to differentiate between good and bad conductor within collected materials.
   e. **Gas laws:** Prepare models to demonstrate Boyle's laws, Charle's Law and Gay Lussac's law using house hold materials.
   f. **Adhesives:** Prepare model to demonstrate the applications of various adhesives.
   g. Vernier Calipers: Prepare prototype vernier caliper of desired least count using card sheet

h. Thermal conductivity: Take different metallic plates of various metals and calculate rate of flow of

i. Temperature sensor : Use Temperature sensor IC LM 35 to measure temperature of given body in vario

j. Mobile applications : Use mobile applications for measurements of different physical quantities

ASSIGNMENTS –

a. Convert the units of a given physical quantity from one system of units to another

b. Measure room temperature of hot baths / bodies by using mercury thermometer and convert it into diff Prepare a chart to summarize units and measurements

c. Demonstrate the variation of angle of refraction with respect to refractive index using online too

d. Use a digital vernier caliper and micrometer screw gauge for measurements.(lab- based).

e. Applications of optical fibers in civil, mechanical , electrical engineering etc.

f. Enlist various Adhesives with properties and applications.

g. Compare between Thermoplastics and Thermosetting.

h. State properties and applications thermocol and glass wool.

i. Basics in Chemistry: Prepare models to demonstrate Fundamental particles of an atom. Definition of Atomic Number, Atomic mass number, and relation between them.

j. Types of chemical reactions: Prepare chart on comparison of chemical reactions for different oxidizing and reducing chemicals.

k. Functional groups in organic compounds: Prepare chart on different functional groups present in different types of organic compounds and highlights the applications in textile chemical processing.

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

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1	Vernier Calipers: Range : 0-150mm , Resolution: 0.1mm	1
2	Micrometer screw gauge : Range : 0-25mm, Resolution: 0.01mm, Accuracy ±0.02mm or better	2
3	Spectrometer	3
4	Prism , Sprit level	3
5	Single strand plastic optical fibers of different core diameter	4
6	laser source and screen.	4
7	Full-scale replica of Joule's experimental apparatus, Joule's calorimeter : well insulated "mechanical equivalent of heat apparatus" in wooden box, ,	5
8	Digital / analog thermometer	5
9	Boyle's apparatus: U tube manometer , barometer	6
10	Regnault's hygrometer	7
11	Travelling microscope , capillary tubes	8,9
12	Burette, Rubber tube, Stop clock, Metre scale, Beaker	8,9
13	Measuring cylinder	8,9
14	Redwood viscometer-I	8,9

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	Measurement and optics.	CO1	12	2	4	4	10
2	II	Heat and elasticity	CO2	10	2	4	6	12
3	III	Surface Tension	CO3	10	3	4	6	13
4	IV	Basics in Chemistry and	CO4	12	06	4	04	14

		Chemical Combination,Types of chemical Reaction,Role of acids,oxidizing and reducing agents						
5	V	Introduction to Organic Chemistry and Hydroxy Compounds and ethers	CO5	10	4	3	4	11
6	VI	Aldehydes,Ketones,Acids ,Esters,and Amines	CO6	10	4	2	4	10

X. ASSESSMENT METHODOLOGY /TOOLS

Formative Assessment (Assessment for learning)

- Tests
- Rubrics for CO's 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	PS O-1	PS O-2	PS O-3
CO1	3	1	1	2	1	1	1			-
CO2	3	1	1	2	1	1	1			-
CO3	3	1	1	2	1	1	1			-
CO4	2	2	1	1	2	1	2	3	2	3
CO5	2	2	1	1	2	1	2	3	2	3
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, coloration and finishing of Textiles using various relevant technologies.

PSO 2: Perform quality evaluation of Textile fibres, yarns, fabrics, dyes and chemicals using various test methods.

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

XII. SUGGESTED LEARNING RESOURCES / BOOKS

Sr.No	Author	Title	Publisher

1	Theory of elasticity	Chandramouli	Yes Dee Publishing Pvt. Ltd.
2	Narlikar J. V. ;Joshi , A. W.; Mathur , Anuradha ; et al	Physics Textbook Part I - Class XI	National Council of Education Research and Training, New Delhi, 2010, ISBN : 8174505083
3	Narlikar, J.V.;Joshi , A. W.; Mathur , Anuradha ; et al	Physics Textbook Part II - Class XI	National Council of Education Research and Training, New Delhi, 2015, ISBN : 8174505660
4	Narlikar J.V.;Joshi , A. W.; Ghatak A.K. et al	Physics Textbook Part I - Class XII	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506314
5	Narlikar, J.V.;Joshi , A. W.; Ghatak A.K. et al	Physics Textbook Part II - Class XII	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506713
6	Haliday, David; Resnik, Robert and Walker, Jearl	Fundamentals of Physics	John Wiley & sons, Hoboken, USA, 2014 ISBN : 812650823X
7	Jain and Jain	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2010, ISBN : 8174505083
8	Dara S. S.	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2015, ISBN : 8174505660
9	BagotskyV.S.	Fundamental of electrochemistry	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506314
10	Jain and Jain	Engineering Chemistry	National Council of Education Research and Training, New Delhi, 2013, ISBN : 8174506713
11	Aryabhatta.	The Surya Siddhanta	Baptist Mission press ,Calcutta
12	SteeramulaRajeswara Sarma	The Archaic And The Exotic : Studies In The History Of Indian Astronomical Instruments	Published by Manohar Book Service, 2008 ISBN 10: 8173045712 / ISBN 13: 9788173045714
13	Anju Rawlley,Devdatta V. Saraf	Applied Chemistry with Lab Manual	Khanna Book Publishing Co. (P) Ltd. New Delhi, 2021, ISBN- 978-93-91505-44-8
14	Dr. Hussain Jeevakhan	Applied Physics - II	Khanna Book Publishing, (2021), ISBN: 978-9391505-57-8
15	P. P. Singh, J. K. Bhambhani & others	Modern Chemistry, Std XII	
16	M. M. Thatte & B. R. Pandit	Fundamental Chemistry, Std XI	
17	M. M. Thatte & B. R. Pandit	Fundamental Chemistry, Std XII	

18	Dr. L. H. Gadgil, Dr. S. P. Pathak & others	Chemistry, Std XI	
19	P. L Soni	Inorganic Chemistry	
20	Madan Malik & Tuli	Inorganic Chemistry	

