DEPARTMENT OF RURAL INDUSTRIES AND MANAGEMENT

The Gandhigram Rural Institute - Deemed to be University

Gandhigram - 624302

DIPLOMA IN TEXTILE TECHNOLOGY

D.T.T

SYLLABUS - OBE Format

(New Regulation)

2021 - 2022

Programme Objectives PO1:

PO1: Students will get familiar with the essential components in the fields of textile technology, namely yarn manufacturing, fabric manufacturing, textile chemical processing, and apparel manufacturing which would make them have a successful career in manufacturing, quality assurance, product development, and technical sales segments of the textile industry.

PO2: Students will learn theory and practices in different concepts of textile manufacturing and allied areas to manage the textile industry and provide techno-economic solutions to the problems.

PO3: Students will continually learn and adapt to the constantly changing technology and take up an entrepreneurial venture.

Programme Specific Outcome:

PSO1: Build the firm foundation in the fundamentals and correspond the application with the current advancements in textile technology.

PSO2: An ability to understand the machine operating and troubleshooting practices in connection with textile manufacturing such as fibre, yarns, fabrics, garments etc.

PSO3: Capacity to design the textile products with cutting edge instruments and to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PSO4: An ability to understand the manufacturing process of textile products and quality assurance of raw materials and finished products.

PSO5: An ability to understand the professional & ethical responsibility and enable them to work effectively as an individual and in a team.

PSO6: An ability to recognize the need to engage in life-long learning and updating the knowledge in contemporary issues in textile manufacturing.

DEPARTMENT OF RURAL INDUSTRIES AND MANAGEMENT

Programme: Diploma in Textile Technology

Syllabus Outline and Scheme of Examinations as per CBCS-OBE New Regulations

Semester	Course Type	Course Code	Course Title	No of Credits	Hours/ Week			ESE Duration	CFA	ESE	Total
					L	T	P				
I	**HS**	21ENGD0101	Foundational English-I	3	3			3	40	60	100
	ES	21DTTES101	General Engineering	3	3			3	40	60	100
	ES	21DTTES102	Engineering Graphics Practical	2			4	3	60	40	100
	ES	21DTTES103	Workshop Practice	1			2	3	60	40	100
	PC	21DTTPC101	Textile Fibres	3	3			3	40	60	100
	PC	21DTTPC102	Yarn Manufacture – I	3	3			3	40	60	100
	PC	21DTTPC103	Yarn Manufacture – I Practical	2			4	3	60	40	100
	PC	21DTTPC104	Fabric Manufacture – I	3	3			3	40	60	100
	PC	21DTTPC105	Fabric Manufacture – I Practical	2			4	3	60	40	100
		Total		**22**	**29**			**27**	**440**	**460**	**900**
II	**HS**	21ENGD0202	Foundational English-II	3	3			3	40	60	100
	ES	21CSAD02T1	Web Designing	2+1	2		2	3	50	50	100
	PC	21DTTPC206	Yarn Manufacture – II	3	3			3	40	60	100
	PC	21DTTPC207	Yarn Manufacture – II Practical	2			4	3	60	40	100
	PC	21DTTPC208	Fabric Manufacture –II	3	3			3	40	60	100
	PC	21DTTPC209	Fabric Manufacture – II Practical	2			4	3	60	40	100
	PC	21DTTPC210	Textile Testing	3	3			3	40	60	100
	PC	21DTTPC211	Textile Testing Practical	2			4	3	60	40	100
			Total	**21**	**28**			**24**	**390**	**410**	**800**
III	**PC**	21DTTPC312	Fabric Manufacture – III	3	3			3	40	60	100
	PC	21DTTPC313	Fabric Manufacture – III Practical	2			4	3	60	40	100
	PC	21DTTPC314	Textile Wet Processing – I	3	3			3	40	60	100
	PC	21DTTPC315	Textile Wet Processing – I Practical	2			4	3	60	40	100
	PC	21DTTPC316	Fabric Structure and Colour	3	3			3	40	60	100
	PC	21DTTPC317	Fabric Analysis and Design & Colour Practical	2			4	3	60	40	100
	Internship	21DTTSI301	Summer In-plant Training Evaluation[#]	2				-	100	-	100
	PE	21DTTPE3EX	Elective – I*	3	3			3	40	60	100

	PE	21DTTPE3EY	Elective – I Practical*	2			4	3	60	40	100
	Audit Course	21DTTAU301	Village Placement Programme	2				-	50	-	50
		Total		**24**	**28**			**24**	**550**	**400**	**950**
IV	**PC**	21DTTPC418	Environmental Engineering in Textile Industry	3	3			3	40	60	100
	PC	21DTTPC419	Textile Management	3	3			3	40	60	100
	PC	21DTTPC420	Textile Wet Processing – II	3	3			3	40	60	100
	PC	21DTTPC421	Textile Wet Processing – II Practical	2			4	3	60	40	100
	PC	21DTTPC422	Computer Aided Textile Designing and Colour Matching Practical	2			4	3	60	40	100
	PE	21DTTPE4EX	Elective–II*	3	3			3	40	60	100
	PE	21DTTPE4EY	Elective–II Practical*	2			4	3	60	40	100
	Project	21DTTPR401	Project	4	4			-	40	60	100
		Total		**22**	**28**			**21**	**380**	**420**	**800**
			Grand Total (I+II+III+IV)	**89**			**113**	**96**	**1760**	**1690**	**3450**

HS: Humanities and Social Science Courses, ES: Engineering Science Course, PC: Programme Core Course, PE: Programme Elective Course

Summer in-plant training evaluation (4 weeks) – Students will undergo in-plant training during summer vacation and the marks will be awarded in the third semester under summer in-plant training evaluation course.

Number of Programme Elective Courses [PE]

S. No	Course Code	Course Title	Hours per Week			Semester	Credits
			L	T	P		
1	21DTTPE3EX	Elective – I 1. Silk Technology 2. Garment Technology 3. Advanced Fabric Manufacture 4. Merchandising and Export Documentation Procedures	3			3	3
2	21DTTPE3EY	Elective – I Practical 1. Silk Technology Practical 2. Garment Technology Practical 3. Advanced Fabric Manufacture Practical 4. Merchandising and			4	3	2

		Export Documentation Procedures Practical					
3	21DTTPE4EX	Elective – II 1. Advanced Fabric Structure and Design 2. Knitting Technology 3. Advanced Textile Wet Processing 4. Technical Textiles	3			4	3
4	21DTTPE4EY	Elective – II Practical 1. Advanced Fabric Structure and Design Practical 2. Knitting Technology Practical 3. Advanced Textile Wet Processing Practical 4. Technical Textiles Practical			4	4	2

Course Code & Title	21ENGD0101: FOUNDATIONAL ENGLISH - I		
Class	DTT	Semester	First
Course Objectives	The Course aims		
	• To help the students understand the intricacies of English Grammar for everyday use.		
	• To help them improve their essential language skills in English.		

Units	Content
I	**Grammar** • Nouns & Pronouns • Adjectives & Determiners • Verbs and Tenses Auxiliary Verbs
II	**Listening Skills** • Descriptions • Story Narrations Short Speeches
III	**Reading & Vocabulary** • Reading comprehension passages Vocabulary building
IV	**Speaking Skills** • Face to Face Conversation • Descriptions Telephone Conversation
V	**Writing Skills** • Paragraph writing • Note making Short Narrative Essays
References	**Textbook:** Foundational English I Textbook/Course Material - Prepared by the School.
	Reference Book: Sergeant, Howard. *Basic English Grammar Book 2.* Irvine: Saddleback, 2007. Print.

Course Code & Title	21DTTES101: GENERAL ENGINEERING		
Class	D.T.T	Semester	First
Cognitive Level	**K-1:** Recall the principles of basic mechanical, electrical and electronic devices.		
	K-2: Comprehend the functions of different mechanical and electrical devices.		
	K-3: Apply the different mechanical and electrical devices in textile manufacturing.		
Course Objectives	• To impart knowledge about the mechanical components such as compressor, drives, clutches, and air-conditioning systems. • To make them understand the principles of A.C and D.C motors & generators and transformers. • To educate knowledge about the various electronic components used in textile industry.		

Units	Content	No. of Hours
I	**Elements of Mechanical Engineering:** Air Compressors: Principle of air compression – block diagram – construction and working of axial and centrifugal type air compressors – uses of compressed air. Air Conditioning: Principle of air conditioning – Room air conditioning – Comparison of summer and winter air conditioning – Comparison of Room and centralized air-conditioning. Transmission of Power: Types of drives – belts –flat, circular and V belts – velocity ratio – slip – related calculations. Clutches and brakes: Principle and uses of clutches – Single plate clutch – Principle of brake – working of hydraulic brake.	10
II	**Elements of Electrical Engineering – I:** Basic ideas and definitions of electrical quantities – current, voltage, power, resistance, etc. Types of supplies – A.C. and D.C. – definitions of frequency, RMS and instantaneous value – inductance, capacitance and resistance in A.C. circuits – D.C. circuits – Basic laws – Ohm's law and Kirchoff's law – Resistances and capacitors in series and parallel – Simple calculations involving current, voltage, resistance, capacitance and power etc.	9
III	**Elements of Electrical Engineering – II:** Principle of electromagnetic induction – construction and working principle of A.C generator – 3 phase A.C. generator – Transformer – basic principle – construction and working – step up and step-down transformer – Motors – Principle of a motor – Flemming's left hand and right hand rule – Induction motors.	9
IV	**Elements of Electronics Engineering-I:** Atomic structure – concept of free electrons – electron flow in a	8

	conductor – Electronic emission – Photo electric emission – photoelectric effect – Photocell in Textiles.	
V	**Elements of Electronics Engineering-II:** Semi conductors – doping of semiconductors – PN junction diodes – diodes as rectifiers – NPN and PNP transistors – principle of working – 3 different configurations of a Transistor – Transistor amplifier – Transducers – Principle of LVDT and strain gauges – applications of transducers. Electronic Speed; control devices – Stepper and Servomotors – applications.	**9**
	Total	**45**
References	**Text Book:** 1. Pravin Kumar, Basic Mechanical Engineering, Pearson India Publications(2013) 2. Bhattacharya S. K , Basic Electrical and Electronics Engineering, Pearson India Publications (2011). 3. Metha V.K, Rohit Mehta, Principle of Electrical Engineering and Electronics, S. Chand Publishing(2014) **Reference Book:** 1. Saro DAS Thermal Engineering, A text book of Hydraulics – Khurmi R. S., Chand S.& Co, 2006. 2. Theraja B.L. A text book of Electrical technology, S. Chand & co (2008) 3. Mehta V.K Basic Electronics Integrated Electronics – Millman and Halkias. 4. Pandey O.N., Electronics Engineering, Springer International Publishing, 2022. 5. Kothari D P, and Nagrath IJ, Basic Electrical and Electronics Engineering | Second Edition, McGraw-Hill Education, 2020.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Describe the different types of mechanical devices used for textile industry. CO2: Explain the working functions of motors, generator and transformers. CO3: Explain the working functions of control devices such as PN Junction diode, LVDT, and strain gauges. CO4: Describe functions of photocell applications in textile industry. CO5: Explain the different applications servo and stepper motors.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**

CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	**21DTTES102 : ENGINEERING GRAPHICS PRACTICAL**		
Class	**DTT**	**Semester**	**First**
Cognitive Level	**K-1:** Recall the different principles of technical drawing. **K-2:** Understand the dimension, and Geometrical Construction principles in technical drawing. **K-3:** Apply the technical drawing principles in textile manufacturing.		
	The Course aims • To provide the fundamental understanding of drawing instruments and their uses. • To teach lettering, numbering and dimensioning of engineering objects. • To provide the understanding of scales and engineering curves. • To provide the understanding of construction of hyperbola, cycloid and involutes. • To make them understand the projection of solids.		

Units	**Content**	**No. of Hours**
I	**Drawing Instruments and Their Uses:** Drawing instruments and their uses – importance of engineering drawing as a graphic communication – drawing practice as per IS codes – list of equipment – drawing boards – mini drafter – large compass – bow compass – use of compass – dividers and their use – drop spring bow instruments and their uses – protractor – set of scales or rules – pencils of different grades – drawing sheets – various sizes as per IS and their layout – drafting machine – inking pen.	**12**
II	**Lettering, Numbering and Dimensioning:** Importance of legible lettering and numbering – single stroke letters – capital and lower case letters – general procedure for lettering and numbering – height of letters – guidelines. Dimensioning: Need for dimensioning – dimensioning terms and narrations as per IS – dimensioning line, extension line and leader line – placement of dimensions – unidirectional and aligned methods – important dimensioning rules – dimensioning of common features – diameters, radii, holes, chamfers – additions of letters and symbols – parallel, chain and progressive dimensioning.	**12**
III	**Scales & Construction of Conics and Geometrical Curves:** Scales – reducing and enlarging scales – plain and diagonal scales –symbol for first angle and third angle. Conics – different types – explanation of locus, focus, and directrix – application of ellipse, parabola, and hyperbola – Ellipse: construction of ellipse by concentric circles method.	**12**
IV	**Geometrical Construction Rectangular and parallelogram:** Introduction about drawing of Parabola- construction by rectangular and parallelogram method – construction of hyperbola when eccentricity is given – construction of cycloid and involutes of a circle.	**12**

V	**Projection of solids:** Projection of simple solids: Cube – Cylinder – Cone, given (i) Axis perpendicular to one plane and parallel to the other plane (ii) Axis parallel to both the principal planes (iii) Axis parallel to one plane and inclined to the other plane.	**12**
	Total	**60**
References	**Text Books:** 1. Manian S.S, Rajagopal P, Technical Drawing, Balachitra Publishers, Madurai-3, 2006. 2. Balasundaram K, Parthasarathy S.V, Technical Drawing, Pratheeba Publishers, Coimbatore-1, 2006. 3. Venugopal K, Engineering Drawing and Graphics, New Age International (P) Ltd., New Delhi, 2002. **Reference Books:** 1. Gill P.S, Engineering Drawing, S.K. Kataria & Sons, Delhi, 2002. 2. Bhatt N.D, Engineering Drawing and Graphics, Charotar Publishing House, Anand, Gujarat, 2006. 3. Narayana K.L and Kannaiah P Engineering Graphics, Tata Mcgraw Hill New Delhi, 2004. 4. Lakdshminarayanan Y and VaishWanar R.S Engineering Graphics, Jain Brothers, New Delhi, 2006. 5. Chandra A.M and ChadraSatish, Egineering Graphics, Narosa, 2006.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Handle drawing instruments properly. CO2: Improve the hand lettering & numbering, dimensioning as per BIS. CO3: Construct of scales and non-circular curves. CO4: Construct the hyperbola, cycloid and involutes. CO5: Understand the projection of simple solids.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTES103 : WORKSHOP PRACTICE		
Class	DTT	Semester	First
Cognitive Level	**K-1:** Recall the different principles of cutting, welding and lathe operation. **K-2:** Understand the working methods of cutting, welding and lathe operation. **K-3:** Apply the workshop functions in textile manufacturing.		
Course Objectives	**The Course aims** • To provide the fundamental understanding of cutting tools, drilling, joining, welding threading and job making with different shapes of different Metals. • To teach the students about various mechanism of machineries used in textile industries.		

Units	Content	No. of Hours
I	**Cutting Practice:** Cutting by Hacksaw, Cutting by file, cutting by scissors.	6
II	**Drilling Practice:** Drilling by hand drill, drilling by electrical hand drill, drilling by power vertical drill, drilling by lathe.	6
III	**Joining and Welding:** a) Joining or fixing: Fixing by riveting. b) Welding: Arc welding.	6
IV	**Threading Practice:** Threading by lathe, threading by taps and die set.	6
V	**Job Making:** a). Three jobs with different shapes on different metals. b). Fitting Job: One fitting job.	6
	Total	30
Course Outcomes	**On completion of the course, students will be able to** CO1: Handle different types of vises properly. CO2: Work on drilling machines and lathe. CO3: Work on the welding machines. CO4: Construct the different shapes by fitting. CO5: Thread on the lathe.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2

CO3	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC101: TEXTILE FIBRES		
Class	**DTT**	**Semester**	**First**
Cognitive Level	**K-1:** Recall the different types of textile fibres and its properties.		
	K-2: Understand the physical and chemical properties of various textile fibres.		
	K-3: Application of fibre properties in clothing design and manufacturing.		
Course Objectives	**The Course aims**		
	• To impart knowledge about the natural, and synthetic fibres. • To make them understand the principles of the fibre extraction and other important properties of animal fibre. • To educate on regenerated fibre production and properties. • To impart the physical and chemical properties of textile fibres. • To impart knowledge on High performance Natural fibres.		

