DKTE Society's
TEXTILE & ENGINEERING INSTITUTE
Rajwada, Ichalkaranji 416115
(An Autonomous Institute)

DEPARTMENT: TEXTILES

CURRICULUM
B. Tech. Man Made Textile Technology Program

Final Year
With Effect From
2023 - 2024

DKTE
Promoting Excellence in Teaching
Learning & Research

Final Year B. Tech Man Made Textile Technology
Semester-I

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits
				L	T	P	Contact Hrs/wk	
1	TML441	Textile Mill Planning and Organization	HSMC	3			3	3
2	TML442	Yarn and Fabric Science	PCC	3			3	3
3	TML443	Utility Engineering in Textiles	PCC	4			4	4
4	TMLOE2	Departmental Open Elective	OEC	3			3	3
5	TMLEL1	Elective - I	PEC	3			3	3
6	TMP452	Textile Mill Planning and Organization	HSMC		1		1	1
7	TMP453	Yarn and Fabric Science Lab	PCC			2	2	1
8	TMD454	Project Phase - I	PST		4		4	4
		Total		**16**	**5**	**2**	**23**	**22**

Course Category	**List of Departmental Open Electives**
HSMC - Hum. & Social Sc., Mgt	TTL444 – Non-woven Technology
BSC - Basic Science	TML445 - High Performance Fibers
ESC - Engineering Science	TCL447 - Functional Finishes
PCC - Prof. Core Courses	TFL448 - Retail Management
PEC - Prof. Elect. Courses	**List of Electives**
OEC- Open Elct. Courses	TML449 - Textile Mill Management
MC - Mandatory Courses	TML450 - Import Export Management
PST - Project / Seminar / Ind. Training	TML451 - Garment Technology

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TML441: TEXTILE MILL PLANNING AND ORGANISATION

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To Explain Project Planning, Formulation of a Project Report for Spinning, Weaving, Knitting Units, Techno economics.
2. To explain Plant & Machinery Layout, Machinery Specification Selection & Civil/Building Construction approach.
3. To calculate number of Machines essential in each textile process for targeted production quantity.
4. To explain Materials Handling concept and method, Labour Complement.

Course Outcomes:

At the end of the course, students will be able to

1. Understand the project report preparation for textile activity.
2. Understand layout preparation process, machine specifications and construction concept.
3. Calculate spin plan and weave plan.
4. Understand material handling equipment's used in textile industry and labour complement details.

Course Contents

Unit I	Project Planning	06 Hours

Introduction, Capital investment required for project, Phases of Capital Budgeting, Difficulties in Capital expenditure, Phases involved.

Formulation of a Project Report for Spinning, Weaving, Knitting Units - Assumptions, Machinery Organizations, Requirement of Miscellaneous Fixed Assets. Machinery Stores, Spares and in process inventories. Machinery erection, commissioning.

Need of modernization and automation in Textile plants. Factors related to safety in Textile Plants.

Unit II	Techno-economic Viability	06 Hours

Calculations of cost of project – Means of Finance – Estimates of sales & production – cost of production – working capital requirement – Profitability Projection – Break even point – Projected cash flow statements.

Unit III	Site Selection	07 Hours

Selection of site for textile mills, General location, Actual selection of specific site, Calculation of spatial requirements, factors influencing site selection, Humidification

considerations.

Civil/Building Construction - Consideration in building design, size, shape and configuration of building. Architectural & structural aspects of textile mill building. Building morphology, General principles of building construction & building functions,
Types of factory buildings, Types of building construction. Material for construction with special reference to walls, roofs, floors, false ceilings, fire resistance, sound proof, etc. Colour schemes for buildings, interior & machinery in textile mills. Cost considerations in building construction. Amenities required as per standards.

Unit IV	Plant & Machinery Layout	06 Hours

Significance and the concept, objectives and principles of layouts, kinds of layouts and their comparisons, flow pattern, work station design, tools and devices of making layouts, use of Auto-Cad for layouts, storage space requirements,
Plant layout procedure, factors influencing layouts, selection of layout, effect of automation on plant layout, symptoms of bad layout. Layout aspects of spinning, weaving, knitting and composite mills.
Spatial requirements of spinning / weaving / knitting machines. Modern trends material handling.