XIII. LEARNING WEBSITES AND PORTALS

Sr.No	Link / Portal	Description
1	www.sciencejoywagon.com/physicszone	Electricity, Magnetism and Semiconductors , basic of fiber optics
2	https://www.sciencedirect.com/science/article/abs/pii/B9781437744613100033	Surface Tension and Its Measurement
3	https://phet.colorado.edu	Electricity, Magnetism and Semiconductors ,Thermometry and basic of fiber optics
4	www.physicsclassroom.com	concepts of basic physics
5	http://nptel.ac.in/course.php?disciplineId=104	concepts of basic physics
6	http://hperphysics.phy-astr.gsu.edu/hbase/hph.html	concepts of basic physics
7	https://www.youtube.com/results?search_query=amruta+university+physics+expts	concepts of basic physics
8	k. https://www.youtube.com/results?search_query=physics+class+11+chapter+1	concepts of basic physics
9	l. https://www.youtube.com/watch?v=zRGh9_a1J7s	concepts of basic physics
10	https://iksindia.org	IKS physics
11	a. http://nptel.ac.in/course.php?disciplineId=115 b. http://nptel.ac.in/course.php?disciplineId=104 c. http://hperchemistry.chem-astr.gsu.edu/hbase/hph.html d. www. chemistryclassroom.com e. www. chemistry.org f. www.sciencejoywagon.com/physicszone g. www.science.howstuffworks.com h. https://phet.colorado.edu i. www.chemistryteaching.com j. www.visionlearning.com k. www.chem1.com l. www.onlinelibrary.wiley.com m. www.rsc.org n. www.chemcollective.org	Chemistry instruction and education

Program Name:	Diploma in Man-made Textile Technology / Diploma in Man-made Textile Chemistry / Diploma in Knitting Technology
Program Code:	TX / TC /KT
Semester:	First
Course Title:	Mathematics and Statistics
Course code:	C234102

I   RATIONAL

Basic Mathematics plays a crucial role in diploma programmes as it fosters the development of critical thinking skills, enhances quantitative literacy, prepares students for higher education, promotes problem-solving abilities, cultivates logical and abstract thinking and fosters mathematical literacy. By engaging with Mathematics, students acquire logical reasoning, problem-solving techniques and analytical thinking, which are valuable for lifelong learning and professional growth. Calculus is a branch of Mathematics that calculates how matter, particles and heavenly bodies actually move. Derivatives are useful to find maxima and minima of the function, velocity and acceleration are also useful for many engineering optimization problems. Statistics can be defined as a type of mathematical analysis which involves the method of collecting and analysing data and then summing up the data into a numerical form for a given set of factual data or real-world observations. It equips individuals with the ability to interpret numerical information, make informed decisions and navigate real-world situations. Moreover, Mathematics provides a foundation for further studies in various disciplines and prepares students to tackle complex challenges. By exploring abstract concepts and logical structures, students develop their ability to reason; make connections, and approach problems with clarity and precision. Furthermore, studying Mathematics helps students appreciate the historical and cultural significance of Mathematics and its applications in diverse fields, thereby fostering mathematical literacy and a deeper understanding of the world. Hence the course provides the insight to analyse Textile engineering problems scientifically using logarithms, matrices, trigonometry, straight line, differential calculus and statistics. By incorporating these topics, students comprehend to approach textile engineering problems from a mathematical perspective, enabling them to devise efficient and effective solutions and this leads to preparing Diploma graduates well-rounded, adaptable and capable of making significant contributions to the textile engineering and technology related problems.

II   INDUSTRY / EMPLOYER EXPECTED OUTCOME
Apply the concept of Mathematics to solve textile industry-based technology problems.

III   COURSE LEVEL LEARNING OUTCOMES (COS)
Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO 1 -   Apply the concepts of algebra to solve textile engineering related problems.
- CO 2 -   Utilize trigonometry to solve textile engineering problems.
- CO 3 -   Apply concept of Co-ordinate Geometry and Mensuration to solve textile industry problems.
- CO 4 –   Use concepts of differential calculus to solve problems of textile industry.
- CO 5 -   Apply concepts of integration in Research and Development activities in Textiles.
- CO 6 -   Use techniques of statistics in various areas like textile testing, process and quality control.

TEACHING-LEARNING AND ASSESSMENT SCHEME (Abbreviation – MAS, Course Category – AEC, Paper duration – 3 hr)

Course Code	Course Title	Learning Scheme						Assessment Scheme											Total Marks
		Actual Contact Hrs/ week			SLH	NLH	Credits	Theory				Based on LL and TL				Based on SL			
												Practical							
		CL	LL	TL				FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA			
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min		
C234102	Mathematic and Statistics	4	2		2	8	4	30	70	100	40	25	10			25			150

Total IKS hours for semester: 6 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 Solve the given simple problem based on law of logarithm. TLO 1.2 Solve given system of linear equations using matrix inversion method. TLO 1.3 Use Cramer's rule for solving simultaneous equations having three variables. TLO 1.4 Calculate the area of triangle using determinant method. TLO 1.5 Solve simultaneous equations by using by concepts given in Ancient Indian Mathematics.	**Unit I - Algebra** 1.1 Logarithm: Concept and laws of Logarithm 1.2 Determinant and matrices Value of determinant of order 3x3 1.3 Solutions of simultaneous equations in three unknowns by Cramer's rule. 1.4 Matrices, algebra of matrices, transpose adjoint and inverse of matrices. Solution of simultaneous equations by matrix inversion method. 1.5 Algebra in Indian Knowledge system: Solution of Simultaneous	Improved Lecture, tutoria Assignments, Demonstration, Simulation.

		equations (Indian Mathematics)	
2.	TLO 2.1 Apply the concept of Compound angle, allied angle, and multiple angles to solve the given simple engineering problems. TLO 2.2 Apply the concept of Sub-multiple angles to solve the given simple engineering related problems. TLO 2.3 Employ concept of factorization and de-factorization formulae to solve the given simple engineering problems. TLO 2.4 Investigate given simple problems utilizing inverse trigonometric ratios. TLO 2.5 Use Concepts of Ancient Indian Mathematics for Trigonometry to solve given problem.	**Unit II – Trigonometry** 2.1 Trigonometric ratios of Compound, allied, multiple and sub-multiple angles (without proofs) 2.2 Factorization and de-factorization formulae (without proofs) 2.3 Inverse trigonometric ratios and related problem. 2.4 Principle values and relation between trigonometric and inverse trigonometric ratios. 2.5 Trigonometry in Indian Knowledge system – The evolution of sine function in India. 2.6 Basic Indian Trigonometry – Introduction and Terminology – (From ancient beginning to Nilakantha) 2.7 Trigonometry in Indian Knowledge System – Pythagorean triples in Sulabhsutras.	Improved Lecture, tutoria Assignments, Demonstration, Simulation.
3.	TLO 3.1 Angle between given two straight lines. TLO 3.2 Formulate equation of straight lines related to given engineering problems. TLO 3.3 Identify perpendicular distance from the given point to the line. TLO3.4 Calculate perpendicular distance between the given two parallel lines. TLO 3.5 Calculate the area of given triangle, circle square, parallelogram, rhombus and trapezium. TLO 3.6 Compute surface area of given cuboids, sphere, cone and cylinder. TLO 3.7 Determine volume of given cuboids, sphere, cone and cylinder.	**Unit III - Co-ordinate Geometry and Mensuration** 3.1 Straight line and slope of straight line 3.2 Angle between two lines. 3.3 Condition of parallel. 3.4 Condition of perpendicular lines. 3.5 Various forms of straight lines. 3.6 Slope point form, two-point form. Two points intercept form. General form. 3.7 Perpendicular distance from a point on the line, perpendicular distance between two parallel lines. 3.8 Area of regular closed figures 3.9 Area of triangle, square, parallelogram, rhombus, trapezium and circle. 3.10 Volume of cuboid, cone, cylinders and sphere.	Improved Lecture, tutoria Assignments, Demonstration, Simulation.
		SECTION II	
	TLO 4.1 Solve the given simple problems based on functions. TLO 4.2 Solve the given simple problems based on rules of differentiation. TLO4.3 Obtain the derivatives of	**Unit IV – Derivatives** 4.1 Functions and Limits: Concept of function and simple examples 4.2 Functions and Limits: Concept of limits without examples. 4.3 Derivatives: Rules of derivatives	Improved Lecture, tutoria Assignments, Demonstration, Simulation.