Units	Content	No. of Hours
I	**Natural Fibres:** Introduction: Definition – classification of Textile fibres. **Cotton:** seed fibre-Cotton Varieties- Hybrid cotton, Grading of cotton. Physical and chemical properties and end uses of cotton. **Bast Fibres: I**ntroduction – Jute and Flax fibre- Retting process. Physical and chemical properties and end uses of bast fibres.	**9**
II	**Animal Fibres:** Introduction of animal fibres. Wool-Varieties of wool- Characteristic of wool fibre and their grading-worsted and woollen -Physical and chemical properties of wool-felting of wool. Introduction to silk fibre-life cycle of silk worm- sericulture production-silk varieties- Physical and chemical properties and end uses of silk. Processing of silk – degumming process, twisting and weighting of silk-wild silk.	**9**
III	**Regenerated Fibres:** **Introduction:** Definitions – Monomer and Polymer – Polymerization techniques – Degree of Polymerization – Properties required for a fibre forming polymer. Regenerated fibres- Production of viscose Rayon and Acetate Rayon – Raw material to fibre production. Staple fibre manufacturing. Physical and chemical properties and end uses and special properties of regenerated rayons.	**9**
IV	**Synthetic Fibre:** **Polyamide Fibres:** Manufacturing process of Polyamide fibres – Nylon 6 and Nylon 66- Physical and chemical properties- Physical and chemical properties and end uses and special properties of aromatic polyamide. **Polyester Fibre:** Introduction to polyester fibres. Manufacturing process	**9**

	of polyester fibre-Physical and chemical properties. **Poly-Acrylic Fibre:** Introduction to poly-acrylic fibres. Types of acrylic fibres Manufacturing process of poly-acrylic fibre-Physical and chemical properties and end uses.	
V	**High-performance fibre:** Properties of Polyolefin Fibre, carbon fibre, elastane fibre, Glass fibre, Asbestos fibre, Silicon fibre, Kevlar fibre, Nomex fibre, HDPP fibre and end uses of high performance fibre. **Post Spinning Operations:** Spin finish**,** Staple fibre manufacturing process. Turbo stapler and Pacific converter, working principle and functioning.	**9**
	Total	**45**
References	**Text Books:** 1. Carolina, S., (1968) "Textile processing", Vol. I, State Department of Education. 2. Shenai, V.A., (1997) Textile fibres 2nd Revised edition in the series, "Technology of Textile Processing" Vo.I, Sevak publications, Bombay. **3.** Sreenivasa Murthy, H. V, Introduction to Textile Fibres, WPI, 2018. **Reference Books:** 1. Hearle J. W. S, Jaffe M, Eichhorn S, Kikutani T, Handbook of Textile Fibre Structure Volume 2: Natural, Regenerated, Inorganic and Specialist Fibres". Elsevier Science, 2006. 2. Moncrieff P.W, Manmadefibres 6th edition, Newnes – Butterworths, London, 1975. 3. Gohle E.P.C and Vilensty L.D, Textile Science 1st Indian edition, CBS Publishers and Distributors Delhi, India, 2010. 4. Corbman, Fibre to Fabric, Tata Mc Graw Hill, New Delhi, 2010. 5. Arindam Basu, Advances in Silk Science and Technology, Elsevier Science, 2015.	
Course Outcomes	**On completion of the course, students will be able to**	
	CO1: Describe the different types of natural fibres and extraction techniques. CO2: Explain the physical and chemical properties of different types of natural fibre. CO3: Describe the different types of polymers involved in the production of synthetic fibres. CO4: Describe different kinds of synthetic yarn spinning techniques. CO5: Explain the different applications of high performance fibre.	

Mapping of Co Vs PO and PSO

CO/PO	**PO**			**PSO**					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC102: YARN MANUFACTURE – I		
Class	DTT	Semester	First
Cognitive Level	**K-1:** Remember the different principles spun yarn preparatory process.		
	K-2: Comprehend technical specifications of various yarn preparation processes.		
	K-3: Application of different theories in spun yarn manufacturing process.		
Course Objectives	**The Course aims**		
	• To teach the process and working principles of Ginning, Blow room, carding, draw frame and comber machines. • To make them understand the different types of blending methods. • To educate the modern developments in yarn preparatory processes. • To teach the process and working principles of Blended yarn spinning.		

Units	Content	No. of Hours
I	**Ginning & Blow Room:** Objectives of Ginning – Study of working of different gins – Knife roller gin saw gin, Ginning out-turn. Effect of ginning performance on yarn quality. Study of contamination detector, fibre properties to be considered for mixing – study of auto mixer – Unimix – multi mixes, Bale management using HVI Instrument. Study of Beaters. Step cleaner – Axi-flow cleaner – ERM cleaner. Lap length measuring motion – Mechanism of lap formation – Chute feed.	**8**
II	**Carding:** Objectives of Carding – Study of working of high production cards – speed and settings – Concept of auto levelling – Heel and toe arrangement – Study of Stripping and Grinding – Study of Clothing– Developments in the Doffer Zone – Gross roll verga – Apron doffing system – Hook Theory Production Calculation.	**10**
III	**Drawing:** Study of fibre arrangement in carding and draw sliver, Principle and objectives of doubling and drafting. Different types of drafting systems – Weighting system – Control systems – Study of auto levellers — influence of roller slip – drafting waves – roller eccentricity - stop motions	**9**
IV	**Combing:** Preparation for Combing: Study of Sliver lap machine – Ribbon lap machine – Super lap machine – Objectives and importance of combing process working of comber - Degree of Combing – Combing Cycle – Salient features of modern comber – Unicomb Calculations of production.	**10**
V	**Blend Yarn Spinning:** Spinning of Cotton, Polyester, Wool and Cellulosic Blends. Study of Silk: Grainage & Filature work.	**8**
	Total	**45**

References	**Text Books:**
	1. Eric Oxtoby, Spun Yarn Technology, Elsevier Science, 2015. 2. Klein W., Vol. 1-3, "The Technology of Short Staple Spinning", "A Practical Guide to Opening & Carding" and "A Practical Guide to Combing, Drawing, and Roving frame", The Textile Institute, Manchester, U.K., 1998. 3. Chattopadhyay R. & Rengasamy R., "Spinning, Drawing, Combing & Roving, NCUTE Pilot Programme. **Reference Books:** 1. Peter R Lord., Handbook of Yarn Production Technology, Science and Economics, Elsevier Science, 2015. 2. Salhotra K. R. & Chattopadhyay R., Book of papers on "Blow room and Carding", IIT Delhi 1998. 3. Duraiswamy I, Chellamani P & Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, Manchester, U.K., 1993. 4. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002. 5. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003.
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on process and working principles of various yarn preparatory machineries. CO2: Describe the setting, speed and other technical specifications of different types of yarn preparatory machineries. CO3: Calculate the production and raw material requirement of various spinning preparatory departments. CO4: Explain the important theories such as blending, cleaning, drafting, and combing. CO5: Describe the technology of blended yarn spinning.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC103: YARN MANUFACTURE – I PRACTICAL		
Class	DTT	Semester	First
Cognitive Level	**K-1:** Remember the gearing diagram of different machineries in yarn preparatory process. **K-2:** Understand the calculations related to yarn preparation process. **K-3:** Application of draft and twist calculations in spun yarn manufacturing process.		
Course Objectives	**The Course aims**		
	• To educate the gearing diagram of various yarn preparatory machines and calculation related to speed, surface speed, draft, and production of various rotating devices. • To provide knowledge about the modern development in Blow room, carding, draw frame and comber machines. • To teach the design, constructional details and working principles of preparatory spinning machines.		

Units	Content	No. of Hours
I	1. Study on ginning machine. 2. Study on speed, surface speed of blowroom machinery.	12
II	3. Settings and production calculations in blowroom machineries. 4. Speed, surface speed card – draft and production calculations.	12
III	5. Study on carding machine settings. 6. Construction details of drawframe.	12
IV	7. Draft calculation in drawframe. 8. Study of comber preparatory machines.	12
V	9. Construction details of comber. 10. Speed surface speed, draft calculation in comber. 11. Modern developments in various preparatory machines.	12
	Total Hours	60
References	**Text Books:**	
	1. Klein W., Vol. 1-3, "The Technology of Short Staple Spinning", "A Practical Guide to Opening & Carding" and "A Practical Guide to Combing, Drawing, and Roving frame", The Textile Institute, Manchester, U.K., 1998. 2. Chattopadhyay R., Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002. 3. Chattopadhyay R & Rengasamy R, "Spinning, Drawing, Combing & Roving, NCUTE Pilot Programme.	

	Reference Books:
	1. Peter R Lord, Handbook of Yarn Production Technology, Science and Economics, Elsevier Science, 2015. 2. Salhotra K. R. & Chattopadhyay R., Book of papers on "Blowroom and Carding", IIT Delhi 1998. 3. Duraiswamy I, Chellamani P & Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, Manchester, U.K., 1993. 4. Eric Oxtoby.," Spun Yarn Technology"., Elsevier Science, 2015. 5. Ganapathy Nagarajan, "Textile Mechanisms in Spinning and Weaving Machines, WPI India, 2014.
Course Outcomes	**On completion of the course, students will be able to** CO1: Explain the gearing diagram of Blow room, carding, draw frame and comber machines. CO2: Calculate the speed, surface speed, draft, production per day, and other technical specifications of preparatory machines. CO3: Explain the modern developments in various yarn preparatory processes. CO4: Explain troubleshooting measures of various yarn preparatory processes. CO5: Explain machine setting, roller speed and other necessary specification of various yarn preparatory processes.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC104 - FABRIC MANUFACTURE – I		
Class	DTT	Semester	First
Cognitive Level	**K-1:** Recall the fabric preparatory process such as winding, warping, and sizing. **K-2:** Understand the principles, working functions in winding, warping, and sizing processes. **K-3:** Application of fabric preparatory process in woven fabric manufacturing.		
Course Objectives	**The Course aims** • To educate the classification of yarn faults and different types of winders. • To provide the knowledge about different types of high speed winding machines and its features. • To impart the knowledge about various types of warping machines and its features. • To teach about various types of automatic sizing machine with its features. • To provide the knowledge about drawing in operations for manual semi automatic and automatic machines.		

Units	Content	No. of Hours
I	**Introduction of Winding:** Description of machines and accessories used for warp and weft and weft winding in Handloom industry - Classification of winders – precision winding. Types and working principles of yarn clearers, knotters and splicers – Classification of yarn faults – Types of tensioners, guides-cop unwinding characteristics – stop motions – cone defects, causes and rectification.	**9**
II	**Features of Automatic Winding:** Features of automatic cheese and cone winding of synthetic yarns, blended yarns. Types and working principle of pirn winding machines – building, stop motion – features of automatic pirn winding machine – production and efficiency calculation – pirn defects – causes and remedies.	**9**
III	**Introduction and Features of Automatic Warping:** Types of warping used in Handloom industry – peg. vertical & horizontal warping - Beam warping machines – types – creels – stop motion – brakes – length measuring motion – features of modern warping machines – sectional warping machine – creel – lease reed-stop motion – end breaks in warping – quality control – beam defects – causes – remedies. Production and efficiency calculations.	**9**
IV	**Introduction and Features of Automatic Sizing:** Sizing practice used in Handloom centers – Hang sizing & street sizing - Types and selection of ingredients for sizing. Size preparation and storage equipments – sizing machines – multi-cylinder & hot air –	**9**

	control systems in sizing machines – mechanism of cylinder drying, beam pressing devices – mechanical, pneumatic, hydraulic devices.	
V	**Sizing Development and Drawing Operations:** Single end sizing machines – sizing of blended & filament yarns – process control in sizing – sizing faults – causes & remedies – modern development in sizing, Efficiency and production calculations. Need for drawing-in operation, working principles of manual, semiautomatic and automatic drawing - in machines – knotting.	**9**
	Total	**45**
References	**Text Books:** 1. Sabit Adanur, "Handbook of Weaving", CRC Press, 2019. 2. Thomas William Fox., The Mechanism of Weaving, Macmillan and Company, limited, 2010. 3. Ganapathy Nagarajan, "Textile Mechanisms in Spinning and Weaving Machines", WPI India, 2014. **Reference Books:** 1. Mukesh Kumar Singh ., "Industrial Practices in Weaving Preparatory"., WPI, 2014. 2. Abhijit Majumdar., "Principles of Woven Fabric Manufacturing", CRC Press, 2016. 3. Ajgaonkar D.B., Talukdar M.K. and Wedekar, Sizing: Material Methods and Machineries, Mahajan Publications Ahmedabad, 1999. 4. Lord P.R. and Mohammed M.H., Weaving – Conversion of Yarn to Fabric, Merrow Publication, 1992. 5. Sen Gupta, Yarn preparation', Vol. I and II, Mahajan publication Ahmedubad.	
Course Outcomes	**On completion of the course, students will be able to do** CO1: Acquire knowledge on working principles of various winding, warping and sizing machines. CO2: Describe the machine setting, speed, and other technical specifications of winding, warping and sizing machines. CO3: Calculate the production and raw material requirement of various spinning preparatory departments. CO4: Acquire the knowledge the about the size paste preparation for cotton and blended textiles. CO5: Describe the functions of drawing-in and denting-in process.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	2	2	2	2	2	2	2	2	2
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC105 : FABRIC MANUFACTURE – I PRACTICAL		
Class	DTT	Semester	First
Cognitive Level	**K-1:** Recall the working functions of different types of fabric preparatory machineries. **K-2:** Understand the calculations related to weaving preparatory processes. **K-3:** Application of technical specification, and process parameters in woven fabric manufacturing.		
Course Objectives	**The Course aims** • To teach about the hands-on experience on double flanged bobbin winding and dabba for hand weaving. • To make them understand the winding practice of pirn winder for hand weaving. • To provide the knowledge about warp preparation processes. • To understand the size paste preparation and sizing of yarn. • To know about piecing up, drawing in and denting processes.		

Units	Content	No. of Hours
I	**Warp winding:** 1. Winding practice on double flanged bobbin and Dabba for Hand weaving. 2. Calculation of speed of drums. 3. Calculation of traverse speed. 4. Calculation of production and efficiency. 5. Running of cone winder to produce cones.	**12**
II	**Pirn Winding:** 6. Winding practice on pirns for Hand weaving. 7. Calculation of spindle speed and traverse speed. 8. Running the pirn winder to wind yarn on the pirn with given conditions.	**12**
III	**Warping:** 9. Preparation of ball warp and beam warp. 10. Warp preparation in sectional warping machine.	**12**
IV	**Sizing:** 11. Preparation of size mixture. 12. Sizing of yarn, Sizing of Hank	**12**
V	13. Piecing up and Drawing-in 14. Denting-in and Dressing – in 15. Gaiting-in	**12**
	Total Hours	**60**

References	**Text Books:** 1. Sabit Adanur., "Handbook of Weaving", CRC Press, 2019. 2. Thomas William Fox , "The Mechanism of Weaving" , Macmillan and Company, limited, 2010. 3. Ganapathy Nagarajan, "Textile Mechanisms in Spinning and Weaving Machines" ., WPI India,2014. **Reference Books:** 1. Mukesh Kumar Singh, "Industrial Practices in Weaving Preparatory" , WPI, 2014. 2. Abhijit Majumdar., "Principles of Woven Fabric Manufacturing" , CRC Press, 2016. 3. Ajgaonkar D.B., Talukdar M.K. and Wedekar, Sizing: Material Methods and Machineries, Mahajan Publications Ahmedabad, 1999. 4. Lord P. R. and Mohammed M.H., Weaving – Conversion of Yarn to Fabric, Merrow Publication, 1992. 5. Sen Gupta, Yarn preparation', VolI and II, Mahajan publication Ahmadabad, 2002.
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the dabba winding and pirn winding method. CO2: Work on different types of winding machines. CO3: Understand the warp preparation. CO4: Prepare the size paste for warp yarn and application of size on warp sheet. CO5: Understand the process of piecing, drawing-in and denting in operation.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21ENGD0202: FOUNDATIONAL ENGLISH –II		
Class	DTT	Semester	Second
Course Objectives	The Course aims		
	• To help the students understand the intricacies of English Grammar for everyday use. • To help them improve their essential language skills in English.		

UNIT	Content
I	**Grammar :** • Prepositions & Prepositional phrases • Conjunctions • Direct & Indirect Speech • Sentences • Punctuation
II	**Listening Skills:** • Long Narratives • Recorded speeches • Movie clips
III	**Reading & Vocabulary:** • Reading comprehension passages • Vocabulary building
IV	**Speaking Skills:** • Narrations • Public speaking • Debate/Turn Coat
V	**Writing Skills:** • Precis Writing • Personal Letter Writing • General Essay Writing
References	Foundational English II Textbook/Course Material - Prepared by the School.

Reference Book:

Sergeant, Howard. *Basic English Grammar Book 2.* Irvine: Saddleback, 2007. Print

Course Code	Course title	Semester	Credits	Hours		Theory		Practical		Total
				T	P	CFA	ESE	CFA	ESE	
21CSAD02T1	**Web Designing**	II	2+1	2	2	30	45	10	15	100
Cognitive Level	**K-1** Recall the basic definitions and terminologies of computer. **K-2** Summarize the knowledge in web programming. **K-3** Prepare web pages related to their field using HTML.									
Course Objectives	**The Course aims to** • Introduce the concepts of internet and terminologies. • Enlarge the web designing concepts • Provide an in-depth training with HTML and JavaScript									
UNIT	**CONTENT**									
I	**Introduction to Computer and HTML** • Introduction to Internet and Website, Web development tools. • HTML: Introduction - Head and Body Sections. • Designing Title – Designing Headings. • Designing Body Section – Alignment and Formatting Tags. • Paragraph Tags.									
II	**Ordered List, Tables and Forms** • Ordered and Unordered List. • Tables – Using Colors. • Embedding Images and Videos. • Hyperlink. • Forms and Frames: Form Elements. • Buttons – Frame Layouts. • Floating Frames.									
III	**Cascade Style Sheet** • Introducing Cascading style sheet. • Formatting colors and background. • Formatting Heading, Paragraph text. • Formatting Table. • Formatting images. • More CSS Techniques.									
IV	**JavaScript** • Introduction to Java Script. • Anatomy of a Script. • Variables, Operators and Events. • Polyfills. • Java Script Libraries. • Database connection with Java Script.									
	XML									

V	• XML: Introduction –Syntax. • XML Document Structure. • Document Type Definitions. • Some Simple DTD Examples.
Reference Books	• Learning Web Design, Jennifer Niederst Robbins, O‟Reilly Publication, 2018. • JavaScript and JQuery, Jon Duckett, Wiley, 2014. • Web coding Bible, Chong Lip Phang, Chong Lip Phang, 2020.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Recall the fundamental concept of computer, Internet and Websites. **CO2:** Be familiar with the web programming concepts. **CO3:** Able to write web programs. **CO4:** Understand the data manipulation using scripting language. **CO5:** Build a simple web site.