Unit V	Machinery Specification, Selection & Calculation for No. of Machines	07 Hours

Selection of machines & machinery specifications - Required for the product in spinning, weaving, knitting etc. Calculation for number of machines in spinning /spin plan.
Preparation of organization for ring spinning mill and preparatory - Departments based on ring spindle capacity and production of ring spun yarn. (Carded, Combed, Blended, folded). Assumptions for draft, waste, efficiency etc.
Calculation for number of machines in weaving / weave plan - Preparation of organization for shuttle & shuttleless weaving mill and preparatory departments based on number of weaving machines & production of different cloths.
Calculation regarding efficiency, waste, crimp, production rates, raw material and number of machinery required at different processes.

Unit VI	Materials Handling	06 Hours

Definition and importance of materials handling, functions and principles of materials handling, material handling methods, engineering and economic factors, relationship to plant layout, selection and type of material handling equipments, study of different types of equipments used for materials handling in spinning, weaving, knitting mills. Latest trends in materials handling. Labour Complement - Types of labour required, labour complement, labour and staff required for spinning and weaving based on workload consideration. Job evaluation and merit rating.

References Books:

1. Management of Textile Industry – Dr. V. Dudeja
2. Textile Project Management by A. Ormerod, The Textile Institute Publication.
3. Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma, Khanna Publishers, Delhi.
4. Norms for Process Parameters, Productivity etc. ATIRA, BTRA, SITRA, NITRA
5. USTER Statistics
6. Management of Textile Production, A. Ormorod. Newnes – Butter Wortrs Publication.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TML442: YARN AND FABRIC SCIENCE

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To discuss classification and geometry of different yarn structures.
2. To study mechanical properties of yarn.
3. To discuss aesthetic and comfort properties of fabric.
4. To explain serviceability of fabric in relation to their performance aspect.

Course Outcomes:

At the end of the course, students will be able to

1. Understand different yarn structures in relation to properties.
2. Apply the effect of yarn structure to mechanical properties of yarn.
3. Demonstrate aspects of aesthetic and comfort in relation to various fabric properties.
4. Explain relation between fabric structural parameters in relation to serviceability.

Course Contents

Unit I	Classification and Structure of yarn	03 Hours

Classification of yarns, Yarn structures – fundamental structural features of yarns. Structurally related performance of yarn, effect of mechanical & chemical treatment

Unit II	Ideal Yarn Geometry and Fibre Migration	07 Hours

a) Twist in Yarns

Geometry of twisted yarns, idealized helical geometry, twist contraction, twist and packing of fibers in yarns, idealized packing and packing in actual yarn, concentrating and deviating features of actual yarn, specific volume and packing fraction, derivation of K(Schwarz constant)

b) Form and fiber arrangement in twisted yarns

Fiber migration – Ideal migration, Characterization of migration behavior, Factors affecting migration of man-made fibers in the yarn, tension variation as a mechanism of migration, frequency and order of migration.

Unit III	Mechanical Properties of Yarn	06 Hours

a) Theory of the extension of continuous filament yarns

Simplest analysis of tensile behavior, analysis with transverse forces & lateral contraction, analysis for large extension, prediction of breakage, prediction of load - extension curve, energy method, Observed extension & breakage of continuous filament yarn.

b) Tensile Behavior of Actual Yarns

Mechanics of yarn structures, tensile behavior of continuous filament yarns. Influence of processing

factors on tensile properties of yarns. Observed extension & breakage of spun yarns, experimental studies

Unit IV	Thermo physiological Comfort	08 Hours

a) Thermal Transmission Properties of Textile Structures
Nomenclature, Definitions of terms – thermal properties- thermal insulation, coldfeel, chillproofness, Factors affecting thermal properties, Methods of measuring thermal properties

b) Moisture Transmission
Nomenclature, Moisture permeability properties of fabrics, factors affecting moisture transmission, Measurement.