	composite, implicit, parametric, inverse, logarithmic, exponential functions. TLO4.4 Apply the concept of differentiation to find given equation of tangent and normal. TLO4.5 Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function.	such as sum, Product, Quotient of functions. 4.4 Derivatives: Derivative of composite functions (chain Rule), implicit and parametric functions. 4.5 Derivatives: Derivatives of inverse, logarithmic and exponential functions. 4.6 Applications of derivative: Second order derivative without examples, Equation of tangent and normal, Maxima and minima, Radius of curvature.	

	TLO 5.1 - Solve the given solve problem(s) based on rules of integration.
	 TLO5.2 - Use method of integration by substitution to solve given problem
	 TLO 5.3 - Use method of integration by parts to solve given problem.
	 TLO 5.4 Evaluate the given simple Integral by partial fraction
		Unit V – Integration
		 5.1 Simple integration Rules of integration and Integration of standard function.
		 5.2 Methods of Integration:
		   a) Integration by substitution.
		   b) Integration by parts.
		   c) Integration by partial fraction.
			Improved Lecture, tutoria Assignments, Demonstration, Simulatio

	TLO 6.1 Understand importance of statistical methods TLO 6.2 Identify type of data TLO 6.3 Present data as per requirement TLO 6.4 Construct discrete and continuous frequency distribution TLO6.5 Construct bar diagram corresponding to the given data TLO 6.6 Construct Histogram corresponding to the given data TLO6.7 Construct frequency polygon corresponding to the given data. TLO 6.8 Calculate the central tendency - mean, mode and median of given data TLO 6.9 Calculate range, mean range, percentage mean range of given data TLO 6.11 Calculate the quartile deviation of given scatter TLO 6.12 Compute standard	**Unit VI – Measurement of Central Tendency** 6.1 Introduction to statistical methods 6.2 Types of data, collection of data, presentation of data 6.3 Frequency Distribution-construction of discrete frequency distribution, construction of continuous frequency distribution 6.4 Class limits, class intervals, Class frequency, class midpoint, Types of class intervals 6.5 Charting of data- Bar diagram, Histogram, frequency polygon, Ogive or cumulative frequency curve. 6.6 Measure of central tendency - Arithmetic mean or average, mode and median 6.7 Measure of dispersion – Range, mean range, percentage mean range, Inter-quartile range or quartile deviation, mean deviation, standard deviation,	Improved Lecture, tutoria Assignments, Demonstration, Simulatio

| deviation, variance and CV % of given data. | | variance, co-efficient of variation. | | |

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
LLO1.1 Solve simple problems of Logarithm based on given application	1	Solve simple problems of Logarithm based on given application	2	CO1
LLO 2.1 Solve simple problems on Algebra of matrices for textile engineering related applications.	2	Solve simple problems on Algebra of matrices for textile engineering related applications.	2	CO1
LLO 3.1 Apply concept of matrix to solve textile engineering related problems.	3	Use method of inversion of matrix to solve simultaneous equations.	2	CO1
LLO 4.1 Apply concept of matrix to solve textile engineering related problems.	4	Apply matrix inversion method to solve given linear equations.	2	CO1
LLO 5.1 Apply concept of matrix to solve textile engineering related problems.	5	Determine inverse of a non-singular matrix by using open-source software.	2	CO1
LLO 6.1 Use Cramer's rule for solving simultaneous equations having three variables	6	Use Cramer's rule for solving simultaneous equations having three variables	2	CO1
LLO 7.1 Calculate the area of triangle using determinant method.	7	Calculate the area of triangle using determinant method.	2	CO1
LLO 8.1 Solve trigonometry problems on compound, allied, multiple and sub-multiple angles for related shapes.	8	Solve trigonometry problems on compound, allied, multiple and sub-multiple angles for related shapes.	2	CO2
LLO 9.1 Use concepts of trigonometry to solve textile engineering problems.	9	Practice trigonometric problems on factorization and refactorization	2	CO2
LLO 10.1 Use concepts of inverse trigonometric functions to solve textile engineering problems	10	Practice numerical based on inverse trigonometric function.	2	CO2
LLO 11.1 Use concepts of inverse trigonometric functions to solve textile engineering problems	11	Solve problems on inverse trigonometric ratios based on application.	2	CO2
LLO 12.1 Solve textile engineering related problem using given conditions of straight line.	12	Practice problems on equation of straight line using different forms.	2	CO3
LLO 13.1 Calculate the time required to wind given length of yarn on drum winding machine running at given speed.	13	Use given form of straight line to calculate speed, distance, time of a moving object.	2	CO3
LLO 14.1 Solve textile engineering related problem using given conditions of straight line.	14	Solve problems on perpendicular distance between to lines, distance between two parallel lines and angle between two lines.	2	CO3
LLO 15.1 Apply the concept of derivatives to solve textile engineering	15	Solve the given simple problems based on rules of differentiation.	2	CO4

related problems.				
LLO 16.1 Apply the concept of derivatives to solve textile engineering related problems.	16	Find the derivatives of composite, implicit, parametric functions.	2	CO4
LLO 17.1 Apply the concept of derivatives to solve textile engineering related problems.	17	Find the derivatives of inverse, logarithmic, exponential functions.	2	CO4
LLO 18.1 Apply the concepts of tangent and normal of a curve to solve given engineering problem.	18	Apply the concept of differentiation to find given equation of tangent and normal	2	CO4
LLO 19.1 Apply the concept of maxima, minima and radius of curvature to solve textile engineering problems.	19	Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function	2	CO4
LLO 20.1 Apply the concept of integration to solve textile engineering related problems.	20	Solve the given problems based on rules of integration.	2	CO5
LLO 21.1 Apply the concept of integration by substitution to solve textile engineering related problems.	21	Use method of integration by substitution to solve given problems.	2	CO5
LLO 22.1 Apply the concept of integration by parts to solve the textile engineering related problems.	22	Use method of integration by parts to solve given problem.	2	CO5
LLO 23.1 Apply the concept of integration by partial fraction to solve given textile engineering problems.	23	Evaluate the given simple Integral by partial fraction	2	CO5
LLO 24.1 Find out the mean, mode, median, range, mean range, percentage of mean range of the data on property of textile raw material and material in process.	24	Calculate the central tendency - mean, mode and median, range, mean range, percentage mean range of given data	2	CO6
LLO 25.1 Compute standard deviation, variance and co-efficient of variation of given data of textile testing.	25	Compute standard deviation, variance and CV % of given data.	2	CO6