Lab Exercises:

- Create a simple web site using HTML.
- HTML code to apply the formatting tags in a Webpage.
- HTML code to apply the List tags in a Webpage.
- HTML code to apply the Table and Table formatting tags.
- HTML code to apply the Form and Form elements.
- HTML code to apply the Frames.
- CSS code to design background.
- CSS code to design text and paragraphs.
- CSS code to design table.
- Simple JavaScript code to understand the variables and operators utilization.
- JavaScript code to use control statements.
- JavaScript code to validate the content of the website using functions.
- JavaScript code to connect a database with the website.
- JavaScript code to get and store the registration form.
- XML codes define the structure of the document.

Mapping with Programme Outcomes

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	3	3	3	3	2	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	2	3
CO4	3	3	3	3	2	3
CO5	3	3	3	3	2	3

Course Code & Title	21DTTPC206: YARN MANUFACTURE – II		
Class	**DTT**	**Semester**	Second
Cognitive Level	**K-1:** Recall the different principles in spun yarn manufacturing. **K-2:** Understand the principles, and working functions of various mechanisms in speed frame and ring spinning process. **K-3:** Application of technical specification, and process parameters in spun yarn manufacturing.		
Course Objectives	**The Course aims** • To teach the process of fibres in yarn manufacturing machines like speed frame, Ring frame, Yarn doubling, reeling, bundling and baling process. • To provide the knowledge about the process of traditional spinning devices like charkas. • To impart the knowledge about production calculation of various sections of yarn production. • To teach the technologies of new spinning systems.		

Units	Content	No. of Hours
I	**Speed Frame:** Objectives of Speed frame – Principle of working of modern speed frame. Design and setting of various mechanisms – Difference between bobbin lead and Flyer lead. Study of Draft – Twist – Roll Speed and Setting – Apron Spacing on yarn quality – Study of Building mechanism. Various change places in fly frame.	**9**
II	**Ring Frame:** Study of Drafting – Twisting – Winding and Building. Study of creels – Traverse motion –Drafting System – Roller Inclination – Top roller weighting – Spacer use – Objects of Ring and Traveller – Modern anti wedge and SV Rings and their comparison with conventional rings. Types of Travellers and their selection – Running – in period. Spindles – Construction details Ballooning – Brief Study of Spindle tapes. **Building Mechanism:** Object and function of Building mechanisms – Defects and remedies.	**10**
III	**Doubling:** Objects of Doubling – Rings, Travellers – Doubled yarn uses, Two for one twister. **Reeling Bundling, Baling** Objects of Reeling – Straight and Cross reeling – fancy yarn production – Bundling – Bundle weight – No. of knots.	**8**
IV	**Traditional Spinning Devices Spinning Charkas:** Types of Spinning equipment – Takli – Kissan, Ambar Charkas, 2, 6, 8, 12 Spindle NMC. Productions calculations and metric yarn numbering.	**9**
V	**New spinning technology**: OE spinning - Rotor spinning - DREFF Spinning, compact spinning, Air jet spinning, SIRO spinning.	**9**
	Total	**45**

References	**Text Books:** 1. Eric Oxtoby.," Spun Yarn Technology", Elsevier Science, 2015. 2. Peter R Lord.," Handbook of Yarn Production Technology, Science and Economics", Elsevier Science, 2015. 3. Klein W. "The Technology of short staple spinning". The Textile Institute, Manchester, 1998. **Reference Books:** 1. Lawrence C A, Advances in Yarn Spinning Technology, Elsevier Science, 2010. 2. Thilagavathi G, Karthik T," Process Control and Yarn Quality in Spinning", WIP India, 2016. 3. Klein W. Vol. 4- 5 "A Practical Guide to Ring Spinning 1987 and New Spinning Systems, 1993. The Textile Institute Manchester, 1987. 4. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003. **5.** Chattopadhyay R. & Rengasamy R., "Spinning, Drawing, Combing & Roving, NCUTE Pilot Programme.
Course Outcomes	**On completion of the course, students will be able to do** CO1: Understand the process involved in the conversion of fibre to yarn. CO2: Describe the process parameters, setting and maintenance of various machineries in spinning section. CO3: Explain the various traditional yarn production systems. CO4: plan the machineries requirement for yarn production. CO5: Explain the technologies of new spinning systems.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**1**	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**4**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC207 – YARN MANUFACTURE – II PRACTICAL		
Class	D.T.T	Semester	Second
Cognitive Level	**K-1:** Remember the different types of machineries used for spun yarn production. **K-2:** Understand the solving problems in machine gearing diagrams of speed frame and ring frame. **K-3:** Application of draft, twist, roller setting, top arm loading on spun yarn manufacturing.		
Course Objectives	**The Course aims** • To teach the speed, draft, twist production and efficiency calculations in speed frame and ring frame. • To provide the knowledge about the process of traditional spinning devices like charkas. • To provide the knowledge about the yarn manufacturing process.		

Units	Content	No. of Hours
I	Construction details of Speed frame, Draft, Twist Calculation in Speed Frame.	12
II	Study of Builder motion in Speed frame.	12
III	Practice to draw and Calculate the draft constant, Twist Constant and Spindle Speed.	12
IV	Practice to set the spindle gauge & lappet gauging. Practice to assemble & Set the Building mechanism.	12
V	Practice to draw the gearing diagram to find the speed and production in reeling machine. Practice in Two spindle, 6- spindle and 8- spindle hand charka.	12
	Total	60

References	**Text Books:** 1. Eric Oxtoby.," Spun Yarn Technology" , Elsevier Science, 2015. 2. Peter R Lord.," Handbook of Yarn Production Technology, Science and Economics" , Elsevier Science, 2015. 3. Klein W. "The Technology of short staple spinning". The Textile Institute, Manchester, 1998. **Reference Books:** 1. Lawrence C A," Advances in Yarn Spinning Technology" , Elsevier Science, 2010. 2. Thilagavathi G, Karthik T," Process Control and Yarn Quality in Spinning" , WIP India, 2016. 3. Klein W. Vol. 4- 5 "A Practical Guide to Ring Spinning 1987 and New Spinning Systems, 1993. The Textile Institute Manchester, 1987. 4. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003. **5.** Chattopadhyay R. & Rengasamy R., "Spinning, Drawing, Combing & Roving, NCUTE Pilot Programme.
Course Outcomes	**On completion of the course, students should be able to do** CO1: Calculate the speed and draft parameters of different spinning machineries. CO2: Gain the knowledge in various machines settings of speed frame and ring frame. CO3: Explain working functions of traditional spinning system.

Mapping of Co Vs PO and PSO

CO/PO	**PO**			**PSO**					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC208 – FABRIC MANUFACTURE – II		
Class	**DTT**	**Semester**	**Second**
Cognitive Level	**K-1:** Recall the different principles in handloom and powerloom.		
	K-2: Understand the principles, and working functions of various mechanisms in handloom and powerloom.		
	K-3: Application of technical specification, and process parameters in weaving process.		
Course Objectives	**The Course aims** • To teach various types of Handlooms and their functions. • To make them understand the mechanism of various types of Handloom and semi automatic looms. • To provide the knowledge of primary, secondary and auxiliary mechanism and working of power looms. • To teach the calculation related to weaving shed.		

UNITS	Content	No. of Hours
I	**Introduction to Handloom:** Different parts of handloom and their functions. Description and working of throw shuttle loom, fly shuttle loom and semi automatic handloom. Heald – type and count of heald. Reed – types and system of numbering reed. Primary, secondary and auxiliary motions on handlooms	**8**
II	**Motions of Handlooms:** Different type of take-up motion and let-off motion used in the handloom industry - Types of heald reversing motion used in handloom, Different types of shedding and devices used in shedding with merit and demerits, Types of multiple boxes used in handlooms – drop box motion and vibrating box motion.	**8**
III	**Introduction of Powerloom:** Classification of powerloom, different parts of powerloom and their functions , motions on powerloom ,Description and working of plain tappet shedding – positive and negative tappets, Heald reversing motions ,Over pick motion and under pick motion , Beat up mechanism – eccentricity of sley, Timing and setting up of different motions in powerloom.	**9**
IV	**Motions on powerloom:** Take up motion – 5 wheel and seven wheel units -, Warp protector motion – loose reed and fast reed, Weft stop motion – side weft fork mechanism, Oscillating back rest motion, Box motion in powerloom – object and principles of drop box mechanism, condition for good shuttle box motion, Eccle's Drop box motion – Timing and settings – card saving device – safety device – pattern card preparation, Object and principle of terry mechanism.	**10**
V	**Weaving calculation:** Weaving defects and their remedies, Calculation related to take-up	**10**

	motion, reed and heald calculation, calculation of weight of warp and weft required for particular sort, warp, weft and total cloth cover factor, Calculation related to loom shed, shed efficiency and production of looms.	
	Total	**45**
References	**Text Books:** 1. Banerjee N.N. weaving mechanism Vol-I, Kalcutta W.B. 2002. 2. Marks R., Robinson A. T. C, "Principles of weaving"., Textile Institute, 2010. 3. Abhijit Majumdar., "Principles of Woven Fabric Manufacturing" , CRC Press, 2016. **Reference Books:** 1. Thomas William Fox , "The Mechanism of Weaving", Macmillan and Company, limited, 2010. 2. Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983. 3. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York 1981. 4. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. **5.** Ganapathy Nagarajan, "Textile Mechanisms in Spinning and Weaving Machines", WPI India,2014, ISBN: 9789380308944.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on functions of various types of Handloom. CO2: Understand the mechanism of various types of Handloom and powerloom machines. CO3: Explain the timing and setting of powerloom mechanisms. CO4: Calculate efficiency and weaving shed calculation. CO5: Identify the various defects occur on fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC209-FABRIC MANUFACTURE – II PRACTICAL		
Class	**DTT**	**Semester**	**Second**
Cognitive Level	**K-1:** Recall the different types of mechanisms in handloom and power.		
	K-2: Understand the erection procedure of handloom and power loom.		
	K-3: Application of different calculations in maintenance of loom shed.		
Course Objectives	**The Course aims** • To teach the various mechanism and working of handloom and powerloom. • To train the dismantling and reassembling of handloom & power loom mechanism.		

UNITS	Content	No. of Hours
I	Handloom.	**60**
II	Weaving practice of fly shuttle pit loom, fly shuttle frame loom, semi automatic handloom.	
III	Arrangement of looms and treadle tie-up on multi treadle fly shuttle frame loom and their designing technique – dismantling.	
IV	Erecting and setting of handloom, semi automatic handlooms.	
IV	Erecting and setting of 5 wheel take-up motion and frictional let –off motion on handloom.	
V	Actual measurement and study of specifications of different types of handlooms, and semi automatic handlooms.	
References	**Text Books** 1. Banerjee N.N. weaving mechanism Vol-I, Kalcutta W.B. 2002. 2. Marks R., Robinson A. T. C., "Principles of weaving", Textile Institute, 2010. 3. Chakravorthy B., Mechanism of Weaving Machines, Smt.Chakravorthy serampore, W.B., 1982. **Reference Books** 1. Thomas William Fox, "The Mechanism of Weaving", Macmillan and Company, limited, 2010. 2. Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983. 3. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York 1981. 4. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. 5. Ganapathy Nagarajan, "Textile Mechanisms in Spinning and Weaving Machines", WPI India, 2014.	

Course Outcomes	CO1: Erect the Hand looms mechanism. CO2: Make the different setting of Hand looms & Power looms. CO3: Weave the Handloom, Semi auto loom and powerloom machines. CO4: Rectify the loom defects. CO5: Rectify the fabric defects.

Mapping of Co Vs PO and PSO

CO/PO	**PO**			**PSO**					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC210: TEXTILE TESTING		
Class	**DTT**	**Semester**	**Second**
Cognitive Level	K-1: Recall the characterization procedures of fibre, yarn and fabric. K-2: Understand the principles and various testing procedures of fibre, yarn, and fabric. K-3: Application of testing specification in textile manufacturing process.		
Course Objectives	**The Course aims** • To provide the fundamental understanding of moisture properties on fibres and fibre length measurement. • To provide the understanding of testing of fibre fineness and fibre strength. • To provide the understanding of yarn numbering, yarn twist, yarn strength and yarn evenness. • To provide the understanding of testing of fabric dimensions, properties and tensile strength. • To provide the understanding of fabric handle, resistance to abrasion, air & water permeation.		

Units	Content	No. of Hours
I	**Moisture Relation and Fibre length measurement:** **Humidity:** Absolute humidity, Standard testing atmosphere and Relative humidity. Wet and dry bulb hygrometer and Sling hygrometer. Moisture regains and content. Standard regain. Estimation of moisture content and regain- Conditioning oven and Shirley moisture meter. **Fibre length:** Length – Importance of fibre length. Methods of measuring fibre length- Hand-stapling method, Baer sorter and Digital Fibrograph.	**9**
II	**Testing of Fibres for other properties:** **Fibre Fineness** – Importance of fibre fineness. Methods of fineness measurement by Sheffield type and ATIRA fibre fineness tester. Importance of Maturity. Estimation of maturity by sodium hydroxide swelling method. Relationship between maturity and fineness. **Fibre Strength** – Importance of fibre strength. Measurement of strength by Stelometer. Brief idea about Uster HVI – AFIS – Strain curves for different fibres. Analysis of trash content in raw cotton by Shirley Analyzer. Fibre Quality Index.	**9**
III	**Testing of Yarns:** Direct and Indirect system of yarn numbering systems – Yarn count determination by Knowle's Balance, Quadrant Balance and Uster Auto Sorter. **Yarn Twist -** Importance of Twist. Measurement of twist -Twist contraction method and Doubled yarn twist by Take-up twist tester – Relationship between yarn count and twist and strength. **Yarn Strength -** Importance of yarn strength. Principles of Constant Rate of Loading (CRL) and Constant Rate of Extension (CRE). Principle and study of Instruments – Single Thread strength Tester, Lea tester, Ballistic tester, Instron tensile tester. **Yarn Evenness** – Random and periodic variations in yarn. Short term,	**9**

	Medium term and Long term variations. Index of irregularity. Methods for assessing yarn irregularity by Visual method, Cutting and Weighing method and Yarn Appearance Boards. Principle and Study of USTER Evenness tester in detail – features of latest evenness testers – Analysis of Spectrogram. Brief study on – USTER Classimat, Yarn Hairiness and its effects, Shirley Hairiness Meter.	
IV	**Testing of Fabric:** Brief study on – Shirley Thickness Gauge, Count determination by Beesley's Balance. Crimp and fabric properties, Shirley Crimp Tester. Importance of Tensile, Tearing and Bursting Strengths of fabric. Cloth Tensile Strength Testing by Ravelled strip, Cut strip and Grab methods. Various test specimens for Tearing Strength Test. Hydraulic and pneumatic Bursting Strength Tester.	**9**
V	**Testing of Fabric (Contd.)** Serviceability, Wear and Abrasion resistance. Martindale Abrasion Tester, Pilling in fabric and Fabric Pilling Tester. Study on – Shirley Stiffness Tester, Drape Meter, Crease resistance and Crease recovery. Shirley Crease Recovery Tester. Brief study – Definitions of Fabric Air – Permeability and Fabric Air Resistance. Shirley Air – Permeability tester. Flammability of fabric – water repellency / proof of fabric – brief study of water absorbency testers.	**9**
	Total	**45**
References	**Text Books:** 1. Angappan & Gopalakrishnan R., Textile testing, 4th revised edition 1997, SSMITT Students Co Operative Stores, Kumarapalayam. 2. Lijing Wang., "Performance Testing of Textiles-Methods, Technology and Applications" Elsevier Science, 2016, ISBN: 9780081005781. 3. Thilagavathi. G, Karthik. T, "Process Control and Yarn Quality in Spinning", WIP India, 2016, ISBN: 9789380308180. **Reference Books:** 1. Booth J.E, 3rd Edition 1986, Principles of Textile Testing, 4th Edition 194, Butterworth Scientific, London. 2. Groover E.B and Hamby D.S, 1st U.S. Edition 1960.Hand Book of Textile Testing and Quality Control., Wiley Estern Reprint 1988, Published by Mohinder Singh Sejwal (for Wiley Eastern Ltd) New Delhi, India. 3. Sundaram V and Iyengar R.L.N, 1968, Hand Book of Methods of Test for Cotton Fibres, Yarns and Fabrics Edition – CTRL, Mumbai. 4. The Characteristics of Raw Cotton –Lord E., Vol. II Part – I in the series Manual of Cotton Spinning, 1961, Edition, The Textile Institute and Butterworths, England. 5. ISI Hand book of Textile Testing, 15 – 1981, First Edition, 1982, Indian Standard Institution, New Delhi, India.	

Course Outcomes	**On completion of the course, students should be able to do** CO1: Estimate of moisture content and regain of textile fibres. CO2: Test the fibre fineness, fibre strength and trash content of fibres, using various instruments. CO3: Determinate yarn count, twist, strength and evenness. CO4: Explain of fabric quality particulars and tensile strength. CO5: Determinate of fabric abrasion resistance, handle and air & water permeability.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC211: TEXTILE TESTING PRACTICAL		
Class	**DTT**	**Semester**	**Second**
Cognitive Level	**K-1:** Recall the instruments used for characterization of fibre, yarn and fabric. **K-2:** Understand the testing procedures of fibre, yarn and fabric using different instruments. **K-3:** Application of testing specification in textile manufacturing.		
Course Objectives	**The Course aims** • To make the students to test the basic fibre properties. • To make to students to determine the yarn count, tensile strength, twist and evenness. • To make the students to test fabric dimensions properties and tensile strength. • To make the students to analyze the data generated during the testing of fibres, yarn and fabric.		