Unit V	Aesthetic and Tactile Comfort	09 Hours

a) Crease Retention Wrinkle Resistance & Dimensional Stability
Nomenclature, Mechanics of Wrinkle Resistance, Inherent Wrinkle Resistance properties of fibres, effect of humidity and wetting on wrinkle resistance, chemical methods for improving wrinkle resistance and their effects, geometric factors influencing wrinkle resistance, Methods of Measurement, dimensional stability and shape retention.

b) Fabric Hand
Objective & subjective evaluation of fabric hand, Hand Nomenclature, Factors influencing fabric hand, Measurement of fabric hand by Kawabata & FAST techniques

Unit VI	Serviceability, Wear & Abrasion	06 Hours

Nomenclature, serviceability, wear & abrasion, Mechanics of abrasion, Influence of fabric/yarn/fiber structural parameters on abrasion resistance of fabric

References Books:

1. Properties of fibres, yarns & fabrics by Kaswel.
2. Structural Mechanics of fibres, yarns & fabrics by Herle, Grosberg and Backer.
3. Textile Yarn by Martindale and Goswami.
4. Physical Testing and quality control textile progress, Vol.23, No.1/2/3, by K. Slater.
5. Principle of Textile Testing by J.E. Booth.
6. Mario Bona – Textile Quality (Eurotex Series).
7. Cotton Testing by Steadman.
8. Physical Testing of Textiles by B.P. Saville
9. Textile Testing – Fibre Yarn & Fabric – by Dr. Arindam Basu (SITRA)
10. Testing & Quality Management by Dr.V.K. Kothari (IIT-Delhi)

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TML443: UTILITY ENGINEERING IN TEXTILES

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 04 Hrs/Week	04	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To learn need of humidification in textile industry. To learn various psychrometric processes for air treatment.
2. To learn different types of air conditioning systems, elements used and their features in modern plants. To learn how to estimate heat load and capacity of Humidification plant.
3. To learn and select different type of drives in Textile engineering. To learn and select illumination system for textile processes. To learn, apply and calculate energy bill in textile industry.
4. To learn and apply energy auditing in textile industry. To learn and improve power quality.

Course Outcomes:

At the end of the course, students will be able to

1. know importance of humidification in textile industry and its systems and components. Able to select various psychrometric processes for air treatment.
2. select different types of air conditioning systems, elements used and their features in modern plants, Able to calculate heat load and capacity of humidification plant.
3. select proper drives in textile engineering. Able to select proper illumination system for textile processes. Able to calculate energy bill in textile industry and understand how to reduce cost of energy and save money.
4. Audit a system and arrest the loss and save energy. Able to understand effect of bad quality of power and how to improve the quality and design a system.

Course Contents

Unit I	Humidification in Textile Mills	10 Hours

a) Need for humidification- Effect of temperature & R.H. on human body &Textile processes. Ambient conditions required in various departments of a textile mill. Basic definitions related to Psychrometry, interrelations of various properties, Psychrometric chart and its use, various psychrometric processes like cooling, heating, humidification, de-humidification, etc. Aspects of evaporating cooling method and refrigerative cooling method.

b) Arrangements and layout of standard humidification methods for spinning, weaving and knitting processes – Return air ducts, Return Air Plenum, Filters, Return Air fans, Dampers, Supply Air Fans, Washers, Eliminators, Supply Air Plenum, Supply Air Duct, Diffusers etc. Study of the construction of each component.

Unit II	Humidification plant design	8 Hours

a) Humidification plant design: Considerations for a humidification plant design and air circulation systems, Heat load calculations in the department, air circulation and the design features of the plant such as fan capacity, Sizes of Dampers, Washers, Ducts, Return Air and Supply Air openings in the department.

b) Various controls in humidification plants. Recent developments in humidification plant used in spinning, weaving, knitting departments.

Unit III	Pumps, Compressors and Fans used in Textile Industry	06 Hours

a) Various types of pumps, its classification and characteristics. Suitability of pumps used in textile mills.

b) Compressors: - Compression methods, intermittent, continuous. Classification of compressors and brief study of construction, working, advantages, limitations of each type. Compressed air requirement in Textile mills, Calculation of compressor capacity. Compressor accessories such as reservoir, dryer, lubrication system, filters, cooling towers, etc.

c) Fans: -Classification, construction and working of different types of fans. Centrifugal, Axial flow and Radial flow. Fan capacity, power and efficiency. Fan selection. Pneumatic conveying of materials in textile mills.

Unit IV	Drives Used on Textile machines	10 Hours

Motor sizing, Losses, speed control, soft starters, inverters for speed control, [VFD] in a ring frame its importance, factors affecting energy consumption in induction motors.
Design features of energy efficient motors, Different classes of efficiency's available motor capacity calculation for Air compressors, blowers, pumps. Motors used in textile industry, New high efficiency Motor developed like BLDC, RELUCTANCE, PMSM, LINE START PM INDUCTION motor.