Note – 1. Take any 15 tutorials out of 25 and ensure that all units are covered. 2. Take tutorial in a batch size of 2 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)

- Collect data count of yarn of 16 ring bobbins of a doff and compute standard deviation, variance and coefficient of variation and interpret the results using free open-source software ORANGE.
- Find area of different regular shapes using the concept of determinants.
- Prepare chart displaying Areas of regular shapes and volumes of solids.
- Compare variation in two data sets using coefficient of variation.
- Preparation of models using matrices to solve simple problems based on cryptography.
- Preparation of models using matrices to solve simple mixture problems.
- Prepare charts of various trigonometric formulae.
- Apply trigonometry principles to calculate angles, distance, forces and dimensions to chosen area and make a poster presentation.

- Prepare charts using determinants to find areas of different shapes.
- Design a puzzle based on matrices. Create a grid of numbers and operations.
- Develop a maths game based on operation of matrices.
- Use matrices as a tool for music composition.
- Assign different notes, chords of music to different elements of matrix. Experiment with combining and transforming the matrices to create unique musical compositions. You can use musical notation open software or even traditional instruments to bring your composition to life.
- Attempt any 10 -12 microprojects, out of the given list.

ASSIGNMENTS –

- Collect examples on real world applications of logarithm and prepare a pdf file.
- Solve a simultaneous equation in two variables by matrix inversion method. Write down a mathematical program using an open-source software to verify the results.
- Solve 5 numerical each on trigonometry and logarithm.
- Calculate the height of tree in your surrounding area using trigonometry and prepare a presentation. Find the height of room or distance between two pillars by using concept of straight line
- Find the derivative of y = , and visualize the graph of the function and its derivative using any open-source software geometrically.
- Construct graphs of sin x, cos x and tan x using Excel.
- Collect data on count of yarn, lea strength of yarn, Count Strength Product (CSP), Single thread strength of yarn. Find out Standard deviation, Variance and co-efficient of variation (CV%).
- Collect at least 10 examples on application of derivatives based on real world uses.
- Attempt any 5 – 7 assignments, out of the above assignments.

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

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1	Open-source software like SageMaths, MATHS3D, GeoGebra, Graph, DPLOT, and Ghraphing Calculator (Graph Eq 2.13), ORANGE can be used for Algebra, Calculus, Trigonometry and Statistics respectively.	All

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	Algebra	CO1	12	2	4	4	10
2	II	Trigonometry	CO2	18	2	4	6	12
3	III	Co-ordinate Geometry and Mensuration	CO3	15	3	4	6	13
4	IV	Derivatives	CO4	15	2	4	4	10
5	V	Integration	CO5	12	2	4	6	12
6	VI	Statistics	CO6	18	3	4	6	13
				90	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	-	-
CO2	3	1	1	1	1	-	-	2	-	-
CO3	3	1	1	1	-	-	-	-	2	-
CO4	3	1	1	1	1	1	1	-	2	-
CO5	3	1	1	1	-	1	1	-	2	-
CO6	3	2	1	1	1	1	1	-	-	3

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	Grewal B S	Higher Engineering Mathematics	Khanna Education New Delhi, 2013 ISBN : 8174091955
2	Dutta D.	A Textbook of Engineering Mathematics	New Age Publications, New Delhi, 2006 ISBN: 978-81-224-1689-
3	Kreysizg, Ervin	Advanced Engineering Mathematics	Wiley Publication New Delhi 2016 ISBN: 978-81-265-5423-2
4	Das H.K	Advanced Engineering Mathematics	S Chand publication New Delhi 2008 ISBN: 9788121903455
5	Marvin L. Bittinger David J. Ellenbogen Scott A. Surgent	Calculus and Its Applications	Addison Welsey 10th Edition ISBN-13: 978-0-321-69433-1
6	C.S. Sheshadri	Studies in the History of Indian Mathematics	Hindustan Book Agency, New Delhi 110016 ISBN978-93-80250-06-9

7	George Gheverghese Joseph	Indian Mathematics Engaging with the world from Ancient to modern times	World Scientific Publishing Europe Ltd. 57 ISBN 978-17-86340-61-0
8	Deepak Singh	Mathematics-I	Khanna Book Publishing Co. (P) Ltd. ISBN:978-93-91505-42-4
9	Garima Singh	Mathematics-II	Khanna Book Publishing Co. (P) Ltd ISBN:978-93-91505-52-3
10	Gareth James, Daniela Witten, Trevor Hastie Robert and Tibshirani	An Introduction to Statistical Learning with Application in R	Springer New York Heidelberg Dordrecht London, ISBN 978-1-4614-7137-0 ISBN 978-1-4614-7138-7(ebook)
11	Gunakar Muley	Sansar ke Mahan Ganitagya	First Edition, Rajkamal Prakashan, ISBN – 10.8126703571, ISBN – 13. 978 - 8126703579
12	T.S. Bhanumurthy	A Modern Introduction to Ancient Indian Mathematics	New Age International Private Limited, 1 January 2008 ISBN 10.812242600X ISBN 13. 978-8122426007
13	M. P Trivedi and P. Y. Trivedi	Consider Dimensions and replace Π	Notion Press, 1st Edition (2018), ISBN 978-1644291795

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	http://nptel.ac.in/106102064/1	Online Learning Initiative by IITs and IISc
2	www.scilab.org/-SCI Lab	Signal processing, Statistical Analysis, Image Enhancement.
3	www.mathswork.com/product/matlab/ - MATLAB	Application of concepts of mathematics to coding.
4	Spreadsheet Applications	Use of Microsoft Excel, Apple Numbers and Google sheets.
5	https://ocw.mit.edu/	MIT course ware
6	https://khanacadamy.org/maths? gclid=CNqHuabCys4CFdOJaddHoPig	Concept of Mathematics through video lecture and notes.
7	http://ocw.abu.edu.ng/courses/mathematics	List of Mathematical courses
8	https://libguides.furman.edu/oer/subject/mathematic	Open Education Resources (OER) in Mathematics.
9	https://phet.colorado.edu/en/simulations/filters? subjects=maths&type=html,prototype	Phet Simulation for Mathematics
10.	https://libguides.cmich.edu/OER/mathematics	Mathematics with OER

C231104

Program Name: Diploma in Textile Technology / Diploma in Textile Chemistry / Diploma in Knitting Technology

Program Code: DTT /DTC /DKT

Semester: First

Course Title: Textile Fibres

Course code: C231104

I RATIONALE

The knowledge of textile fibers is the basis of the textile manufacturing & processing. To achieve the best quality of textile materials, the diploma engineers must have adequate knowledge of the morphological structure, chemical composition, physical & chemical properties of the various Natural & Synthetic fibres. They must also posses' knowledge about the application areas of the fibres. This course is developed in such a way by which fundamental information will help the diploma engineers to apply the basic concepts of textile fibres to solve broad based problems in the textile industry.