Units	Content	No. of Hours
I	Fibre length, fineness, maturity.	**12**
II	Fibre maturity and tensile strength.	**12**
III	Yarn count and twist.	**12**
IV	Yarn tensile strength and evenness.	**12**
V	Fabric quality particulars, strength, stiffness, crease recovery and yarn crimp.	**12**
	Total	**60**
References	**Text Books:** 1. Angappan P. & Gopalakrishnan R, Textile testing –, 4th revised edition 1997, SSMITT Students Co Operative Stores, Kumarapalayam. 2. Lijing Wang, Performance Testing of Textiles-Methods, Technology and Applications, Elsevier Science, 2016. 3. Thilagavathi G, Karthik. T, Process Control and Yarn Quality in Spinning, WIP India, 2016. **Reference Books:** 1. Booth J.E., Principles of Textile Testing, Butterworth Scientific, London. 1996. 2. Groover E.B. and Hamby D.S, Hand Book of Textile Testing and Quality Control, Wiley Estern Reprint, 1988. 3. Sundaram V. and. Iyengar R.L.N, Hand Book of Methods of Test for Cotton Fibres, Yarns and Fabrics, CTRL, Mumbai, 1968. 4. Lord E, The Characteristics of Raw Cotton, Vol. II Part – I in the series Manual of Cotton Spinning, The Textile Institute and Butterworths, England, 1961. 5. BIS Hand book of Textile Testing (SP 15:1981), Bureau of Indian Standards, New Delhi, India, 1982.	

Course Outcomes	**On completion of the course, students should be able to do** CO1: Testing of fibre length, fineness and maturity. CO2: Testing of fibre strength and trash content. CO3: Determination yarn count, twist, strength and evenness. CO4: Testing of fabric construction, strength, stiffness, crease recovery and yarn crimp. CO5: Analysis of data and determine the quality of textiles tested.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPC312: FABRIC MANUFACTURE – III		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the loom mechanisms and loom history. **K-2:** Understand the mechanism for weave design and the functions of automatic looms. **K-3:** Application of weaving principles for different types of fabric manufacturing.		
Course Objectives	**The Course aims** • To understand the various types of Indian handloom systems. • To acquire knowledge on dobbies and other shedding devices. • To acquire knowledge about the jacquard looms. • To acquire knowledge on Harness Mounting and tie-ups. • To understand the functions and processes of various automatic and shuttleless looms.		

Unit	Content	No. of Hours
I	**Handlooms of India:** Detailed study of Banarasi loom and system of ornamenting the fabric by adopting Jala technique. Detailed study of Kancheepuram loom and system of ornamenting the fabric by adopting adai technique. Detailed study of Mau loom and its techniques. Detailed study of Real Madras hand kerchief loom. Detailed study of important handlooms like loin loom, Salem loom, Venkatagri loom. Study of Chandila, Jamthani, Malabar, Panipat, Nagpur, Bijanur,Chanderi, Gadwal, Himroo and Solapur looms.	**9**
II	**Dobbies:** Additional mechanism on handlooms like long length weaving device, roller temple, fly wheel, 5 wheel take-up, frictional let-off and terry motions. Types of handloom dobbies – working principle of bottom closed shed dobby and centre closed shed dobby, barrel dobby and lattice dobby. Powerloom dobbies – cross border dobby, Keighly and Claimax dobby. Common defects and their remedies in dobby weaving.	**10**
III	**Jacquard:** Study of single lift single cylinder jacquard. Study of double lift single cylinder and double lift double cylinder jacquards. Study of open shed, centre shed and cross border jacquards. Different system of harness mounting and their use. Harness building - Defective shedding in jacquard weaving	**10**
IV	**Harness Mounting:** Different types of tie-ups made in harness mounting- straight, centre, border and mixed, sectional or compound tie - Calculations pertaining to jacquard. Study of card cutting devices – hand punching and piano card cutting machine, method of punching cards on these machine and card lacing	**8**
V	**Automatic power loom and Shuttleless loom:** Introduction to automatic loom and shuttleless loom and their merits, weft	**8**

	insertion techniques of shuttleless weaving machines - airjet, water jet, projectile, rapier looms. Terry and pile mechanisms.	
	Total Hours	**45**
References	**Text Books:** 1. Lord P.R. and Mohamed M.H., Weaving: Conversion of Yarn to Fabric, Merrow Publications, 2010. 2. Chakravorthy B., Mechanism of Weaving Machines, Smt. Chakravorthy serampore W.B.2008. 3. Marks R., RobinsonA. T. C., Principles of weaving, Textile Institute, 2010. **Reference Books:** 1. Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983. 2. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York, 2008. 3. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. 4. Banerjee N.N. weaving mechanism Vol - I, Kalcutta, W.B. 2002. 5. Marks R, Robinson A. T. C, "Principles of weaving", Textile Institute, 2010, ISBN: 9780900739798.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the various types of Indian handloom systems. CO2: Acquire knowledge on dobbies and other shedding devices. CO3: Acquire knowledge about the jacquard looms. CO4: Acquire knowledge on Harness Mounting and tie-ups. CO5: Understand the functions and processes of various automatic and shuttle less looms.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	3	3	3	3	3	3	3
CO4	2	2	3	3	3	3	3	3	3
CO5	3	3	3	2	3	3	3	3	3

Course Code & Title	21DTTPC313: FABRIC MANUFACTURE – III PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the Dobby and jacquard setting and various working elements in the shedding mechanism.		
	K-2: Understand the dismantling and assembling practice of various working elements in dobby and jacquard device.		
	K-3: Application of card cutting, pattern cards, peg card, motif design in the weave design creation.		
Course Objectives	**The Course aims**		
	• To understand the various types of Indian handloom systems. • To acquire knowledge on dobbies and other shedding devices. • To acquire knowledge about the jacquard looms. • To acquire knowledge on Harness Mounting and tie-ups. • To understand the functions and processes of various automatic and shuttle less looms.		

UNITS	Content	No. of Hours
I	1. Practice to mount and set the dobby over the loom on handloom & power loom. 2. Practice to dismantle and assemble jacks, baulk lever, needle, hooks etc. 3. Practice to assemble and set the T lever, L lever, knifes etc.	**12**
II	4. Practice to tune the given dobby. 5. Practice to assemble and set the cylinder. 6. Practice to peg a design on lattice and mount on the cylinder.	**12**
III	7. Practice of hooks and needles arrangement in the jacquard. 8. Practice of driving arrangement for cylinder and griffe in jacquard. 9. Preparation of motif and graph design to produce sarees and dhoties, pegging on lattice, mounting and weaving in dobby loom.	**12**
IV	10. Preparation of suitable motif, graph enlargement, binding mark of different furnishing fabric. 11. Practice of harness building on jacquard loom to produce furnishing fabrics.	**12**
V	12. Practice of card cutting, on pattern cards for the given designs using hand punching and pedal punching machine. 13. Mounting of these cards on jacquard loom. 14. Weaving practice on jacquard loom.	**12**
	Total Hours	**60**

References	**Text Books:** 1. Lord P.R. and Mohamed M.H., Weaving: Conversion of Yarn to Fabric, Merrow Publications, 2010. 2. Chakravorthy B., Mechanism of Weaving Machines, Smt. Chakravorthy serampore W.B. 2008. 3. Marks R., Robinson A. T. C, Principles of weaving, Textile Institute, 2010. **Reference Books:** 1. Thomas William Fox, The Mechanism of Weaving, Macmillan and Company, limited, 2010. 2. Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983. 3. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York, 2008. 4. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. 5. Marks R., Robinson A. T. C., " Principles of weaving"., Textile Institute, 2010.ISBN: 9780900739798.
Course Outcomes	**On completion of the course, students will be able to** CO1: The student will understand the various types of Indian handloom systems. CO2: The student will acquire knowledge on dobbies and other shedding. CO3: The student will acquire knowledge about the jacquard looms. CO4: The student will acquire knowledge on Harness Mounting and tie-ups. CO5: The student will understand the functions and process of various automatic and shuttle less looms.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	4	2	2	2
CO3	2	2	2	4	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	4	3	2	3

Course Code &Title	21DTTPC314: TEXTILE WET PROCESSING – I		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the structure & properties of cotton. **K-2:** Understand the importance of quality water & pretreatments of cotton. **K-3:** Application of different classes of dyes on cotton.		
Course Objectives	**The Course aims** • To provide the fundamental understanding of water for dye house, properties of cotton and singeing. • To provide the understanding of desizing & scouring of cotton and the methods used. • To provide the understanding of bleaching and mercerization of cotton and the methods used. • To provide the understanding of dyes and dyeing of cotton with various classes of dye. • To provide the understanding of printing and printing of cotton with various classes of dye.		

Units	Content	No. of Hours
I	**Water and Cotton:** Requirement of water for dye house – hard and soft water – carbonate and non-carbonate hardness – expression of hardness – removal of impurities – water softening – cation exchange softening – lime soda treatment – softening by sequestering agents – estimation of hardness. Structure and properties of cotton – impurities present in grey cotton – grey checking – stitching – shearing and cropping – singeing – objectives – process of singeing on gas singeing machine	**9**
II	**Desizing and Scouring of Cotton:** Desizing of cotton fabric – objectives – starch based size by hydrolytic and oxidative desizing – desizing of synthetic size – merits and demerit of each method. Scouring of cotton – Fibre, yarn and fabric – objectives – different methods of scouring – defects and remedies – machinery like kier, jigger, etc.	**9**
III	**Bleaching and Mercerization of Cotton:** Bleaching of cotton – objectives – bleaching with calcium hypochlorite – sodium hypochlorite – hydrogen peroxide – concept of full bleaching and use of blueing agents and optical brightening agents – evaluation of bleaching, damages and defects caused by bleaching. Mercerizing of cotton –yarn and fabric – physical and chemical aspects of mercerization –factors determining the efficiency of mercerization – mercerizing machinery.	**9**
IV	**Dyeing of Cotton:** Dyeing – objectives – general theory of dyeing – classification of dyes based on their mode of Application – procedure for Application of direct dyes, vat dyes, solubilised vat dyes, azoic dyes, sulphur dyes and reactive	**9**

	dyes on cotton – dyeing machinery.	
V	**Printing of Cotton:** Printing – objectives – methods of printing – styles of printing – printing procedures of cotton fabric with various classes of dyes and pigments – printing machinery.	9
	Total Hours	**45**
References	**Text Books:** 1. Prayag R.S., Bleaching, Mercerising and Dyeing of Cotton Materials, Prayag, Dharwad, 2005. 2. Prayag R.S., Technology of Printing, Prayag, Dharwad, 2000. 3. Marsh J T, An Introduction to Textile Bleaching, B.I. Publications, New Delhi, 1996. **Reference Books:** 1. Shenai V.A., Technology of Bleaching and Mercerising, Sevak Publications, Mumbai, 2002. 2. Marsh J.T., Mercerising, B.I. Publications, New Delhi, 2006. 3. Shenai V.A., Technology of Printing, Sevak Publications, Mumbai, 2002. 4. Trotman E.R. and Griffin BI, Chemical Technology of Scouring and Bleaching, B.I. Publications, New Delhi, 1990. 5. Trotman E.R. and Griffin B.I., Dyeing and Chemical Technology of Textile Fibres, B.I. Publications, New Delhi, 1990.	
Course Outcomes	**On completion of the course, students will be able to do the** CO1: Water softening and gas singeing of cotton. CO2: Desizing and scouring of cotton by various methods. CO3: Bleaching of cotton with calcium hypochlorite, sodium hypochlorite and hydrogen peroxide and mercerization of cotton. CO4: Dyeing of cotton with various classes of dye. CO5: Printing of cotton with various classes of dye.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	3	2	3	3	1	3	1	1
CO2	2	3	2	3	3	1	3	1	1
CO3	2	3	2	3	3	1	3	3	3
CO4	2	3	2	3	3	2	3	3	3
CO5	2	3	2	3	3	2	3	3	3

Course Code & Title	21DTTPC315: TEXTILE WET PROCESSING - I PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the procedure to test water hardness, pretreat and colour cotton. **K-2:** Understand the calculations to carry out the practicals. **K-3:** Application procedure to perform practicals.		
Course Objectives	**The Course aims** • To make the students estimate the water hardness. • To make the students desize and scour the grey cotton fabric. • To train the students to bleach cotton with different types of bleaching agents and to mercerize grey/bleached cotton fabric. • To prepare the students to dye cotton with direct, vat, reactive, sulphur and azoic dyes. • To make the students to print fabric with various dye classes.		

Units	Content	No. of hours
I	Estimation of water hardness by EDTA method.	**12**
II	Desizing of cotton with enzyme and scouring of cotton with caustic soda.	**12**
III	Bleaching of cotton with bleaching powder, sodium hypochlorite and hydrogen peroxide and mercerizing of cotton.	**12**
IV	Dyeing of cotton with direct, reactive, vat, sulphur and azoic dyes	**12**
V	Printing of cotton by direct and discharge styles.	**12**
	Total Hours	**60**
References	**Text Books:** 1. Prayag R.S., Bleaching, Mercerising and Dyeing of Cotton Materials, Prayag, Dharwad, 2005. 2. Prayag R.S., Technology of Printing, Prayag, Dharwad, 2000. 3. Marsh J T, An Introduction to Textile Bleaching, B.I. Publications, New Delhi, 1996. **Reference Books:** 1. Shenai V.A., Technology of Bleaching and Mercerising, Sevak Publications, Mumbai, 2002. 2. Shenai V.A., Technology of Printing, Sevak Publications, Mumbai, 2002. 3. Marsh J.T., Mercerising, B.I. Publications, New Delhi, 2006. 4. Trotman E.R. and Griffin BI, Chemical Technology of Scouring and Bleaching, B.I. Publications, New Delhi, 1990. 5. Trotman E.R. and Griffin B.I., Dyeing and Chemical Technology of Textile Fibres, B.I. Publications, New Delhi, 1990.	

Course Outcomes	**On completion of the course, students will be able to** CO1: Estimation of water hardness. CO2: Desize the cotton with enzyme and scouring of cotton with caustic soda. CO3: Bleach the cotton with calcium & sodium hypochlorites, hydrogen peroxide, and Application of optical brighteners. CO4: Do the slack mercerization of cotton with caustic soda. CO5: Dye and print the cotton with different classes of dyes – direct, vat, azoic, reactive, sulphur, and pigment colours using blocks and screens.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	3	2	3	3	1	3	1	1
CO2	2	3	2	3	3	1	3	1	1
CO3	2	3	2	3	3	1	3	3	3
CO4	2	3	2	3	3	2	3	3	3
CO5	2	3	2	3	3	2	3	3	3

Course Code & Title	21DTTPC316 – FABRIC STRUCTURE AND COLOUR		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the principle and construction of fabric structure. **K-2:** Understand the technique involved to produce various types of basic and ornamental structure of textile fabric. **K-3:** Application of various colour theories to suit for the production of different fabric.		
Course Objectives	**The Course aims** • To know about the principle and construction of fabric structure. • To know about the construction of furnishing and towel weaves. • To gain knowledge in the ornamentation and of producing various fabric structure. • To understand the different methods of producing double & trible layer of fabric. • To know about theories of colour and their applications on various textiles.		

UNITS	Content	No. of Hours
I	**Plain Weave:** Elementary principle of fabric construction – design, draft, peg plan and denting plan - Design paper and its use - Various kinds of draft and their uses - Preparation of peg plan from given design. Plain weave – Characteristics, Construction and Ornamentation - Derivations of plain weave – construction and uses.	**8**
II	**Twill Weave:** Characteristics of Twill weave, different types of twill weaves – regular twill, pointed twill, herring bone twill, broken twill, combined twill, elongated twill, transpose twill. Miscellaneous elementary weaves – Barley corn, stitched hopsack, and Twilled hopsack weaves.	**9**
III	**Sateen Crepe and Diamond Weaves:** Sateen weaves – regular sateen and Irregular sateen – construction and uses. Crepe weaves – construction and its specialties. Diamond weave – methods and their construction.	**8**
IV	**Towel and Furnishing Weaves:** Honey comb – characteristics, construction of ordinary and brighten honey comb weaves. Huck-a-back and mock leno weaves – characteristics, construction and uses. Terry weaves – formation of pile, construction of weaves, ornamentation to form stripe and check effect. Bedford cord, pique and Double cloth furnishing– construction and their specialties.	**10**
V	**Colour for Textile Designing:** Elements of colour – light and colour phenomena,	**10**

	Theory of colour – light and pigment Colour in combination, colour contrast and colour harmony. Application of colour – mixed colour effects, fibre mixture yarn, twist yarn mixture, combination of differently coloured thread, colour strip and check, simple and irregular pattern, colour combination in relations to weave. Introduction of Computer Application in Textile Designing.	
	Total Hours	**45**
References	**Text Books** 1. Grosicki Z.J, Textile Design and Colour – Butterworths London, 1950. 2. Grosicki Z.J, Advanced Textile Design & Colour, Butterworths, London, 1952 3. Behera B.K, Hari B.K, Woven Textile Structure - Theary and Application 1st Edition, Woodhead publishing, 2010. **Reference Books:** 1. Goerner D, Woven Structure and Design, Part – I – WIRA, 2006. 2. Goerner D, Woven Structure and Design, Part – II – BTT6 – 2006. 3. Priyak Goyal, Fabric Structure- Simplified, Kindle 1st Edition-2014. 4. Chakrabarty JN, Fundamental And Practices in Colouration of Textiles, Woodhead Publishing, 2014. 5. Gokarneshan, Fabric Structure and Design, 3rd Edition, New Age International Publishing 2020.	
Course Outcomes	**On completion of the course, students will be able to** CO1: To know about the principle and construction of fabric structure. CO2: To know about the construction of furnishing and towel weaves. CO3: To gain knowledge in the ornamentation and of producing various fabric structures. CO4: To understand the different methods of producing double & treble layer of fabric. CO5: To know about theories of colour and their applications on various textiles.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPC317 – FABRIC ANALYSIS AND DESIGN & COLOUR PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the analysis of textile fabric and the application of colour on the fabric. **K-2:** Understand the techniques involved to analyze the various structures of fabrics for their reproduction. **K-3:** Application of various colour theories to suit for the production of different fabric.		
Course Objectives	**The Course aims** • To know about the principle and construction of fabric structure. • To know about the analytical methods of fabric analysis for finding construction details of fabrics. • To find out the construction particulars required for reproduction of fabric structure. • To understand the different methods of producing double & treble layer of fabric. • To know about theories of colour and their applications on various textiles.		