Unit V	Energy Management	08 Hours

a) Electrical power required in Textile mills. Maximum demand, Average demand, Power factor, Load factor. Methods of power measurement, Tariff and its Concept of power triangle, active power, apparent and reactive power, various modern methods improving power factor [APFC] and its importance in industries types. Example in Two part tariff, Control of maximum demand for saving. Power factor control for saving, Load factor control for saving.

b) **Power Quality Improvement**: Concept of power quality, harmonics& methods of harmonics elimination. Method to improve power quality.

Unit VI	Electricity Transmission & its application	06 Hours

a) High Tension substation Transformers, Switch yard, Panels, etc. Methods of Power distribution in the department. H.T. supply and policies and charges and deposits based on connected load and maximum demand. Methods of captive generation Brief production to D.G set and furnace oil. Energy Audit -Principle, energy measurement and energy conservation, Scope for energy audit in various departments in textile industry.

b) None conventional energy resources – Cogeneration, solar energy, solar photo voltaic cell, wind energy, fuel cell.

References Books:

1. Air Conditioning and Refrigeration by Arora and Domkundwar.
2. Air Conditioning and Refrigeration by Khurmi and Gupta.
3. Air Conditioning in Textiles by S.P. Patel.
4. Compressors by Royce N Brown.
5. Refrigeration and Air Conditioning by P.L. Ballaney.
6. Manual of Humidification – Batliboi Ltd.,
7. Utilisation and traction by S.L. Uppal.
8. Power system by V.K. Mehta.
9. Electrical power system by Dr. H.P. Inamdar.
10. Utilisation of electrical power and electric traction by J.b Gupta

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Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLOE2-TTL444: NONWOVEN TECHNOLOGY

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To understand the concept of Nonwoven Textiles
2. To describe the stages of nonwoven fabric manufacturing
3. To illustrate the scope and merits of nonwovens in different applications
4. To analyze and identify the Nonwoven products

Course Outcomes:

At the end of the course, students will be able to

1. Explain basic terms in nonwovens, classification and market potential of nonwoven
2. Describe web formation methods like dry laid and spun laid and its process parameter
3. Identify and describe various methods of web bonding and its process parameters
4. Identify the suitability of the nonwoven technology for various applications

Course Contents

Unit I	**Introduction of Nonwoven**	**04 Hours**

Historical background of nonwovens, non-woven definition, stages in non-woven manufacturing. Web Forming Techniques: carding, air laid, wet process, polymer extrusion. Comparison.

Unit II	**Classification of Nonwoven**	**03 Hours**

Classification of nonwoven – On the basis of use, on the basis of manufacturing process, on the basis of web formation, on the basis of bonding.

Unit III	**Web forming Techniques**	**09 Hours**

Dry laid webs – fibre selection, fibre preparation, web formation, layering, Wet laid nonwoven – Raw materials, production process, special features of the wet laid process and its product. Spun bonded and Melt blown webs.

Unit IV	**Mechanical Bonding Techniques**	**10 Hours**

Mechanically bonded webs – needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications. Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications.

Unit V	**Thermal Bonding Technique**	**06 Hours**

Thermally bonded nonwovens – binder, binding fibres, binding powder, binding webs, methods of thermal bonding – Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding. Applications.

Unit VI	Chemical Bonding Technique	04 Hours
Chemically bonded nonwoven – Latex binder, other types of nonwoven binders, formulation, order of formulation, bonding technology. Application of chemical bonded nonwovens.		

References Books:

1. Non-Woven – Process, Structure, Properties and Applications, T. Karthik, Prabha Karan C & R. Rathinamoorthy, Woodhead Publishing India Pvt. Ltd., 2016.
2. Handbook of Nonwovens, 1st Edition By: S Russell, Woodhead Publishing 2007
3. Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, Prof. Dr. Wilhelm Albrecht, Prof. Dr.-Ing. Hilmar Fuchs, Dr.-Ing. Walter Kittelmann, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, 2003
4. Nonwovens Technology Market & Product Potential, Proceedings of the Seminar IIT New Delhi,2007
5. NPTEL Study material on Nonwoven Technology by Dipyan Das
6. Nonwovens: Monogram by BTRA
7. Nonwovens BY DR.P.K. Banerjee
8. Manual of Nonwovens by Krcma

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLOE2-TML445: HIGH PERFORMANCE FIBERS

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To describe the concept of high performance fibres
2. To explain the manufacturing process of commonly used high performance fibres
3. To explain structure and properties of commonly used high performance fibres
4. To explain the applications of high performance fibres

Course Outcomes:

At the end of the course, students will be able to

1. Understand concept of high performance fibres
2. Understand manufacturing process of commonly used high performance fibres
3. Analyse structure and properties of commonly used high performance fibres
4. Apply high performance fibres for various products

Course Contents

Unit I	**Introduction to high performance fibres**	**06 Hours**

- Concept and requirements of high performance fibres. Comparison of regular fibres with high performance fibres.