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

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

(a) Select fibres to manufacture good quality yarn & fabrics.
(b) Select fibres for the relevant wet processing.

III COURSE LEVEL LEARNING OUTCOMES (COS)

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

CO 1 Select fibres according to their end use & classify the fibres according to its chemical composition.
CO 2 Test properties of cotton & Bast Fibres to suit relevant manufacturing & wet processing.
CO 3 Test properties of wool & Silk Fibres to suit relevant manufacturing & wet processing.
CO 4 Classify man-made fibre based on their chemical group and select man-made fibre for given application.
CO 5 Test properties of Regenerated Fibres to suit relevant manufacturing & wet processing.
CO 6 Test properties of Polyester, Polyamide & Acrylic fibres, to suit relevant manufacturing & wet processing.

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 & TL				Based on SL			
															Practical							
				CL	LL	TL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA			
											Max	Max	Max	Min	Max	Min	Max	Min	Max	Min		
C231104	Textile Fibres	TF	DSC	3		1	2	6	3	3	30	70	100	40	25	10	0	0	25	10	150

Total IKS hours for semester: 6 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

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 Differentiate the properties of the given fabric sample based on substrate. TLO 1.2 Classify the given fibres based on their chemical nature & origin. TLO 1.3 Choose the given fibre based on the properties with justification TLO 1.4 Differentiate between the fibres based on fibre structure. TLO 1.5 Explain basic terminology in Textile field.	**Unit I - Textile Fibres & properties** 1.1 Plastic & Non- thermoplastic Substrate: Definition of fibres, staple, filament & its comparison. 1.2 Classification of fibres: Chemical & natural origin. 1.3 Properties of fibres: Essential & Desirable 1.4 Textile Basic Terminology: Linear Density, Tenacity, Tex, Moisture Content, Moisture Regain, Hydrophobic & Hydrophilic fibres, Thermoplastic fibres.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.
2.	TLO 2.1 Describe the properties of the given fibre TLO 2.2 Describe with sketches the structure of the cellulose & cotton fibre. TLO 2.3 Describe the properties of the given varieties of fibre TLO 2.4 Describe with sketches the structure of the relevant method of retting & extraction of the given type of bast fibres.	**Unit II – Cotton and Bast Fibers** 2.1 Cellulose : Definition, chemistry & Structure 2.2 Cotton : Cultivation & Harvesting, Varieties, Morphological structure, physical & chemical properties 2.3 Bast Fibres: Cultivation of jute & Retting & extraction of the jute Fibre. 2.4 Morphological structure, physical & chemical properties of jute fibre 2.5 Extraction of the Flax fibres physical & chemical properties of Flax Uses of Jute & Flax fibres.	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.
3.	TLO 3.1 Describe the properties of the animal fibre: Wool & Silk. TLO 3.2 Differentiate the properties of the animal fibres. TLO 3.3 Describe life cycle of silk	**Unit III - Animal Fibers.** 3.1 Wool Fibre: Physical & chemical properties 3.2 Silk Fibre: Varieties of Silk, Life Cycle of silk worm. 3.3 Silk Fibre: Physical & chemical properties	Improved Lecture, tutorial, Assignments, Demonstration, Simulation.

		worm. TLO 3.4 List down various types of fabric produced using different types of silk and wool fibers.	3.4 Uses of Wool & Silk fibres	

<table>
<tr><td colspan="5" align="center">SECTION II</td></tr>
<tr>
<td>4.</td>
<td>TLO 4.1   Differentiate the properties of the   given fabric sample based on substrate
TLO 4.2   Classify the given man made fibre based on their chemical group.
TLO 4.3   Choose the given fibre based on the properties with justification.</td>
<td>Unit IV – Man-made Fibers
4.1 Man-Made fibres: Classification of polymers. Definition of fibres, advantages & its limitations.
4.2 Classification of fibres: Chemical origin
4.3 Basic Terminology: Addition polymerization   Condensation Polymerization,   Degree   of polymerization</td>
<td>Improved Lecture, tutorial, Assignments, Demonstration, Simulation.</td>
</tr>
<tr>
<td>5.</td>
<td>TLO 5.1   Differentiate the properties of the   given fabric sample based on chemical group.
TLO 5.2   Classify the given viscose rayon fibre based on their chemical group.
TLO   5.3   Choose   the   given regenerated fibre based on the properties for required application.</td>
<td>Unit V – Regenerated Fibers
5.1 Viscose   Rayon: Manufacturing process,   Physical   &   chemical properties. Uses of Viscose rayon
5.2 Cuprammonium   Rayon: Manufacturing process, Physical & chemical   properties.   Uses   of Cuprammonium rayon
5.3 HWM, Polynosic Rayon, Acetate Rayon: Manufacturing   process, Physical   &   chemical   properties. Uses of   HWM, Polynosic Rayon, Acetate Rayon.</td>
<td>Improved Lecture, tutorial, Assignments, Demonstration, Simulation.</td>
</tr>
<tr>
<td>6.</td>
<td>TLO 6.1   Select a Synthetic fiber for required end use.
TLO 6.2   Classify the given viscose rayon fibre based on their chemical group.
TLO 6.3   Choose the given fibre based on the properties with justification</td>
<td>Unit VI – Synthetic Fibers
6.1 Polyester   Fibres: Manufacturing process,   Physical   &   chemical properties. Uses of polyester
6.2 Polyamide   fibres: Manufacturing process,   Physical   &   chemical properties, Nylon 6 & Nylon 6 6, Uses of Nylon 6 & Nylon 6,6.
6.3 Acrylic fibre: Manufacturing process, Physical & chemical properties. Uses of acrylic fibres.
6.4 New   generation   fibres: Uses   of Spandex, Lycra, Aramid & Lyocell.</td>
<td>Improved Lecture, tutorial, Assignments, Demonstration, Simulation.</td>
</tr>
</table>

Workshop Practices for Textiles   C235105

Program Name:	Diploma in Textile Technology / Diploma in Textile Chemistry / Diploma in Knitting Technology
Program Code:	DTT / DTC /DKT
Semester:	First
Course Title:	Workshop Practices for Textiles
Course code:	C235105

I   RATIONAL

The concept of graphical language of engineers are used in expressing ides, conveying the instructions, which are used in carrying out the jobs on site, shop floor etc. Industry always expects to have certain basic skills of operation and performing tasks of machine and tools. It is also necessary to have preliminary skills in operating related equipment in different type of workshop. This course is useful in understanding graphical language of engineers. It also provides the basics in handling equipment, machines used in Textile manufacturing, Processing, Knitting industry. This course is aimed to develop understanding of graphical language, core hands-on skills related to work as well as use of fire fighting equipment from safety point of view, which are required in the textile industry.