Units	Content	No. of Hours
I	**Fabric Analysis:** General principle of cloth analysis, analysis of fabric for all manufacturing particulars and detailed study of techniques adopted in weaving of the fabric like plain, twill, sateen, and their derivatives, crepe, Huck-a-back, spider, mock leno, diamond, terry, Bedford cord, pique.	**22**
II	1. Preparation of chromatic and pigment colour circle, shades and hues, colour in combination, hormoney in colour combination, contrast or complementary colours. 2. Preparation of pattern on colour and weave effects strip effect, shot effect, solid effect, spotted effect and check effect.	**8**
III	3. Pattern preparations of designs based on natural, conventional and abstract forms. 4. Preparation of simple, regular and irregular patterns for jacquard weaving.	**8**
IV	4. Practicing the design based on different forms of layout in colour for saree borders. 5. Practice in planning the designs, placement, repeats, transferring designs for jacquard furnishing. 6. Design practice on traditional motifs in kalamkari and folk style etc.,	**8**
V	7. Practice in creating basic computer designing suitable for textile fabrics. 8. Design and development of stripes and checks using textile CAD.	**8**
	Total Hours	**60**

References	**Text Books:** 1. Grosicki Z.J, "Textile Design and Colour" – Butterworths London, 1950. 2. Grosicki Z.J, "Advanced Textile Design & Colour" Butterworths, London, 1952. 3. Behera B.K, Hari B.K, "Woven Textile Structure - Theary and Application: 1st Edition, Woodhead publishing, 2010. 4. Josephine Steed, Frances Steevenson, "Soursing Ideas For Textie Designs", Woodhead Publishing, 2021. **Reference Books:** 1. Goerner D, "Woven Structure and Design", Part – I – WIRA, 2006. 2. Goerner D, "Woven Structure and Design", Part – II – BTT6 – 2006. 3. Priyak Goyal, Fabric Structure- Simplified,Kindle 1st Edition-2014. 4. Chakrabarty JN,"Fundamental And Practices in Colouration of Textiles", Woodhead Publishing, 2014. 5. Gokarneshan "Fabric Structure and Design", 3rd Edition, New Age International. Publishing 2020.
Course Outcomes	**On completion of the course, students will be able to** CO1: To know about the principle and construction of fabric structure. CO2: To know about the analytical methods of fabric analysis for finding construction details of fabrics. CO3: To find out the construction particulars required for reproduction of fabric structure. CO4: To understand the different methods of producing double & treble layer of fabric. CO5: To know about theories of colour and their applications on various textiles.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTSI301: SUMMER IN-PLANT TRAINING EVALUATION		
Class	DTT	Semester	Third
Cognitive Level	**K-1:** Recall the different types of technologies, operating procedure and troubleshooting method in textile firm. **K-2:** Understand the importance of various machine setting, speed, and necessary technical parameters in textile machineries. **K-3:** Application of different various technical specifications for the smooth functioning of the textile industry.		
Course Objectives	**The Course aims** • To provide hands-on knowledge on various textiles and apparel machineries. • To understand the production techniques, quality parameters, management aspects and other trouble shooting measures of the textile firm. • To train the students suitable for industry environment.		

Content
The students individually undertake training in reputed textile and clothing industries during the summer vacation for a specified duration of four weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a course teacher. **The evaluation will be based on the following** Attendance - 20% Report Submission -50% Viva-voce - 30%

Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on operating procedure and functions of textile machineries. CO2: Analyze industry problems and their solutions. CO3: Acquire Technical report writing abilities. CO4: Document various material, machine and process parameters. CO5: Understand organizational flow structure.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code &Title	21DTTPE3EX1: ELECTIVE - I – SILK TECHNOLOGY		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the life cycle, properties, weaving and wet processing of silk fabric. **K-2:** Understand the process of Silk production of yarn and fabric with dyeing, printing and finishing treatments. **K-3:** Application of various colourations on silk material.		
Course Objectives	**The Course aims** • To provide knowledge about the production of silk. • To understand reeling technique of the production of silk yarn. • To understand the process of silk throwing, testing and weaving. • To understand the dyeing of various colour application on silk yarn and fabric. • To understand the various printing and finishing techniques of silk fabric.		

Units	Content	No. of Hours
I	**Silk production:** Production of silk – life cycle of silk worm, silk worm eggs, silk worm rearing, temperature and humidity, mounting and harvesting. Physical and commercial cocoon quality Defects in cocoon.	**9**
II	**Silk Reeling:** Selection of raw material for reeling - scientific method of testing and classification. Stifling of cocoons and its methods – sun drying, steam stifling, barrel steaming, chamber steaming. Cocoon boiling and brushing. Reeling operation, importance of good water for reeling; silk examination, lacing and skeining. Physical and chemical structure, properties of silk and types of silk.	**9**
III	**Silk throwing, Testing & Weaving:** *Silk throwing* – object, winding, doubling, twisting, re-winding and preparation of fancy yarn – crepe, georgette, gold zari thread. *Raw silk testing and classification* – object, advantages. Types of test – standard testing appliances and equipments – winding frame, sizing reel, balance scale, seriplane, cohesion test, serigraph, conditioning oven. *Weaving* – preparatory process – warping, pirn winding, Handloom and powerloom for silk weaving, weaving defects.	**9**
IV	**Bleaching & Dyeing of Silk:** *Pretreatment of Silk:* Degumming: Definition, Objectives, Methods, Degumming machines, degumming faults. Bleaching and fluorescent brightening. Weighting and Weighting methods. *Dyeing of Silk*: Dyeing with suitable classes of dyes. After treatment for improving wet fastness properties. Dyeing machines.	**9**
V	**Printing and Finishing of Silk** *Printing*: Definition, objectives, suitable classes of dyes. Different printing	**9**

	methods. Various styles of printing. After treatment of printed fabric. *Finishing:* Definition, objectives, classification, machines, chemicals types of finishes - scroopy handle, Soft-full hand finish, spot resistant finish, oil and water repellent finish, elastic finish.	
	Total Hours	**45**
References	**Text Books:** 1. Angappan and Gopalakrishnan, Textile testing, 4th revised edition 2000, SSMITT Students Co Operative Stores, Kumarapalayam. 2. Lijing Wang., "Performance Testing of Textiles-Methods, Technology and Applications" Elsevier Science, 2016. 3. Arindam Basu., "Advances in Silk Science and Technology", Elsevier Science, 2015, ISBN: 9781782423249. **Reference Books**: 1. Panda. H," The Complete Book On Textile Processing And Silk Reeling Technology", NIIR Project Consultancy Services, 2010, 2. Trotman E.R, Dyeing and Chemical Technology of Textile fibre, 2000. 3. Krishnasamy S, Sericulture manual I – Mulbery cultivation, Central Silk Board, Bangalore, 1990. 4. Krishnasamy S, Sericulture manual II – Silk worm rearing, Central Silk Board, Bangalore, 1990. 5. Krishnasamy S, Sericulture manual III – Silk worm reeling, Central Silk Board, Bangalore, 1990. 6. British Standards Institution, London, England.	
Course Outcomes	**On completion of the course, students will be able to do** CO1: Understand about the production of silk. CO2: Understand of reeling technique of the silk yarn. CO3: Gain knowledge about the process of silk throwing, testing and weaving. CO4: Know the dyeing of various colour applications on silk yarn and fabric. CO5: Understand the various printing and finishing techniques of silk fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	3	3	1	3	2	2	2	2	2
CO5	3	3	3	3	3	3	3	3	3

Course Code &Title	21DTTPE3EY1: ELECTIVE – I - SILK TECHNOLOGY PRACTICAL		
Class	DTT	Semester	Third
Cognitive Level	**K-1:** Recall the production of silk and its weaving and wet processing technique. **K-2:** Understand the process of Silk production of yarn and fabric. **K-3:** Application of various colorations on silk material.		
Course Objectives	**The Course aims** • To provide knowledge about the production of silk. • To understand of reeling technique of the production of silk yarn. • To understand the process of silk throwing, testing and weaving. • To understand the dyeing of various colour application on silk yarn and fabric. • To understand the various printing and finishing techniques of silk fabric.		

Units	Experiments	No. of Hours
I	1. Practice in rearing of silk worm eggs.	12
II	2. Practice in selection and scientific method of testing of cocoons – cocoon sorting, cooking and brushing and reeling.	12
	3. Practice in winding of silk thread – winding, doubling, twisting and preparation of fancy silk yarn.	
	4. Practice in silk examination, lacing and skein making.	
III	5. Practice in silk yarn testing for Denier-testing with seriplane, inspection board, serigraph.	12
	6. Practice in preparing warp for silk weaving, pirn winding.	
	7. Practice in weaving of silk handloom and powerloom.	
IV	8. Practice in degumming and bleaching of silk fabric. Application of optical whitening agents. 9. Practice in dyeing of silk and silk blended fabric with Acid and Metal complex dyes.	12
V	10. Practice in printing of silk fabric using direct, discharge and resist styles. 11. Practice in finishing of silk fabrics.	12
	Total Hours	60
References	**Text Books:** 1. Angappan and Gopalakrishnan, Textile testing, 4th revised edition 2000, SSMITT Students Co Operative Stores, Kumarapalayam. 2. Lijing Wang., "Performance Testing of Textiles-Methods, Technology and Applications" Elsevier Science, 2016. 3. Arindam Basu, "Advances in Silk Science and Technology", Elsevier Science, 2015, ISBN: 9781782423249. **Reference Books:** 1. Panda. H.," The Complete Book On Textile Processing And Silk Reeling Technology"., NIIR Project Consultancy Services, 2010. 2. Trotman E.R, Dyeing and Chemical Technology of Textile fibre.	

	2000. 3. Krishnasamy S, Sericulture manual I – Mulbery cultivation, Central Silk Board, Bangalore, 1990. 4. Krishnasamy S, Sericulture manual II – Silk worm rearing, Central Silk Board, Bangalore, 1990. 5. Krishnasamy S, Sericulture manual III – Silk worm reeling, Central Silk Board, Bangalore, 1990. 6. British Standards Institution, London, England.	
Course Outcomes	**On completion of the course, students will be able to do** CO1: Understand about the production of silk CO2: Understand of reeling technique of the silk yarn. CO3: Gain knowledge about the process of silk throwing, testing and weaving. CO4: Know the dyeing of various colour applications on silk yarn and fabric. CO5: Understand the various printing and finishing techniques of silk fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPE3EX2: ELECTIVE – I - GARMENT TECHNOLOGY		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the principles of garment production. **K-2:** Understand the stitch, seam, sewing machine types, feeding systems. **K-3:** Application of garment designing principles for surface ornamentation.		
Course Objectives	**The Course aims** • To understand the fundamentals of Garment production. • To predict the value addition methods in Garmenting. • To methods of cutting and operation of sewing machineries. • To understand the ornamentation methods in garment construction.		

Units	Content	No. of Hours
I	**Tools and Machines:** Introduction about the clothing technology, Basic garment production systems – Brief study, Basic tools, their uses, care operation and maintenance of garment, making machines. Hand cutters and Power cutters. Sewing m/c mechanisms – Variations in feeding devices. Basic and decorative stitches; Seams and hem finishes – Temporary and permanent stitches	**9**
II	**Production Systems:** Evaluation of fabric quality – Receiving and inspecting materials – Types of fabric effects – Fabric grading – common fabric problem for apparel manufacturers. Apparel production systems – Basic concepts – Flexible Manufacturing – work flow – Balancing	**9**
III	**Pattern Construction:** Sewing of Garment panels, stitch practices, Drafting and construction of standard dress materials for men and women; Zabla, petticoat, frock, salwar and kamees T-shirts, shirts, and trousers and and assembling of garments.	**10**
IV	**Embroidery Work:** Techniques and scope. Different types of embroidery machines. Basic stitches in machine embroidery, First stitches, cording, eyelet, round and satin stitches. Computerised embroidery work – Brief study	**8**
V	**Surface Ornamentation:** Miscellaneous work in embroidery – appliqué work – Patch work and cut work. Smoking, crochet work, Bead work. Embroidered lace work, its implements; selection and use of materials	**9**
	Total Hours	**45**

References	**Text Books:** 1. Jacob Solinger, Apparel Manufacturing Handbook, Vannostrand Reinhold Company, 2002. 2. Ruth E. Glock, Grace I. Kunz, Apparel Manufacturing Sewn Product Analysis, Blackwell Scientific Publications. 2000. 3. Padhye R, Rajkishore Nayak, Garment Manufacturing Technology, Elsevier Science, 2015. **Reference Books:** 1. Gerry Cooklin, Pattern Grading Blackwell, Scientific publication, 2002. 2. Gordana Colovic, Management of Technology Systems in Garment Industry, WPI India, 2011. 3. Karthik T.P. Ganesan. D. Gopalakrishnan, Apparel Manufacturing Technology, 2016. 4. Winifred Aldrich, Metric Pattern Cutting for Menswear, Wiley, 2012 5. Catherine Fair hurst, Advances in Apparel Production, Elsevier Science, 2008.
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on garment construction process. CO2: Analyze the sewing techniques and seam making. CO3: Acquire the knowledge from fabric cutting process to finishing. CO4: Follow the surface ornamentation techniques. CO5: Understand the different types of embroidery techniques.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPE3EY2: ELECTIVE -I- GARMENT TECHNOLOGY PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the principles of garment production. **K-2:** Understand the stitch, seam, sewing machine types, feeding systems. **K-3:** Application of garment designing principles for surface ornamentation.		
Course Objectives	**The Course aims** • To understand the fundamentals of Garment production. • To practicing the value addition methods in Garmenting. • To practicing methods of cutting and use of sewing machineries. • To understand the ornamentation methods in garment construction.		

Units	Content	No. of Hours
I	**Practical Experiments** 1.Measurement Techniques 2. Sewing practice through paper and fabric	**12**
II	3. Pattern making for men's shirt 4. Stitch and seam preparation	**12**
III	5. Construction of garments components 6. Construction of men's shirt	**12**
IV	7. construction of women's top 8. Construction of baby wear	**12**
V	9. Study on cutting department 10. study on finishing department	**12**
	Total Hours	**60**
References	**Text Books:** 1. Jacob Solinger, Apparel Manufacturing Handbook, Vannostrand Reinhold Company 2002. 2. Ruth E. Glock, Grace I. Kunz, Apparel Manufacturing Sewn Product Analysis, Blackwell Scientific Publications. 2000. 3. Padhye. R, Rajkishore Nayak., Garment Manufacturing Technology, Elsevier Science, 2015. **Reference Books:** 1. Gerry Cooklin, Pattern Grading Blackwell, Scientific publication, 2002. 2. Gordana Colovic, Management of Technology Systems in Garment Industry, WPI India, 2011. 3. Karthik T, Ganesan P., Gopalakrishnan D., Apparel Manufacturing Technology, 2016.	

	4. Winifred Aldrich, Metric Pattern Cutting for Menswear, Wiley, 2012 5. Catherine Fairhurst, Advances in Apparel Production, Elsevier Science, 2008
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on garment construction process. CO2: Analyze the sewing techniques and seam making. CO3: Acquire the knowledge from fabric cutting process to finishing. CO4: Follow the surface ornamentation techniques. CO5: Understand the different types of embroidery techniques.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code &Title	21DTTPE3EX3: ELECTIVE -I- ADVANCED FABRIC MANUFACTURE		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall various types of shuttle and shuttleless looms **K-2:** Understand the various mechanisms involved in the operation of shuttle and shuttleless looms. **K-3:** Application of various weft insertion systems to suit different construction of fabric.		
Course Objectives	**The Course aims** • To provide knowledge about automatic looms. • To understand the functions of various stop motions used in automatic looms. • To understand the various types of shuttleless loom to suit different construction of fabric. • To gain knowledge about the mechanism involved in the operation of shuttless looms. • To understand the various types of selvedges to suit for the different fabrics.		

Units	Content	No. of Hours
I	**Introduction of Automatic Loom:** Characteristic feature, advantage over non-automatic loom. Weft feelers – types-mechanical and electric feelers – working, timing and setting. Warp stop motion - object - types – principle and types of drop wires. Mechanical, electrical warp stop motion-working-merit and demerits.	**9**
II	**Motions in Automatic Loom:** Cop changing mechanism – working, timing and setting. Studies of weft thread cutters-shuttle protector. Positive warp let-off motion – objects – types – uses – roper let-off motion – working – timing and setting. Shuttle changing loom – working – comparative study of cop changing and shuttle changing loom.	**9**
III	**Introduction of Shuttle less and Projectile weaving:** Preparation of warp for shuttles weaving - Advantage and disadvantage of shuttles weaving machine-classification. Projectile weaving machine-study of torsion bar picking – cam beat up. Stages of weft insertion system in projectile weaving	**9**
IV	**Rapiers and Circular Weaving Rapier loom:** Principle – types and Study of flexible and rigid rapier, drive Method of weft insertion system. Brief study about circular weaving machine	**9**
V	**Jet looms and Multi Phase looms:** Jet looms – types – principles – hydraulic picking for water jet looms. Study of Air jet loom – study of weft measuring device – study of weft selection mechanism. Study of multi phase loom. Salient features of shuttles looms – scope and limitation study of leno, tuck-in and melted selvedge.	**9**
	Total Hours	**45**

References	**Text Books:** 1. Lord P.R. and Mohamed M.H., Weaving: Conversion of Yarn to Fabric, Merrow Publications, 1992. 2. Sabit Adanur., Handbook of Weaving, 2019. 3. Abhijit Majumdar., Principles of Woven Fabric Manufacturing, 2016. **Reference Books:** 1. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York 2008. 2. Thomas William Fox ., The Mechanism of Weaving, Macmillan and Company, limited, 2010. 3. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. 4. Ganapathy Nagarajan, Textile Mechanisms in Spinning and Weaving Machines, WPI India, 2014. 4. Ormerod, Modern Preparation and Weaving, Butterworths & Co. Ltd., 1983.	
Course Outcomes	**On completion of the course, students will be able to** • To provide knowledge about automatic looms. • To understand the functions of various stop motions used in automatic looms. • To understand the various types of shuttleless loom to suit different construction of fabric. • To gain knowledge about the mechanism involved in the operation of shuttless looms. • To understand the various types of selvedges to suit for the different fabrics.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPE3EY3: ELECTIVE – I - ADVANCED FABRIC MANUFACTURE PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall various types of shuttle and shuttless looms. **K-2:** Understand the various mechanisms involved in the operation of shuttle and shuttleless looms. **K-3:** Application of various weft insertion systems to suit different construction of fabric.		
Course Objectives	**The Course aims** • To provide knowledge about automatic looms. • To understand the functions of various stop motions used in automatic looms. • To understand the various types of shuttleless loom to suit different construction of fabric. • To gain knowledge about the mechanism involved in the operation of shuttless looms. • To understand the various types of selvedges to suit for the different fabrics.		