Unit II	**Carbon Fibres**	**06 Hours**

- Introduction to PAN and pitch based carbon fibres – their production, properties and applications.

Unit III	**High molecular weight polyethylene fibres. & Fully aromatic polyester fibres**	**06 Hours**

- Introduction, manufacture, fibre characteristics and applications of high molecular weight polyethylene fibres.
- Fibre manufacture, properties and applications of fully aromatic polyester fibres

Unit IV	**High temperature resistant fibres**	**06 Hours**

- Manufacture, fibre characteristics and applications of PBI, PBO, and other high temperature resistant fibres

Unit V	**Aramid Fibres**	**06 Hours**

- Introduction, polymer preparation, spinning of fibres, structure and properties and applications of meta and para aramid fibres

Unit VI	Inorganic Fibres	06Hours

- Glass fibre manufacture, Glass fibre composition, properties and applications
- Types of ceramic fibres, their production, characteristics and applications

References Books:

1. High Performance Fibres, Edited by J. W. S. Hearle, Published by wood head publishing Ltd., England in association with Textile Institute Manchester
2. Hand book of Fibres Science and Technology, High Technology Fibres, Edited by Manachem Lewin and Jack Preston.
3. New fibers. T. Hongu and G. 0. Phillips Ellis Horwood Ltd, Chichester
4. Kevlar aramid fiber. By H.H. Yang. John Wiley and Sons, Chichester, New York,
5. High-Performance and Specialty Fibers, Editors: Technology, Japan, Society of Fiber Science & (Ed.)

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLOE2- TCL447: FUNCTIONAL FINISHES

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To describe the mechanism and chemistry of functional finishes.
2. To select the proper functional finish based on end use application.
3. To apply various functional finishes used for textiles finishing.
4. To evaluate the functional finishes applied on textiles.

Course Outcomes:

At the end of the course, students will be able to

1. Describe the mechanism and chemistry of functional finishes.
2. Select the proper functional finish based on end use application.
3. Apply various functional finishes used for textiles finishing.
4. Evaluate the functional finishes applied on textiles.

Course Contents

Unit I	**Introduction to Functional Finishes**	**06 Hours**

Objects, types of functional finishing, methods employed for the application of functional finishes on textile materials - irradiation of high energy, coating, insolubilisation or deposition, microencapsulation, polymerisation, cross-linking and resin treatment, covalent formation and ion-exchange/chelation.

Unit II	**Wrinkle Resistance Finish**	**09 Hours**

Mechanism of creasing and resin finishing, Types of resin finishing, concept of Anticrease, wash-n-wear and Durable Press, Role of catalysts in resin finishing, Concept of deferred cure and post cure. Limitations of resin finishing causes of strength loss of resin finished fabric. Various approaches towards reducing the strength loss of resin finished goods. Low and ultra-low formaldehyde resins. Evaluation of Resin Finishing.

Unit III	**Antimicrobial Finish**	**07 Hours**

Object, requirements, types of antimicrobial finishing. Mechanism of antimicrobial finishing, Desirable properties of a good antimicrobial finishes, various antimicrobial finishes for cotton, wool, silk. Mildew-proof and rot proof finishing, Evaluation of antimicrobial finishes.

Unit IV	**Flame Retardant Finish**	**07 Hours**

Concept of flameproof and flame retardancy. Limiting oxygen Index and its importance, Thermal behaviour of textile fibres. Concept of solid phase and Gas phase flame retardant. Classification of flame-retardants. Mechanism of the mode of action of flame retardant. Factors affecting flame retardancy. Essential requirements of a good flame retardant. Evaluation of flame-retardant finish.

Unit V	**Repellent Finish**	**05 Hours**

Introduction, Mechanisms of repellency, chemistry of repellency, Evaluation of textiles treated with repellent finishes

Unit VI	Soil Release Finish	05 Hours

Type of soils, mechanism of soil impingement and soil retention. Mechanism of soil release. Soil release finishing of synthetics & its blends, Evaluation of soil release finishing.