II   INDUSTRY / EMPLOYER EXPECTED OUTCOME

Understand graphical language of engineers. To help students to attain the industry expected outcome through various teaching and learning experiences: Working of Textile machinery, tools and fire safety equipment used in Textile industry.

III   COURSE LEVEL LEARNING OUTCOMES (COS)

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

CO 1 -   Use tools, instruments, devices and equipment for basic level maintenance.

CO 2 -   Draw the views of given object using principles of orthographic projection.

CO 3 -   Apply concept of weaving to produce different structures and products of woven fabric.

CO 4 -   Apply concept of knitting to produce different structures and products of knitted fabric

CO 5 -   Print fabric by block, screen, tie and dye and batik printing.

CO 6 -   Perform mock-drill related to fire fighting in simulated environment.

IV   TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Code	Course Title	Course Category	Actual Contact Hrs/ week			SLH	NLH	Credits	Paper Duration (hrs)	Theory				Based on LL and TL Practical				Based on SL		Total Marks
			CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
										Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
C235105	Workshop Practices for Textiles	SEC	0	0	4	0	4	2	0	0	0	0	0	50	20	50 @	20	0	0	100

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 Enlist of tools used in fitting. TLO 1.2 Write different process use for fitting TLO 1.3 Prepare metal fitting job as per sample.	**Unit I – Fitting** 1.1 Various tools such as vices, files, hammers, steels rule, Surface gauge, Surface plates, angle plates, punch, V block, drilling machine, measuring instruments like vernier calliper, Audley calliper 1.2 Various fitting process such as filling, marking, sawing, drilling, tapping, finishing etc.	Assignments, Demonstration, Simulation.
2.	TLO 2.1 - Explain methods of Orthographic Projections. TLO 2.2 - Draw orthographic views of given simple 2D entities containing lines, circles and arcs only. TLO 2.3 - Draw the orthographic views from given pictorial views. TLO 2.4. - Use of IS code IS SP-46 for dimensioning technique for given situation. TLO 2.5 - Prepare isometric scale. TLO 2.6 - Draw isometric views of given simple 2D entities containing lines, circles and arcs only. TLO 2.7 - Interpret the given orthographic views. TLO 2.8 - Draw Isometric views from	**Unit II – Orthographic and Isometric projections** 2.1 Introduction of projections- orthographic, Perspective, isometric and oblique: concept and applications. (No question to be asked in examination) 2.2 Introduction to orthographic projection, First angle and Third angle method, their symbols. 2.3 Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (Use First Angle Projection Method Only). 2.4 Introduction to isometric projections	Assignments, Demonstration, Simulation.

	given orthographic views.	2.5 Isometric scale and Natural Scale. 2.6 Isometric view and isometric projection. 2.7 Illustrative problems limited to objects containing lines, circles and arcs shape only. 2.8 Conversion of orthographic views into isometric View/projection.	
3.	TLO 3.1 – Write types of weaving looms. TLO 3.2 – Write procedure for preparing weaving frame. TLO 3.3 – Prepare knitted fabric sample/product using weaving frame.	**Unit IV – Woven Fabric** 3.1 Types of weaving machines 3.2 Procedure of preparing weaving frame. 3.3 Producing sample of woven fabric, products using Weaving frame.	Assignments, Demonstration, Simulation.
SECTION II
	TLO 4.1 – Write types of knitting machines. TLO 4.2 – Write procedure for preparing knitting loom. TLO 4.3 – Prepare knitted fabric sample/product using knitting loom.	**Unit IV – Knitted Fabric** 4.1 Types of knitting machines 4.2 Procedure of preparing knitting loom. 4.3 Producing sample of knitted fabric, products using knitting looms.	Assignments, Demonstration, Simulation.
	TLO 5.1 – Identify the ingredients and process parameters for Block Printing recipe. TLO5.2 – Write procedure for Block Printing. TLO 5.3 – Identify the ingredients and process parameters for Screen Printing recipe. TLO5.4 – Write procedure for Screen Printing. TLO 5.5 – Identify the ingredients and process parameters for Tie and dye. TLO5.6 – Write procedure for Tie and dye. TLO 5.7 – Identify the ingredients and process parameters for Batik Printing recipe. TLO5.8 – Write procedure for Batik Printing.	**Unit V –Textile Processing** 5.1 Recipe for Block Printing on Cotton Fabric. 5.2 Procedure for Block Printing. 5.3 Recipe for Screen Printing on Cotton Fabric. 5.4 Procedure for Screen Printing. 5.5 Recipe for Tie and Dye on Cotton Fabric. 5.6 Procedure for Tie and Dye. 5.7 Recipe for Batik printing on Cotton Fabric. 5.8 Procedure for Batik printing.	Assignments, Demonstration, Simulation
	TLO 6.1 Enlist causes of fire. TLO 6.2 Differentiate between the types of fires.	**Unit VI – Firefighting operation** 6.1 Fire, Causes of fire, classification of fire 6.2 Ways of extinguishing fire	Assignments, Demonstration, Simulation

TLO 6.3 Write procedure for use of fire extinguishing equipment for the given fire class.	6.3 Use of equipment.		