Units	Experiments	No of Hours
I	1. Assembling and setting of mechanical weft feeler in cop changing mechanism. 2. Setting the warp stop motion on automatic loom for correct working.	**12**
II	3. Assembling the part of positive let-off motion in automatic loom. 4. Study of method of preparing warp for shuttles weaving. 5. Setting of the torsion bar picking on projectile loom.	**12**
III	6. Study of the passage of weft insertion on projectile loom weaving. 7. Study of driving mechanism on rapier weaving. 8. Study of the passage of weft insertion on rapier weaving.	**12**
IV	9. Setting of shuttle driving mechanism on circular weaving. 10. Study of hydraulic picking mechanism on water jet loom.	**12**
V	11. Setting of weft measuring device on air jet loom. 12. Study and setting of different mechanism of selvedge formation on shuttle less loom.	**12**
	Total Hours	**60**
References	**Text Books:** 1. Lord P.R. and Mohamed M.H., Weaving: Conversion of Yarn to Fabric, Merrow Publications, 1992. 2. Sabit Adanur., Handbook of Weaving, 2019.	

	3. Abhijit Majumdar, Principles of Woven Fabric Manufacturing, 2016. **Reference Books:** 1. Talavasek O. & Svaty V., Shuttleless Weaving Machines, Elsevier Scientific Pub. Co., New York 2008. 2. Thomas William Fox , The Mechanism of Weaving, Macmillan and Company, limited, 2010. 3. Adanur S., Handbook of Weaving, Technomic Publishing Co., Inc., 2001. 4. Ganapathy Nagarajan, Textile Mechanisms in Spinning and Weaving Machines, WPI India. 2014. 5. Chakravorthy B., Mechanism of Weaving Machines, Smt.Chakravorthy serampore W.B, 1982.	
Course Outcomes	**On completion of the course, students will be able to** CO1: To provide knowledge about the introduction of extra material to the fabric CO2: To understand the principle construction of Baked cloth and patent satin structures. CO3: To gain knowledge about the production of Brocade and Double cloth construction. CO4: To understand the various style of producing Tapestries, Leno and Terry fabrics. CO5: To understand the different types of Traditional mounting and special jacquard arrangement and computer textile software to produce advanced figured fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPE3EX4: ELECTIVE -I- MERCHANDIZING AND EXPORT DOCUMENTATION PROCEDURES		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the merchandising and marketing environment **K-2:** Understand the production process, costing, export documentation procedure for apparel products and functions of various export promotion councils. **K-3:** Application of marketing mix, market segmentation on textile exports and visual merchandising.		
Course Objectives	**The Course aims** • To understand the Basics Concepts of Merchandising, Marketing & Its Evolution. • To acquire knowledge on Marketing Environment, Segmentation. • To the acquire knowledge about the various functions involved in apparel industry and Marketing Mix. • To acquire knowledge on Export Market Identification & functions of promotion councils. • To understand the Indian textile market environment and importance of the visual merchandising.		

Units	Content	No. of Hours
I	**Basics Concepts of Merchandising:** Introduction, Functions and role of Merchandiser, Merchandising Process, Meaning and Need for quality control in Merchandising process. Basics of marketing – need, wants, demands, product, exchange of satisfaction – market, marketing management – marketing philosophies and challenges ahead – need for export marketing	**8**
II	**The Overview of Apparel Industry & Apparel Production:** Apparel industry - Major segments; Organizational structures - Structure of Export house, Buying house and Domestic companies, Buyer's classification and buying network in exports. Sources of fabric buying and selling of finished fabric. Apparel construction techniques - Introduction to Drafting & Patten making. Machinery & Equipment - Cutting, sewing, finishing, washing, stain removal, embellishment. Production methodology - Assembly line, individual garment manufacturing, job work, quality checkpoints. Design & Tech-pack - Introduction & Definition. Labelling & Packing.	**10**
III	**Marketing Mix:** Product and Pricing for Exports Components of marketing mix – selection of product for exports – basis – product strategy: product brand, package, services – new product – product life cycle analysis – product line and levels – pricing considerations – product mix, adjustment pricings – price changes. Impact of OS and values.	**10**

IV	**Visual Merchandising:** Definition – Elements of Visual Merchandising – Displays -Principles of Displays – Window display – Interior Display -Mannequins – Department displays – Signs – Lighting -Fixtures. Special events -The Environments of visual presentation. Trends in visual merchandising – Small store applications -Boutique -Assessment of Visual Merchandising Programme	**8**
V	**Export Market and Export documentation:** Market research – identification of textile product for exports – buyer, seller meet – trade delegation – seminar & workshops, journal – fair & exhibition – fashion forecast .Shipping and Documentation - Procedure of shipping and documentation. Method of coordination with shipping and documentation department for forwarding approved shipment-FOB, CIF. Export business negotiations – stages – buying agent, foreign agent, fixing commission, selection & appointment of agent ,samples for exports, export contract, processing of export order	**9**
	Total Hours	**45**
References	**Text Books** 1. Rathinamoorthy and. Surjit, Apparel Merchandising,WPI India,2017. 2. Gordana Colovic, Management of Technology Systems in Garment Industry, WPI India, 2011. 3. Kapoor DC, Export Management, Vikas Publishing House Pvt Ltd, New Delhi, 2002. **Reference Books** 1. Karthik T., Ganesan P., D. Gopalakrishnan., Apparel Manufacturing Technology, 2016. **2.** Sinha. D, Export Planning and Promotion, IIM, Calcutta, 1989. **3.** Tuhin K. Nandi, Import–Export Finance, IIM, Calcutta, 1989. **4.** JarnowJ. A, Guerreiro M, Judelle B, Inside the Fashion Business, MacMillan Publishing Company, 1987. **4.** Shivaramu, Export Marketing – A Practical Guide to Exporters, Wheeler Publishing, 1996.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on Merchandising and textile marketing Environment. CO2: Analyze the fashion market segmentation. CO3: Acquire Technical knowledge on the marketing mix and visual merchandising. CO4: Follow the Export documents and forwarding process. CO5: Understand the different types of export promotion councils and its functions.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPE3EY4: ELECTIVE -I- MERCHANDIZING AND EXPORT DOCUMENTATION PROCEDURES PRACTICAL		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the merchandising and marketing environment **K-2:** Understand the functions of apparel industry, costing of textile products, export documentation, and functions various export promotion councils **K-3:** Application of marketing mix, market segmentation and visual merchandising.		
Course Objectives	**The Course aims** • To understand the basics concepts of merchandising, marketing and its evolution. • To acquire knowledge on marketing environment, Segmentation. • To the acquire knowledge about the various functions involved in apparel industry and marketing mix. • To acquire knowledge on export market identification & functions of promotion councils. • To understand the Indian textile market environment and importance of the visual merchandising.		

Units	Content	No. of Hours
I	**Practical Experiments:** 1. The functions of merchandizing department in textile industry. 2. Plan and prepare a Textile business plan. 3. Planning of export and import textile trade. 4. Procedure for getting an import and export code.	12
II	5. Procedure for opening a current account in nationalized bank. 6. Membership ID and it s importance in exporting. 7. Processing of export orders. 8. Promote a business at trade shows and exhibitions.	12
III	9. Membership ID and it s importance in exporting. 10. Processing of export orders. 11. Promote a business at trade shows and exhibitions.	12
IV	12. Study about the current developments in textile industry. 13. Market segmentation in terms of textile products.	12
V	14. Export forwarding process through bank. 15. Fund mobilization for export business.	12
	Total Hours	**60**

References	**Text Books:** 1. Rathinamoorthy and Surjit, Apparel Merchandising, WPI India, 2017. 2. Gordana Colovic, Management of Technology Systems in Garment Industry, WPI India, 2011. 3. Elaine Stone, Jean A. Samples, Fashion Merchandising, McGraw-Hill Book Company, 1985. **Reference Books:** 1. Karthik T., Ganesan P, Gopalakrishnan D, Apparel Manufacturing Technology, 2016. 2. Padhye. R, Rajkishore Nayak., Garment Manufacturing Technology, Elsevier Science, 2015. 3. Sinha. D, Export Planning and Promotion, IIM, Calcutta, 1989. 4. Tuhin K. Nandi, Import–Export Finance, IIM, Calcutta, 1989. **5.** Jarnow J.A, Guerreiro M, Judelle B, Inside the Fashion Business, MacMillan Publishing Company, 1987.
Course Outcomes	**On completion of the course, students will be able to** CO1: Acquire knowledge on Merchandising and textile marketing Environment. CO2: Analyze the fashion market segmentation. CO3: Acquire Technical knowledge on the marketing mix and visual merchandising. CO4: Follow the Export documents and forwarding process. CO5: Understand the different types of export promotion councils and its functions.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTAU301: VILLAGE PLACEMENT PROGRAMME		
Class	**DTT**	**Semester**	**Third**
Cognitive Level	**K-1:** Recall the different types of physical, chemical, and biological characterization of waste water. **K-2:** Understand the primary, secondary, and tertiary waste water treatment methods. **K-3:** Application of primary, secondary, and tertiary waste water methods in textile effluent treatment.		
Course Objectives	**The Course aims** To train the students to acquire skills in data collection methods, organizing rural people, conducting need based programmes, establishing collaborations with institutions and organizations of similar interest.		

Units	Content	No. of Hours
I	• Appraisal and economic conditions of villages – PRA methods – surveys • Understating and analyzing resource base and occupational pattern. • Assessing mobilities and linkages • Documentation of Rural Ins and Rural outs • Case studies on CPR, Rural economic organization/ entities, Rural community based organizations, Educational institutions, Religious institutions • Budget analysis of local bodies • Campaigns on thrifts and savings • Awareness programme on organic farming, marketing of agricultural produces, value addition Sensitization sessions on rural business / livelihood opportunities • Documentation and sharing.	7 days
Course Outcomes	**On completion of the course, students will be able to** **CO1:** The students would have acquired skills in Interviewing, Data collection, conducting case studies. **CO2:** To students gain the knowledge in organizing people and conducting meetings establish linkages and collaborations with institutions and organizations documenting information. **CO3:** The students also gain the enhanced social awareness and developed an attitude towards contributing to the society.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3

Course Code & Title	21DTTPC418: ENVIRONMENTAL ENGINEERING IN TEXTILE INDUSTRY		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the different types of physical, chemical and biological characterization of waste water. **K-2:** Understand the primary, secondary and tertiary waste water treatment methods. **K-3:** Application of primary, secondary and tertiary waste water methods in textile effluent treatment.		
Course Objectives	**The Course aims to** • Understand the water pollution due to textile effluent. • Acquire knowledge on greenhouse effects due to textile processing. • Understand the waste management principles. • Understand air pollution due to textile processing. • Acquire knowledge on solid management and design the ETP plant for textile industry.		

Units	Content	No. of Hours
I	**Introduction to Environmental Management:** Definitions of environment, ecology, pollution, Green house emission, Types of pollution and effects of stages of textiles on environment, general waste categorization, effective pollution prevention programme, Testing of Effluents for various characteristics such as BOD, COD, Turbidity, TDS, SS, Grease, Oils; Types of textile effluents and their characteristics.	**10**
II	**Water Characterization & Water Treatment:** Physical, chemical and biological characteristics of water – water analysis – IS and WHO standards – Requirements of water supply – Role of water in Textile Wet Processing units. Treatment plants – process of treatments – mixing, aeration, sedimentation, coagulation, filtration, disinfection, softening – advanced water treatment.	**10**
III	**Toxic and hazardous wastes:** Equalization and neutralization – biological degradation –recycle and reuse of waste effluents – treatment of industrial wastes – spinning units, weaving units, wet processing units and garment units.	**8**
IV	**Air Pollution:** Air pollution due to textile wastages –dust collection – cellars and rotary filters - stack emission – exhaust – green house gases – its impact on environment – control devices. Environmental problems and human health, Risk assessment and risk management, ecology and textiles, Toxicological considerations of textile processing	**8**
V	**Solid waste** Solid waste – characteristics – disposal – composting – anaerobic and	**9**

	aerobic digestion – combustion – incineration –energy recovery & management related to textile units –Noise pollution – standards – laws – methods to control noise pollution in spinning, weaving units and garment units.	
	Total Hours	**45**
References	**Text Books:** 1. Garg S.K, Water Supply Engineering, Khanna Pubishers, New Delhi, 2006. 2. Birdie G.S. and Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons, New Delhi, 2005. **3.** Duggal K.N, Elements of Public Health Engineering, S.Chand & Co, New Delhi, 2006. **Reference Books** 1. Slater, Environmental Impact of Textiles - Production, Processes and Protection, Elsevier Science, 2003. 2. Subramanian, Senthil, kannan, Muthu, Assessing the Environmental Impact of Textiles and the Clothing Supply Chain, Elsevier Science, 2020. 3. Christie R, Environmental Aspects of Textile Dyeing, Elsevier Science, 2007 4. Himanshu Patel, Vashi R. T, Characterization and Treatment of Textile Wastewater, Elsevier Science, 2015. 5. Subramanian Senthil, kannan Muthu, Advances in Textile Waste Water Treatments, Elsevier Science, 2021.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the water pollution due to textile effluent. CO2: Acquire knowledge on greenhouse effects due to textile processing. CO3: Understand the waste management principles. CO4: Understand air pollution due to textile processing. CO5: Describe the principles of solid management and design the ETP plant for textile industry.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPC419: TEXTILE MANAGEMENT AND ENTREPRENEURSHIP		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the concepts of Organization structure, human resource management and finance management in textile industry. **K-2:** Understand the principles of textile management and entrepreneurship. **K-3:** Application of principles of management in textile value chain.		
Course Objectives	**The Course aims** • Understand the Management principles adopted in textile industry. • Acquire knowledge on finance management principles of textile industry. • Acquire knowledge on HR management principles of textile industry. • Acquire knowledge on factory act and industrial safety. • Acquire knowledge on entrepreneurship related to textile supply chain.		

Units	Content	No. of Hours
I	**Organisation and Planning:** Organisation – definition – Different types of organization structure – Line type, Line & Staff type, Functional type. Relative merits and demerits. Organisation chart of a Textile unit. Factors considered in Selection of site for a textile unit. Different types of Building structures for textile units. Importance of Lighting. Requirements of lighting in different section of Textile units. Control of Air pollution in different sections of a textile unit. Layout machines in different sections of a textile unit. Material handling equipment employed in different sections of a textile unit.	**9**
II	**Production and Financial Management:** Objectives of Work study. Method study and Work measurement. Purchasing – methods of purchase – role of purchase manager – Inventory control – definition and objectives. Production planning and control. Functions of PP & C Department – pre-planning, routing, scheduling, dispatching, controlling, Brief idea about Capital cost and Working capital. Importance and objectives of costing. Elements of cost. Determination of selling price. Break even chart. Definition and objectives of Depreciation.	**9**
III	**Personal Management:** Importance and duties of Personal management. Elementary idea. Sources of recruitment. Selection procedure for employees. Objectives of training. Different methods of training for a supervisor in a textile mill. Wages and its components. Different methods of wage payment. Incentives and its objectives. Labour welfare activities and their objectives. Role of labour welfare officer. Grievance and Grievance procedure. Causes and consequences of Industrial dispute. Mechanism for settlement.	**9**
IV	**Factory Act, Industrial Safety:** Factory act 1948 pertaining to Health, Cleanliness, Ventilation, Safety, Welfare, Working hours, and Accident Compensation. Importance, Causes and consequences of Industrial accidents. Steps to bring down accidents. Guards and safety devices used in a Textile Mill. Fire prevention and control.	**8**

V	**Entrepreneurship Development:** Definition of Entrepreneur – characteristics and function of an entrepreneur. Entrepreneurship Development Programme. Role of education and training in EDP. Ideas about project identification. Role of trade fairs and exhibitions. Criteria for selection a project. Study of feasibility report. Functions of District Industries Centres (DIC). Brief idea about functions of Small Industries Service Institute (SISI), SIPCOT, TIIC and ITCOT. Definition of small-scale industry. Government concessions and encouragement to small-scale industry. Procedure for registration of MSME.	**10**
	Total Hours	**45**
References	**Text Books:** 1. Stephen P. Robbins and Mary Coulter, Management, Prentice Hall of India, 8th edition 2000. 2. Nandagopal, Textile and clothing management, Allied Publishers, 2004. 3. Charles W L Hill, Steven L McShane, Principles of Management, Mcgraw Hill Education, 2007. **Reference Books:** 1. Ormerod, A. – Management of Textile Production, 1979 by Butterworth & Company. 2. Purushothama, Work Quality Management in the Textile Industry, WPI India, 2013. 3. Singa J.C & Mugali, V.N – Business Management: Theory and Practice, Edition 5, 1982. 4. Saravanavel P. – Entrepreneurial development – principles, policies and programmes, 1987. 5. Dudega V.D – Management of textile Trade press, Textile Industry, A/3 Tagore flats, Ahemedabad.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the Management principles adopted in textile industry. CO2: Acquire knowledge on finance management principles of textile industry. CO3: Acquire knowledge on HR management principles of textile industry. CO4: Acquire knowledge on factory act and industrial safety. CO5: Acquire knowledge on entrepreneurship related to textile supply chain.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code &Title	21DTTPC420: TEXTILE WET PROCESSING - II		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the structure & properties of viscose rayon, silk, wool, polyester & acrylic. **K-2:** Understand the mechanism of coloration of the fibres mentioned above. **K-3:** Application of different classes of dyes and finishes on viscose rayon, silk, wool, polyester & acrylic.		
Course Objectives	**The Course aims** • To provide the fundamental understanding of structure and properties of silk, wool, viscose rayon, acrylic and polyester & their pretreatments. • To provide the understanding of dyes and dyeing of silk, wool, viscose rayon, acrylic and polyester. • To provide the understanding and printing of silk, wool, viscose rayon, acrylic and polyester. • To provide the understanding of finishing and finishing of all the fibres stated above. • To provide the understanding of quality control and eco-friendly processing.		

Units	Content	No. of Hours
I	**Introduction of Fibres and their Pre-Treatments:** Structure and properties of silk, wool, viscose rayon, acrylic and polyester – impurities present in these fibres – introduction to various pretreatments such as singeing, desizing, scouring and bleaching.	**9**
II	**Dyeing of Textile Materials:** Dyeing of viscose rayon with direct dyes, vat dyes, azoic dyes, and reactive dyes – dyeing of silk and wool with acid and metal complex dyes – dyeing of polyester with disperse dyes – dyeing of polyester / cotton blend – dyeing of acrylic with basic dyes –dyeing machinery	**9**
III	**Printing of Textile Materials:** Printing of silk, wool, viscose rayon, polyester and acrylic fabric with various classes of dyes by different styles of printing – printing machinery	**9**
IV	**Finishing of Textile Materials:** Finishing – object – principles of finishing of cotton, viscose rayon, silk, wool, polyester, acrylic and their blends – classification of various finishes – finishing materials: their functions and applications – Finishes: (e.g) Softening, stiff finish, crease resistant, anti-shrink, water repellent, water proof, fire proof, mildew proofing, calendaring, decatising, milling, weighting of silk, weight reduction of polyester, organdie etc.	**9**
V	**Quality Control and Eco-Friendly Processing:** Importance and needs of quality control – determination of colour fastness to various agencies such as washing, rubbing, light and perspiration. A brief study on importance of eco-friendly processing – list of banned dyes and chemicals – eco labels: a brief study – ISO 14000 standards: a brief study.	**9**
	Total Hours	45

References	**Text Books:** 1. Prayag R.S., Dyeing of wool, silk and Man-Made fibres, Dharwad, 1989. 2. Prayag R.S, Technology of Printing, Dharwad, 2000. 3. Shenai V.A., Technology of Printing, Sevak Publications, Mumbai, 2002. **Reference Books:** 1. Karmakar S.R., Chemical Technology in the Pre-Treatment Processes of Textiles, Elsevier, 1999. 2. Marsh J T., An Introduction to Textile Bleaching, B.I. Publications, New Delhi, 1996. 3. Trotman E.R. and Griffin BI, Chemical Technology of Scouring and Bleaching, B.I. Publications, New Delhi, 1990. 4. Trotman E.R. and Griffin B.I., Dyeing and Chemical Technology of Textile Fibres, B.I. Publications, New Delhi, 1990. 5. Shenai V A, Technology of Textile Finishing, Sevak Publications, Mumbai, 1990.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Pre-treatments of silk, wool, viscose rayon, acrylic and polyester. CO2: Dyeing of silk, wool, viscose rayon, acrylic and polyester. CO3: Printing of silk, wool, viscose rayon, acrylic and polyester. CO4: Finishing of textile fibres. CO5: Quality testing of coloured textiles and eco-friendly processing.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	3	2	3	3	1	3	1	1
CO2	2	3	2	3	3	1	3	1	1
CO3	2	3	2	3	3	1	3	3	3
CO4	2	3	2	3	3	2	3	3	3
CO5	2	3	2	3	3	2	3	3	3

Course Code &Title	21DTTPC421: TEXTILE WET PROCESSING - II PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the procedure to pretreat and colour the fibres – viscose rayon, silk, wool, polyester & acrylic. **K-2:** Understand the calculations to carry out the practicals. **K-3:** Application procedure to perform practicals.		
Course Objectives	**The Course aims** • To make the students to carry out pretreatments of silk, wool, viscose rayon, acrylic and polyester. • To make the students to dye the above said fibres with various classes of dyes. • To train the students to print silk, wool and man-made fibres. • To make the students to apply finishes to textiles. • To make the students to determine colour fastness.		

Units	Content	No. of Hours
I	Degumming of silk and scouring and bleaching of wool, viscose rayon, polyester and acrylic.	**12**
II	Dyeing of silk, wool, viscose rayon, polyester and acrylic with various classes of dyes.	**12**
III	Printing of silk, wool, viscose rayon, polyester and acrylic with various classes of dyes.	**12**
IV	Finishing of cotton and silk.	**12**
V	Determination of colour fastness to various agencies such as washing, rubbing, light and perspiration.	**12**
	Total Hours	**60**
References	**Reference Books:** 1. Shenai V.A., Textile Fibres, Sevak Publications, Mumbai, 2002. 2. Shenai V.A., Technology of Bleaching and Mercerising, Sevak Publications, Mumbai, 2002. 3. Karmakar S.R., Chemical Technology in the Pre-Treatment Processes of Textiles, Elsevier, 1999. 4. Shenai V.A., Technology of Dyeing, Sevak Publications, Mumbai, 2002. 5. Shenai V.A., Technology of Printing, Sevak Publications, Mumbai, 2002.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Degumming of silk and scouring and bleaching of wool, viscose rayon, polyester and acrylic. CO2: Dyeing of silk, wool, viscose rayon, polyester and acrylic	

	with various classes of dyes. CO3: Printing of silk, wool, viscose rayon, polyester and acrylic with various classes of dyes. CO4: Finishing of cotton with softeners and water repellents and scroop finish of silk. CO5: Determination of colour fastness to washing, rubbing, light and perspiration.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	3	2	3	3	1	3	1	1
CO2	2	3	2	3	3	1	3	1	1
CO3	2	3	2	3	3	1	3	3	3
CO4	2	3	2	3	3	2	3	3	3
CO5	2	3	2	3	3	2	3	3	3

Course Code & Title	21DTTPC422: COMPUTER AIDED TEXTILE DESIGNING AND COLOUR MATCHING PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the textile fabric design production and its colour application with the help of various textile softwares. **K-2:** Understand the operation of software techniques to create various textile fabric designs. **K-3:** Apply the techniques of colour matching software using colour spectro photometer to produce matching of fabric shades.		
Course Objectives	**The Course aims** • To understand the concept of textile designing & colour matching techniques. • To identify different softwares and their utilization in creating textile design and colour application in textile field. • To create basic weave structures, colour pattern & simulation for dobby software designing. • To create jacquard furnishing designs using jacquard software. • To practice on file management, data editing of colour difference in spectro photometer.		

Units	Content	No. of Hours
I	**Dobby software:** 1. Create weavers – Plain twill sateen, crepe & other miscellaneous weavers. 2. Dobby designs, draft, Peg plan & its manipulation. 3. Creation of color patters, simulates, print out in real scale.	**15**
II	**Jacquard Software:** 4. Practice on Jacquard designing – motif creating, motif scanning, colour & attributes / image editing for graph making scaling, rotating, reversing, dropping, Colour application in motif – masking and protecting, Repeat setting to see joining 5. Method of creating different styles – Butta, Horizontal & vertical all over design, half drap and half drap reverse design. 6. Preparation of computerized graph design from edited motif with suitable weavers – flout control and float checking – simulation and printout practice on computer aided cord punching. 7. Creation of printing design on computer with colour reduction Technique.	**15**
III	**Computer Aided Colour Matching:** 8. File management. – Handling reflectance data. 9. Examining data of different level and editing the data	**10**

	generated.	
IV	10. Grouping and ungrouping of colorants on the basis of exhaustion rates, percentage and fastness ratings 11. Specifying / modifying match parameters.	**10**
V	12. Colour matching – mixing of colouants and its functions, Batch Correction. 13. Colour difference analysis and fastness ratings	**10**
	Total Hours	**60**
References	**Text Books:** 1. Sule A.D., computer colour analysis – Textile Application, New aye international (P) ltd., publications, New Delhi 2. Shah H.S and Gandhi RS, Instrumental Color Measurements and Computer Aided Color Matching for Textiles, Mahajan Book Distributors, Ahmedabad, 1990. 3. John H Xin, Total Colour Management in Textiles, Elsevier Science, 2006. **Reference books:** 1. Gulrajani M L (Ed.), Computer Colour Matching, Northern India Textiles Research Association, Ghaziabad. 2. Annabelle Ruston, Framing and Presenting Textile Art, A&C Black and the Fine Art Trade Publishing, London, 2018. 3. Chakraborty JN, Fundamental& Practice in colouration of Textiles, Wood Head Publishing Pvt Ltd, India, 2014. 4. M L Gulrajani, Colour Measurement Principles, Advances and Industrial Applications,Elsevier Science, 2010. 5. 5.Asim Kumar Roy Choudhury , Principles of Colour and Appearance Measurement, Elsevier Science, 2014.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Create weaves for fabric constructions. CO2: Create colour patterns using Dobby software. CO3: Create jacquard furnishing designs with jacquard software and to manipulate it for the need. CO4: File management, data editing, grouping, analyzing of colour difference using spectro photometer. CO5: Mix the colorants for colour matching of textile samples.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPE4EX1: ELECTIVE – II - ADVANCED FABRIC STRUCTURE AND DESIGN		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the fabric structure with extra threads arrangement to form ornamental figured effect **K-2:** Understand the technique involved to produce various types of figured fabric. **K-3:** Application of various harness and jacquard mounting to produce figured fabric.		
Course Objectives	**The Course aims** • To provide knowledge about the introduction of extra material to the fabric. • To understand the principle construction of backed cloth and patent satin structures. • To gain knowledge about the production of brocade and double cloth construction. • To understand the various style of producing tapestries, leno and terry fabrics. • To understand the different types of traditional mounting and special jacquard arrangement to produce advanced figured fabric.		

UNITS	Content	No. of Hours
I	**Figuring with Extra Threads:** Principle and methods of introducing extra threads – Disposal of surplus extra threads. Construction of extra warp figuring. Construction of extra weft figuring. Construction of figuring with extra warp and extra weft.	**9**
II	**Backed Cloth and Patent Satin Construction:** Purpose-.Construction of weft backed cloth and warp backed cloths. Inter changing figured backed cloth construction. Backed cloth with wadding threads. Patent satin structure – Construction and specialities.	**9**
III	**Damasks, Brocades and Double Cloth Construction:** Damasks – construction and specialities. Compound brocades – construction and specialities of multi weft brocades and multi warp brocades. Stitched double cloth construction – classification, self stitched double cloth, centre-stitched double cloth, wadded double cloth. Interchanging double plain cloth and figured double cloth construction. Treble cloth construction	**9**
IV	**Tapestries, Leno and Terry Construction:** Simple weft face tapestries construction and its specialties. Gauze and leno structures – principle, leno weave with flat steep doup with an eye – counter leno, Russian cords, net leno weaves. Figured terry fabric, construction of warp pile (velvet) and weft pile (corduroy) fabric	**9**

V	**Traditional mounting and special jacquard:** Heald and harness mounting, Sectional Jacquard and harness arrangement – inverted hook jacquard. Principle of working comber board, Twilling Jacquard and Pressure Harness, String doup mounting for leno weaving	**9**
	Total hours	**45**
References	**Text Books:** 1. Grosicki Z.J, "Textile Design and Colour" – Butterworths London, 1990. 2. Behera B.K, Hari B.K, "Woven Textile Structure - Theary and Application: 1st Edition, Woodhead publishing, 2010. 3. Priyak Goyal, Fabric Structure- Simplified, Kindle 1st Edition-2014. **Reference Books:** 1. Grosicki Z. J. Advanced Textile Design & Colour, Butterworths, London, 1990. 2. Chakrabarty JN,"Fundamental and Practices in Colouration of Textiles", Woodhead Publishing, 2014. 3. Gokarneshan "Fabric Structure and Design", 3rd Edition, New Age International Publishing, 2020. 4. Josephine Steed, Frances Steevenson, "Soursing Ideas for Textile Designs", Woodhead Publishing, 2021. 5. J. Hayavadana, Woven Fabric Structure Design and Product Planning, WPI India, 2016.	
Course Outcomes	**On completion of the course, students will be able to do** CO1: To provide knowledge about the introduction of extra material to the fabric. CO2: To understand the principle construction of Baked cloth and patent satin structures. CO3: To gain knowledge about the production of Brocade and Double cloth construction. CO4: To understand the various style of producing Tapestries, Leno and Terry fabrics. CO5: To understand the different types of traditional mounting and special jacquard arrangement to produce advanced figured fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21RIMD0E4EY1: ELECTIVE -II- ADVANCED FABRIC STRUCTURE AND DESIGN - PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the preparation of graph enlargement to produce fabric structure to form an ornamental figured effect. **K-2:** Uunderstand various harness and jacquard mounting to produce figured fabric. **K-3:** Application of computer aided textile design software to produce figured fabric.		
Course Objectives	**The Course aims** • To provide knowledge about the introduction of extra material to the fabric. • To understand the principle construction of baked cloth and patent satin structures. • To gain knowledge about the production of brocade and double cloth construction. • To understand the various style of producing tapestries, leno and terry fabrics. • To understand the different types of traditional mounting and special jacquard arrangement and computer textile software to produce advanced figured fabric.		

Units	Experiments	No. of hours
I	Preparation of suitable motif, graph enlargement, binding mark for extra warp and extra weft design – interchanging figured backed cloth, damask – interchanging figured double cloth with 2 colour and 4 colour combination – patent satin structure – warp rib brocade weft rib brocade – figured terry – figured velveteen – figured leno structure.	**12**
II	1. Practice in card cutting, lacing of the above design on pattern cards using hand punching and pedal punching machine. 2. Mounting of these cards on jacquard loom. 3. Weaving practice of the above design on jacquard loom.	**12**
III	1. Practice on heald and harness mounting for extra warp design 2. Practice on sectional Jacquard and harness arrangement for producing double cloth	**12**
VI	1. Practice on working comber board for producing pattern satin construction. 2. Practice on pressure harness for making damask fabric 3. Practice on string doup mounting & weaving leno fabric.	**12**
V	Design practice and card cutting of the above design on computer using computer aided textile design software.	**12**
	Total Hours	**60**

References	1. Grosicki Z.J, "Textile Design and Colour", Butterworths London, 1990. 2. Behera B.K, Hari B.K, "Woven Textile Structure - Theary and Application: 1st Edition, Woodhead publishing, 2010. 3. Priyak Goyal, Fabric Structure- Simplified, Kindle 1st Edition, 2014. **Reference Books:** 1. Grosicki Z.J, Advanced Textile Design &Colour, Butterworths, London, 1990. 2. Chakrabarty JN., "Fundamental and Practices in Colouration of Textiles", Woodhead Publishing, 2014. 3. Gokarneshan "Fabric Structure and Design", 3rd Edition, New Age International Publishing 2020. 4. Josephine Steed, Frances Steevenson, "Soursing Ideas for Textile Designs", Woodhead Publishing 2021. 5. Hayavadana J., Woven Fabric Structure Design and Product Planning, WPI India, 2016.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand about the production of silk. CO2: Understand of reeling technique of the silk yarn. CO3: Gain knowledge about the process of silk throwing, testing and weaving. CO4: Know the dyeing of various colour applications on silk yarn and fabric. CO5: Understand the various printing and finishing techniques of silk fabric.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	2	2	2	2	2	2	2	2	2
CO2	**3**	**3**	**1**	**3**	**2**	**2**	**2**	**2**	**2**
CO3	2	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

Course Code & Title	21DTTPE4EX2: ELECTIVE – II - KNITTING TECHNOLOGY		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the Knitting principles, types, and structures. **K-2:** Understand the basic knitting cycle, basic and derivative knitting structures. **K-3:** Application of knitting principles in warp and weft knitting production.		
Course Objectives	**The Course aims** • Recognize the fundamentals of weft knitted fabric production processes. • Acquire knowledge on the structure and properties of various advanced weft knitted fabrics. • Outline the fundamentals of flat knitting machines and designing tools. • Recognize the structure, properties, applications and Latest developments in weft knitting. • Acquire knowledge on knitted fabrics defects and quality control measures.		