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 Identify various tools used for fitting. LLO 1.2 Select suitable tools for the simple activities LLO 1.3 Use relevant tools to perform activity	1	Preparation of a metal job as per given sample	16	CO1
LLO 2.1 Apply method of projection for drawing simple orthographic view	2	Draw a problem on orthographic projections using first angle method of projection having plain surfaces. (Sketch book)	4	CO2
LLO 3.1 Apply method of projection for drawing simple orthographic view	3	Draw a problem on orthographic projections using first angle method of projection having plain surfaces. (Drawing sheet).	4	CO2
LLO 4.1 Apply method of projection for drawing simple orthographic view	4	Draw a problem on orthographic projections using first angle method of projection having slanting surfaces. (Sketch book)	4	CO2
LLO 5.1 Apply method of projection for drawing simple orthographic view	5	Draw a problem on orthographic projections using first angle method of projection having slanting surfaces. (Drawing sheet)	4	CO2
LLO 6.1 Apply method of projection for drawing simple Isometric view	6	Draw Isometric view of simple objects having plain and slanting surface by using natural scale.	4	CO2
LLO 7.1 Collect information of an ancient Indian culture related to engineering graphics	7	Correlate ancient Indian sculptures, Indian temples, Monuments, etc. with Engineering Graphics	2	CO2
LLO 8.1 Identify relevant tools for designing weaving frame LLO 8.2 Identify relevant material for designing weaving frame LLO 8.3 Use relevant tools and material to prepare weaving frame	8	Prepare weaving frame	4	CO3
LLO 9.1 Use weaving frame to produce woven fabric sample.	9	Prepare fabric sample using weaving frame	4	CO3
LLO 10.1 Identify relevant tools for designing Knitting loom	10	Prepare Knitting loom	4	CO4

LLO 10.2 Identify relevant material for designing Knitting loom LLO 10.3 Use relevant tools and material to prepare Knitting loom				
LLO 11.1 Use weaving frame to produce Knitted fabric sample.	11	Prepare fabric sample using Knitting loom	4	CO4
LLO 12.1 Identify the relevant tools for preparing the fabric sample using block printing LLO 12.1 Select suitable tolls for the fabric sample using block printing LLO 12.1 Select process parameters for performing the activities LLO 12.1 Use block printing method to produce decorative fabric sample.	12	Prepare the fabric sample using block printing	4	CO5
LLO 13.1 Identify the relevant tools for preparing the fabric sample using screen printing LLO 13.1 Select suitable tolls for the fabric sample using screen printing LLO 13.1 Select process parameters for performing the activities LLO 13.1 Use screen printing method to produce decorative fabric sample.	13	Prepare the fabric sample using screen printing	4	CO5
LLO 14.1 Identify the relevant tools for preparing the fabric sample using tie and dye printing LLO 14.1 Select suitable tolls for the fabric sample using tie and dye printing LLO 14.1 Select process parameters for performing the activities LLO 14.1 Use tie and dye printing method to produce decorative fabric sample.	14	Prepare the fabric sample using tie and dye printing	4	CO5
LLO 15.1 Identify the relevant tools for preparing the fabric sample using batik printing LLO 15.1 Select suitable tolls for the fabric sample using batik printing LLO 15.1 Select process parameters for performing the activities LLO 15.1 Use batik printing method to produce decorative fabric sample.	15	Prepare the fabric sample using batik printing	4	CO5
LLO16.1 Identify the relevant tools used in firefighting LLO 16.2 Select suitable tools for the firefighting process LLO 16.3 Select process parameters for performing the activities. LLO 16.4 Use relevant tools and gauges in firefighting processing. LLO 16.5 Use relevant firefighting equipment in given situation.	16	Operate given firefighting equipment in simulated environment. Prepare chart for firefighting equipment as per application.	4	CO6

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

- Prepare a catalogue of various firefighting equipment used in textile industry and its applications.
- Prepare a catalogue of different types of machines used in fabric manufacturing.
- Prepare a catalogue of different types of machines used in knitting industry.
- Prepare a catalogue of different types of machines used in fabric printing.
- Collect information from internet about different tools and gauges used in textile industry.

ASSIGNMENTS –

- Prepare a chart to classify tools and gauges as per use in various fabric manufacturing and processing operations.

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

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1		1
2	Drawing table with drawing bord of full imperial size.	2,3,4,5,6,7
3	Models of objects for orthographic/isometric projections	2,3,4,5,6,7
4	Drawing equipment and instruments for class room teaching – Large size: a. T-square. b. set squires c. Drawing instruments box, drawing sheets, drawing pencils, eraser, drawing pins/clips	2,3,4,5,6,7
5	Weaving frames, decorative yarns	8,9
6	Knitting frames, decorative yarns	10,11
7	Printing blocks, fabric, ink	12
8	Printing screens, fabric, dyes	13
10	Tying threads, fabric, dyes	14
11	Wax, fabric, dyes	15
12	Industrial fire fighting equipments	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	Fitting	CO1	12	0	0	9	9
2	II	Orthographic and Isometric projections	CO2	12	0	0	9	9
3	III	Woven Fabric	CO3	8	0	0	9	9
4	IV	Knitted Fabric	CO4	8	0	0	9	9
5	V	Textile Processing	CO5	16	0	0	9	9
6	VI	Firefighting Operations	CO6	4	0	0	5	5
				60	0	0	50	50

X ASSESSMENT METHODOLOGY /TOOLS
Formative Assessment (Assessment for learning)

- Lab. Performance (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	1	1	1	1	-	-	1	-	-	-
CO2	1	1	-	1	-	-	-	-	-	-
CO3	3	2	3	1	-	-	2	2	2	-
CO4	3	2	3	1	-	-	2	2	2	-
CO5	3	2	3	1	-	-	2	-	2	-
CO6	1	2	-	1	-	-	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, 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	Bhatt N. D.	Engineering Drawing	Charotar Publishing House, 2010 ISBN No. 978-93-80358-11-6
2	K. K. Pradhan, S. L. Jain	Engineering Graphic	Khanna Book Publishing CO(P) LTD, New Delhi, ISBN No. 978-93-91505-50-9
3	NIR Board	The complete technology book on textile processing with effluent treatment	NIR Board ISBN 8178330504
4	Raghuwashi B. S.	A course in Workshop Technology	Dhanapat Rai Sons, New Delhi, 2011, ISBN no. 0000017108
5	Gupta J. K. , Khurmi R. S.	A textbook of Manufacturing Process (Workshop Tech.)	S. Chand & Co., New Delhi, 216-17 ISBN No. 9788121930925
6	Choudhary, Hajara S. K.	Elements of Workshop Technology	Media Promoters & Publishers, Mumbai 2009, ISBN No. 8185099146

XIII LEARNING WEBSITES AND PORTALS

Sasmira's Institute of Man-made Textiles, Worli

Semester – I, S4 Scheme

Sr. No.	Links / Portals	Description
1	http://textilelearner.net/block-printing-in-textile/	Learning about Shop relevant tools and equipment to perform block printing on fabric
2	http://risklogic.com/fire-protection-for -the-textile-industry/	Learning about types of fire relevant fire fighting equipment
3	http://textilelearner.net/maintenance-tools-in-textile-industy/	Learning about relevant tools and equipment for given process control in textile industry
4	http://www.globalsecurity.org/military/library/policy/navy/nrtc/14310_ch.pdf	Learning of the specific purpose, correct use, and proper care of the more common tools.
5	http://apparelresources.com/business-news/manufacturing/shop-floor-control-in-apparel-production/	Learning about shop floor control in apparel industry that begins by understanding the reason for co.

Program Name: Diploma in Textile Technology / Diploma in Textile Chemistry / Diploma in Knitting Technology

Program Code: DTT / DTC /DKT

Semester: First

Course Title: Yoga and Meditation

Course code: C236107

I RATIONAL

Diploma graduate needs a sound body and mind to face challenging situations in career as an employee or as an entrepreneur. Yoga and meditation bring about holistic development of an individual and equips him with necessary balance to handle the challenges. The age of diploma students is appropriate to get introduced to yoga practice as this will help him in studies as well as in his professional life. Moreover, yoga inculcates discipline in all walks of life. Pranayama practice regulate breathing of students to improve stamina, resilience. Meditation empowers a student to focus and keep calm to get piece of mind. World Health Organisation (WHO) also emphasised the role of Yoga and Meditation as stress prevention measures. Nation Education Policy – 2020 (NEP) highlights importance of yoga and meditation among students of all ages. Therefore, this course for diploma students is designed for the overall wellbeing of the students and aim to empower students to adopt and practice "Yoga" in daily life.

II INDUSTRY / EMPLOYER EXPECTED OUTCOME

Practice Yoga and Pranayama in daily life.

III COURSE LEVEL LEARNING OUTCOMES (COS)

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

- CO 1 - Practice yoga and pranayama in daily life to maintain physical and mental health.
- CO 2 - Practice meditation regularly for improving concentration and better handling of stress and anxiety.
- CO 3 - Follow healthy diet and hygienic practices for maintaining good health.

IV TEACHING-LEARNING AND ASSESSMENT SCHEME (Abbreviation – YAM, Course Category – VEC, Paper duration – 3 hr)

Course Code	Course Title	Learning Scheme						Assessment Scheme											
		Actual Contact Hrs/ week			SLH	NLH	Credits	Theory				Based on LL and TL				Based on SL		Total Marks
												Practical						
		CL	TL	LL				FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA		
								Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	
C236107	Yoga and Meditation	1	-	1	-	2	1	-	-	-	-	25	10	-	-	25	10	50

Total IKS hours for semester: 1 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

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.

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
LLO1.1 Practice warming up yoga.	1	Presentation on introduction to Yoga and its History. Lab Exp -1 Perform warming up exercises to prepare the body form head to toe for yoga.	2	CO1
LLO 2.1 Practice Surya Namaskar.	2	Lab Exp 2 – Perform all the postures of Surya Namaskar one by one in slow pace, after warming up. Lab Exp 3 – Perform multiple Surya Namaskar (starting with three to twelve) in one go. Experiment 2 to 4 must be followed by Shavasana for self-relaxation.	2	CO1 CO2
LLO 3.1 Practice basic Asanas	3	Lab Exp 4 – Perform Sarvangasana, Halasana and Kandharasana (Setubandhasana) Lab Exp 5 – Perform Bhujangasana, Naukasana, Mandukasana, Lab Exp 6 – Perform Paschimottanasana, Baddhakonasana, Bharadwajasana. Lab Exp 7 – Perform Veer Bhadrasana, Vrukshasana, Trikonasana Follow up Experiments 5 to 7 with Shavasana for self-relaxation	2	CO2
LLO 4.1 Practice basic Pranayama	4	Lab Exp 8 – Perform Bhastrika, Anulom Vilom Pranayama kriya. Lab Exp 9 – Practice Kapalbhati Pranayam Kriya Lab Exp 10 – Practice Ujjai, Dantaya, Oshtha, Bhramary Pranayam Kriya.	2	CO3
LLO 5.1 Practice Meditation	5	Lab Exp 11 – Perform sitting in Dhyan Mudra and meditating. Start with 5 minutes and slowly increase the duration.	2	CO3

Note – 1. Start and end of each session can be with appropriate yoga prayers and chanting of Omkar.
2. Trainers can add similar asanas of their choice in practice session.
3. Students are instructed to practice the experiment performed at least twice a week as a part of self-learning practice.
4. Live demonstration by the trainer needs to be carried out during practical session. Yogic videos can be used as well.

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

- Maintain a diary indicating date-wise practice done by the students with photo graph of self in yogic posture.

ASSIGNMENTS –

- Prepare a diet and nutrition chart for self.

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

Sr. No	Equipment Name with Borad Specifications	Relevant LLO Number
1	Yoga and Meditation kit – Yoga mats, Yoga rollers, Yoga blocks, Aero yoga clothing blankets, cloth straps, Bolsters, Wheels	All

IX SUGGESTED FOR WEIGHTAGE TO LEARNING EFFORTES AND ASSESSMENT PURPOSE (Specification Table) – Not applicable.

X ASSESSMENT METHODOLOGY /TOOLS

Formative Assessment (Assessment for learning)
- Lab performance
- Self-learning
- Term work

Summative Assessment (Assessment of Learning)
- Actual Practical 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 Developm ent of solutions	PO-4 Enginee ring tools	PO-5 Engineering practices for Society, Sustainability and Environment	PO-6 Project Managem ent	PO-7 Life-long learning	PSO -1	PSO- 2	PSO -3
CO1	3	-	-	-	3	-	-			
CO2	3	-	-	-	3	-	-			
CO3	3	-	-	-	3	-	-			

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	Swamy Vivekanand	Patanjali Yoga Sutras	Fingerprint Publishing (2023) Prakash book India Pvt Limited, New Delhi ISBN: 13?:? 978-9354407017
2	Luisa Ray, Agnes Sutherland	Yoga for Every Body – A beginner's guide to yoga postures, breathing exercises and me.	Vital Life Books (2022) ISBN-13?:? 978-1739737009
3	Swamy Saradananda	Mudras for Modern Living: Boost your health, re-energize your life, enhance your yoga and deepen your meditation	Watkin Publishing (2019) – ISBN – 13 ?:? 978- 1786782786
4	Martha Devis, Elizabeth Robbins, Mattew Mckay, Eshelman MSW	The Relaxation and Stress Reduction Workbook	A New Herbinger Self-Help workbook (2019)
5	Ann Swanson	Science of Yoga – Understand the Autonomy and Physiology to perfect your practice.	ISBN-13?: ?978 - 1465479358

XIII LEARNING WEBSITES AND PORTALS

Sr. No.	Links / Portals	Description
1	https://onlinecourses.swayam2.ac.in/aic19_ed28/preview-	Yoga and application of yoga
2	https:/onlinecourses.swayam2.ac.in/aic23_ge09/preview	Yoga for creativity
3	https:/onlinecourses.swayam2.ac.in/aic23_ge05/preview	Yoga for concentration
4	https:/onlinecourses.swayam2.ac.in/aic23_ge06/preview	Yoga for memory development
5	https:/onlinecourses.nptel.ac.in/noc21_hs29/preview	Psychology of stress, health and well being
6	https:/onlinecourses.swayam2.ac.in/nce19_sc04/preview	Food Nutrition for Healthy Living – course – Swayam
7	https://www.classcentral.com/course/swayam-fitness-management	Fitness Management from Swayam