Units	Content	No. of Hours
I	**Properties of Woven and Knitted fabrics:** Terms and definitions used in Knitting, Yarn quality requirements for knitting. Comparison of warp and weft knitting. Classification of warp and weft knitting machines. Knitting needles: Spring – beard – Latch – Compound needles.	**9**
II	**Introduction of Weft Knit structure:** Technical terms and symbolic representation of Weft Knit structure – Characteristics of Plain, Rib, Interlock, Purl Knit structures. Rib, interlock and purl circular knitting machines. Fundamentals of formation of knit tuck and float stitches. Factors affecting the formation of loop. Effect of loop length and shape on fabric properties. Fault in knitted fabrics, causes and remedies. Production calculation.	**9**
III	**Introduction of Flat Knitting machine:** Basic principles and elements of flat knitting machines. Different types of flat knitting machines-manual, mechanical and computer controlled knitting machines. Production of various fabric designs with flat knitting machines. Jacquard knitting – Pattern wheel, Pattern drum, Tape patterning devices, Electronic Devices.	**9**
IV	**Introduction of Warp Knit Machine:** Warp knitting fundamentals, Basic Warp knitted structures, Closed lap and Open lap stitches. Classification of Warp Knitting Machines – Knitting elements of Raschel and Tricot knitting machine, Points of difference between Raschel and Tricot knitting machine. Representation of Warp – Knit structure.	**9**
V	**Quality of Knit Fabrics:** Defects in weft and Warp Knitted fabrics, causes and remedies – Test for Weft Knit quality – Knitting Calculations for Weft Knits and Warp Knits.	**9**
	Total Hours	**45**

References	**Text Books:** 1. Ajgaonkar, Knitting Technology, Universal Publication Corporation, Mumbai, 1998. 2. Sadhan C. Ray, Fundamentals and Advances in Knitting Technology, WPI, 2014. 3. Spencer D.J, Knitting Technology, Textile Institute, Manchester, 2000. **Reference Books:** 1. Samuel Raz., Flat Knitting, The new generation, Meisenbach GmbH, Bamberg, 1987. 2. Samuel, Raz., Warp Knitting Production, Mellian Textilberichte GmbH, Rohrbacher, 1987. 3. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach, Circular Knitting, Meisenbach GmbH, Bamberg, 1995. 4. YordanKyosev, Warp Knitted Fabrics Construction, CRC Press,2019 5. Terry Brackenbury , Knitted Clothing Technology, Wiley,1992
Course Outcomes	**On completion of the course, students will be able to** CO1: Recognize the fundamentals of weft knitted fabric production processes. CO2: Describe the structure and properties of various advanced weft knitted fabrics. CO3: Outline the fundamentals of flat knitting machines and designing tools. CO4: Recognize the structure, properties, applications and Latest developments in weft knitting. CO5: Understand the knitted fabrics defects and quality control measures.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPE4EY2: ELECTIVE – II - KNITTING TECHNOLOGY PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the Knitting principles, types, and structures. **K-2:** Understand the knitting machine setting, speed, production methods. **K-3:** Application of knitted fabric in various fields.		
Course Objectives	**The Course aims** To know about the properties, constructions of warp and Knitting fabrics – knitting machineries and their production process – defects and calculation of Knit fabrics.		

Units	Content	No. of Hours
I	1. To study the working Principle of Circular Weft Knitting machines. 2. To study the knitting elements.	**12**
II	3. To study the features of various types of Knitting needles. 4. To study the yarn tensioning devices.	**12**
III	5. Effect of Stitch length on Knitted fabric quality setting of various machine parameters on Circular Knitting Machine. 6. Study the passage of material through a Rib knitting machine.	**12**
IV	7. Knitting cycle of Rib knitting machine. 8. Study the passage of material through an Interlock knitting machine.	**12**
V	9. Knitting cycle of interlock knitting machine. 10. Basic and derivative knit structures.	**12**
	Total Hours	**60**
References	**Text Books:** 1. Ajgaonkar, Knitting Technology, Universal Publication Corporation, Mumbai, 1998. 2. Sadhan C. Ray, Fundamentals and Advances in Knitting Technology, WPI, 2014. 3. Spencer D.J, Knitting Technology, Textile Institute, Manchester, 2000. **Reference Books:** 1. Samuel Raz., Flat Knitting, The new generation, Meisenbach GmbH, Bamberg, 1987. 2. Samuel, Raz, Warp Knitting Production, Mellian Textilberichte GmbH, Rohrbacher, 1987. 3. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach, Circular Knitting, Meisenbach GmbH, Bamberg, 1995. 4. Yordan Kyosev, Warp Knitted Fabrics Construction, CRC Press, 2019. 5. Terry Brackenbury , Knitted Clothing Technology, Wiley,1992	

Course Outcomes	On completion of the course, students will be able to CO1: Operate various knitting machineries and preparation of knitted fabrics. CO2: Recognize the fundamentals of weft knitted fabrics. CO3: Outline the fundamentals trouble shooting measures in weft knitting machines. CO4: Recognize the knit structures, machine setting, design tool incorporation etc. CO5: Understand the knitted fabrics defects, production sums, and quality control measures.

Mapping of Co Vs PO and PSO

CO/PO	PO				PSO				
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPE4EX3: ELECTIVE – II - ADVANCED TEXTILE WET PROCESSING		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the structure & properties surface active agents and dyes. **K-2:** Understand the principles of recent developments in coloration and finishing. **K-3:** Application of recent developments in coloration and finishing.		
Course Objectives	**The Course aims** • To provide the fundamental understanding of surface active agents. • To describe process modification in pre-treatments. • To discuss the new developments in dyeing and evaluation of fastness properties. • To discuss the new developments in printing. • To explain finishing of textiles and evaluation of finishes.		

Units	Content	No. of Hours
I	Study of surface active agents - Types, adsorption at surfaces and interfaces, surfactant - aggregates, factors affecting aggregation phenomena, applications of surfactants and mixed surfactant systems	9
II	Advancement in bleaching - Mechanism of Desizing, Scouring, Bleaching, Mercerization and Heat setting. Degradation of fibres associated with chemical pre-treatment processes. Combined pretreatment processing of textiles. Batch and continuous processing techniques – Material passage, quality control measures and limitations. Low liquor applications.	9
III	Advancement in dyeing - Chemical Constitution of Colourants, Dye-Fibre Bonds, Influence of fibre structure on dye uptake, - Thermodynamic Considerations, Heat of Dyeing, Adsorption Isotherms, Kinetics of Dye Adsorptions. Dye-Fibre affinity and calculations. Solubility parameter. Functions and properties of dyeing auxiliaries. Use of microwave and ultrasonic waves in dyeing, Apparel dyeing.	9
IV	Advancement in printing: Printing - Production and properties of printing pastes, Principles of direct, resist, discharge printings, Transfer, digital and ink-jet printing. 3D printing. After-treatment processes	9
V	Advancement in finishing - Finishing – Types of finishing, Antishrink, Easy-care and durable press finishes of cellulosic, water repellent, soil-release, flame-retardant, antimicrobial and mite protection finishes.	9
	Total Hours	45
References	**Text Books:** 1. Prayag R.S., Bleaching, Mercerising and Dyeing of Cotton Materials, Prayag, Dharwad, 1992. 2. Prayag R.S., Technology of Printing, Prayag, Dharwad, 1989. 3. R.S.Prayag, Dyeing of wool, silk and Man-Made fibres, Mrs.L.R.Prayag, Dharwad, 1989.	

	Reference Books: 1. Schindler W.D. and Hauser P.J., Chemical Finishing of Textiles, Woodhead Publishing India Pvt Ltd, New Delhi, 2004. 2. Jamshed A Khan, Eco-Friendly Textile Dyeing and Finishing, Scitus Academics LLC, 2016. 3. Clerk W, Introduction to Textile Printing, Newnes - Butterworths, London. 4. Leslie W C Miles, Textile Printing, Society of Dyers and Colourists, England, 2003. 5. Christina Cie, Ink Jet Textile Printing, Woodhead Publishing India Pvt Ltd, New Delhi, 2015.	
Course Outcomes	**On completion of the course, students will be able** CO1: Application of surface active agents for wet processing of textiles and evaluation of them. CO2: Application of basics and modified pre-treatments of textiles. CO3: Description of the developments in various dyes and dyeing process. CO4: Summarization of textile printing in detail and prediction of operation sequence for expected results. CO5: Summarization and illustration of finishing operations for textiles and effluent treatment.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	3	2	3	3	1	3	1	1
CO2	2	3	2	3	3	1	3	1	1
CO3	2	3	2	3	3	1	3	3	3
CO4	2	3	2	3	3	2	3	3	3
CO5	2	3	2	3	3	2	3	3	3

Course Code & Title	21DTTPE4EY3: ELECTIVE -II- ADVANCED TEXTILE WET PROCESSING PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the procedure to evaluate surfactants, pre-treat and colour the fibres. **K-2:** Understand the calculations to carry out the practical. **K-3:** Application procedure to perform practical.		
Course Objectives	**The Course aims** • To impart practical training in determination strength of wetting agents and detergents. • To impart practical training in bleaching of man-made fibres with various oxidizing agents. • To compare the properties of mercerized and unmercerized cotton and let the students to test barium activity number. • To make the students to dye wool with acid and metal complex dyes. • To impart training to print silk, wool and polyester/cotton blends by various styles & to impart training to finish the textiles.		

Units	Content	No. of Hours
I	Determination of strength of wetting agents and detergents.	**12**
II	Bleaching of viscose rayon, polyester, acrylic, polyester/cotton blend and polyester/viscose rayon blend and mercerising cotton fabrics.	**12**
III	Determination of barium activity number of mercerized cotton yarn/fabric. Continuous method of dyeing wool.	**12**
IV	Discharge style of printing of silk and wool. Printing of polyester/cotton blend – direct style. Printing of polyester/cotton blend – discharge style. Printing of polyester/cotton blend – burnt out style.	**12**
V	Softening finish and Wash-n-wear finish. Anti-static finish and Water repellent finish. Mildew proofing and Fire proofing.	**12**
	Total Hours	**60**
References	**Reference Books:** 1. Rosen M. J, Surfactants and Interfacial Phenomena, John Wiley & Sons, Inc., 2012. 2. Shenai V.A., Technology of Bleaching and Mercerising, Sevak Publications, Mumbai, 2002. 3. Karmakar S.R., Chemical Technology in the Pre-Treatment Processes of Textiles, Elsevier, 1999. 4. Shenai V.A., Technology of Dyeing, Sevak Publications, Mumbai, 2002. 5. Shenai V.A., Technology of Printing, Sevak Publications, Mumbai, 2002.	

Course Outcomes	**On completion of the course, students will be able to** CO1: Evaluation of wetting agents and detergents. CO2: Bleaching of man-made fibres and their blends. CO3: Mercerization of cotton and evaluation of mercerization. Dyeing of wool. CO4: Printing of silk, wool and polyester/cotton blends. CO5: Finishing of natural and man-made fibres.

Mapping of Co Vs PO and PSO

CO/PO	**PO**			**PSO**					
	1	**2**	**3**	**1**	**2**	**3**	**4**	**5**	**6**
CO1	**2**	**3**	**2**	**3**	**3**	**1**	**3**	**1**	**1**
CO2	**2**	**3**	**2**	**3**	**3**	**1**	**3**	**1**	**1**
CO3	**2**	**3**	**2**	**3**	**3**	**1**	**3**	**3**	**3**
CO4	**2**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**3**
CO5	**2**	**3**	**2**	**3**	**3**	**2**	**3**	**3**	**3**

Course Code & Title	21DTTPE4EX4: ELECTIVE – II - TECHNICAL TEXTILES		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the technology of technical fibres. **K-2:** Understand the need of technical textiles products in various sectors. **K-3:** Application of various technological concepts for the manufacturing of suitable technical textile products.		
Course Objectives	**The Course aims** • To understand high performance fibres used for Technical Textiles. • To understand the textile reinforced composites. • To understand the usage of Textile Fibres for civil Engineering and medical textiles. • To gain the knowledge about textile fibres used for defence. • Students to have knowledge about textiles in transport applications.		

Units	Content	No. of Hours
I	**Textiles and Fibres:** Technical Textiles – An Overview: Definition and scope of technical textiles, Milestones in the development of technical textiles, Textile processes, applications, Globalization of technical textiles, Future of the technical textiles industry. Technical Fibres: Introduction, High strength and high modulus organic fibres, High chemical- and combustion-resistant organic fibres, High performance inorganic fibres, Ultra-fine and novelty fibres, Fibres used in Civil and agricultural engineering, Automotive and aeronautics, Medical and hygiene applications, Protection and defence applications.	**9**
II	**Applications:** Textile-reinforced Composite Materials: Composite materials, Textile reinforcement, Woven fabric-reinforced composites, Braided reinforcement, Knitted reinforcement, Stitched fabrics. Prepergs. Textiles in Filtration: Introduction, Dust collection, Fabric construction, Finishing treatments, Yarn types and fabric constructions, Fabric constructions and properties, Production equipment, Finishing treatments, Fabric test procedures.	**9**
III	**Other Fields:** Textiles in Civil Engineering: Geosynthetics, Geotextiles, Essential properties of geotextiles, Engineering properties of geotextiles, Geotextiles structure, Frictional resistance of geotextiles. Medical Textiles: Introduction, Fibres used Non-implantable materials, Extra-corporeal devices, Implantable materials, and Healthcare / hygiene products.	**9**
IV	**Textiles In Defence:** Textiles in Defence: Introduction, Historical background, Criteria for modem military textile materials, Textiles for environmental protection, Thermal insulation materials, Water vapour permeable and waterproof materials, Military combat clothing systems, Camouflage concealment and deception, Flame-retardant, heat protective textiles, Ballistic protective materials, Biological and chemical warfare protection.	**9**

V	**Textiles in Transportation:** Textiles in Transportation: Introduction, Textiles in road vehicles, Rail applications, Textiles in aircraft, Marine applications, Future prospects for transportation textiles. Belts, Tyre cords, Hoses: Introduction, Construction particulars, Fibres and yarns used.	9
	Total Hours	**45**
References	**Text Books:** 1. Malsuo T, Fibre materials for advanced technical textile, CRC publication 2008. 2. Pushpa B. and Sengupta A.K., Industrial Application of textiles for filtration and coated fabrics. Textile progress vol.14.1992. 3. Lijing Wang., Performance Testing of Textiles-Methods, Technology and Applications, Elsevier Science, 2016. **Reference Books:** 1. Horrocks& S.C. Anand (Edrs.), Handbook of Technical Textiles, The Textile Institute, Manchester, Woodhead Publishing Ltd., Cambridge, England, U.K., 2000. 2. Adanur, Wellington Sears Handbook of Industrial Textiles, Technomic Publishing Co. Inc., Lancaster, Pennylvania, 1995. 3. John N.W.M, Geotextiles, Blackie, London, 1987. 4. Mukhopadhyay and Partridge J.F, Automotive Textiles, Text. Prog, Vol. 29, No.1/2, 1998. **5.** Anand S.C, "Medical Textiles", Text. Inst., 1996.	
Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the manufacturing process of Non-woven materials. CO2: Understand the high performance fibres properties. CO3: Gain the knowledge about various textile reinforced composite applications. CO4: Acquire the knowledge about textiles in civil engineering and medical field. CO5: Understand the Textiles for transportation.	

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPE4EY4: ELECTIVE – II - TECHNICAL TEXTILES PRACTICAL		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the technology of technical fibres **K-2:** Understand the need of technical textiles products in various sectors **K-3:** Application of various technological concepts for the manufacturing of suitable technical textile products		
Course Objectives	**The Course aims** • To understand the manufacturing process of Non-woven materials with different types of resins layered fabrics. • To understand braided materials and multilayer fabrics. • To know about geo textile applications. • To understand water proofing and heat protection coats. • To understand the different finishes on fabrics and testing.		

UNITS	Content	No. of Hours
I	**Non woven**-Needle punching, melt blown fabric, spun bonded fabric, thermal bonded fabric.	**12**
II	**Composites** – Fabrication and Testing for Physical properties using different natural / synthetic/ high performance fibres – gums and resins applications	**12**
III	**Hand Braiding** – braided materials – multi layered fabrics- preparation and weaving using the tools in the lab	**12**
IV	**Geo Textiles** – simple coir / net/ structures	**12**
V	**Thermal Insulation** –Water proofing and heat protection coats / finishes on fabric and testing.	**12**
	Total Hours	**60**
References	**Text Books:** 1. Malsuo T, Fibre materials for advanced technical textile, CRC publication 2008. 2. Pushpa B. and Sengupta A.K., Industrial Application of textiles for filtration and coated fabrics. Textile progress vol.14, 1992. 3. Lijing Wang., Performance Testing of Textiles-Methods, Technology and Applications, Elsevier Science, 2016. **Reference Books:** 1. Horrocks & S.C. Anand (Edrs.), Handbook of Technical Textiles, The Textile Institute, Manchester, Woodhead Publishing Ltd., Cambridge, England, U.K., 2000. 2. Adanur, Wellington Sears Handbook of Industrial Textiles, Technomic Publishing Co. Inc., Lancaster, Pennylvania, 1995. 3. John N.W.M, Geotextiles, Blackie, London, 1987. 4. Mukhopadhyay and Partridge J.F, Automotive Textiles, Text. Prog, Vol. 29, No.1/2, 1998. **5.** Anand S.C, "Medical Textiles", Text. Inst., 1996.	

Course Outcomes	**On completion of the course, students will be able to** CO1: Understand the manufacturing process of non-woven materials. CO2: Understand the various applications of technical textile Products. CO3: Students to have knowledge about Geo-Textile applications. CO4: Students to acquire the knowledge about different types of finishes. CO5: Students to have knowledge about water proofing and heat protection materials.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3
CO4	2	3	2	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

Course Code & Title	21DTTPR401: PROJECT		
Class	**DTT**	**Semester**	**Fourth**
Cognitive Level	**K-1:** Recall the different types of fibres and it's physical and chemical. **K-2:** Understand the basic principles of various mechanisms in textile machineries and methods of production. **K-3:** Apply the concepts to innovate textile products for various applications.		
Course Objectives	**The Course aims** To orient the students in conducting and documenting project study.		

Content	No. of Hours
The students are expected to undertake real time industry problems/study/specifications for their project work and a report shall be submitted in a specific format. For evaluation of project report the following criteria will be adopted. Internal valuation : 40 Marks Joint Viva-voce Examination : 60 Marks Total : 100 marks	40
Course Outcomes	**On completion of the course, students will be able to** **CO1:** Identify the problem for taking up project study. **CO2:** Analysis the problem and draw inference prepare. **CO3:** Project report in a systematic manner.

Mapping of Co Vs PO and PSO

CO/PO	PO			PSO					
	1	2	3	1	2	3	4	5	6
CO1	2	2	2	2	2	2	2	2	2
CO2	3	3	1	3	2	2	2	2	2
CO3	2	2	2	3	3	3	3	3	3