References Books:

1. Chemical Finishing of Textiles by W. D. Schindler and P. J. Hauser, Woodhead Publishing Ltd., Cambridge England, 1st Edition 2004, ISBN 1 85573 905 4
2. Functional Finishes for Textiles, Improving Comfort, Performance and Protection, Edited by Roshan Paul, Woodhead Publishing Series in Textiles: Number 156, 2015, ISBN 978-0-85709-839-9.
3. Chemistry & Technology of Fabric Preparation & Finishing, by Dr. Charles Tomasino, Department of Textile Engineering, Chemistry and Science College of Textiles, North Carolina State University, 1992.
4. Principles of Textile Finishing, by Asim Kumar Roy Choudhury,2017 Elsevier Ltd., ISBN: 978-0-08-100646-7.
5. Textile Finishing, Edited by Derek Heywood, Published by the Society of Dyers and Colourists, UK, 2003, ISBN:9780901956811
6. Advances in Functional Finishing of Textiles, by Mohammad Shahid and Ravindra Adivarekar, Springer Nature Singapore Pte Ltd. 2020, https://doi.org/10.1007/978-981-15-3669-4
7. Textile Finishing-Recent Developments and Future Trends Edited by K.L. Mittal and Thomas Bahners, John Wiley & Sons, Inc., USA, 2017, ISBN 978-1-119-42676-9
8. Functional Textiles and Clothing, edited by Abhijit Majumdar,Deepti Gupta, Sanjay Gupta,Springer Nature Singapore Pte Ltd. 2019, ISBN 978-981-13-7720-4, https://doi.org/10.1007/978-981-13-7721-1

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLOE2-TFL448: RETAIL MANAGEMENT

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To describe retail industry and the retailing environment.
2. To develop competence in Retail Planning, Implementation and Management.
3. To describe retail buyers and merchandisers, store operations, supply chain management.
4. To classify trends in fashion retailing.

Course Outcomes:

At the end of the course, students will be able to

1. Describe retail industry and the retail environment.
2. Develop competency in retail planning, implementation and management.
3. Describe retail buyers and merchandisers, store operations, supply chain management.
4. Classify trends in fashion retailing.

Course Contents

Unit I	**Principles of retailing**	**06 Hours**

The history of retail, Understanding the difference between retailing and the retailer, Classification of retailers, On-site vs. off-site retailing, Multichannel retail approaches.

Unit II	**Consumer buying behavior**	**06 Hours**

Consumer behavior, Consumer demographics, Site selection and store location, Emerging domestic and international markets. Factors affecting consumer behaviour. Effect of consumer behaviour on marketing strategies.

Unit III	**Retail Corporate Offices**	**06 Hours**

Corporate offices and their role, Strategic planning; Supporting store teams, Ethics and corporate, Social responsibility, HRM, Importance & Motivation, Issues associated with HRM. Customer Relationship Management: CRM defined, Process Collection and evaluation of customer data..

Unit IV	**Planning Merchandise assortment and pricing**	**06 Hours**

Process, Buying plans, Assortment planning. Retail Pricing strategies: Setting Retail Prices, Price adjustments, Pricing Strategies & Services. Buying Systems: Process, Buying plans, Assortment planning OTB, preparation.

Unit V	**Store Management**	**06 Hours**

Types and methods, Store management and the back of house, Employee management, Store logistics, Merchandise controls and loss prevention. Manpower, infrastructure in retail.

Unit VI	Trends in Retailing	06 Hours
E-commerce and the online shopper, Mobile retail, pop-up, and concept shops, Retailer and designer collaborations, Technology in the retail sector.		

References Books:

1. Retailing Management by William, Davidson, Daniel J. Sweeney. John Wiley & Sons publication. ISBN: 978-0471850946
2. Retailing Management by Michael Levy, Barton Weitz and Dhruv Grewal 9th edition McGraw-Hill Education publication. ISBN: 978-0078028991
3. Fundamentals of Retail Management by Arupghosh, Neha Publishers & Distributors, ISBN: 9789381422465
4. Retail Management by Gibson G. Vedamani, Jaico Publishing House. 4th edition ISBN: 978-8179921517
5. Retail Management by Chetanbajaj, RajnishTuli, NidhiVarma and Srivastava, Oxford publication. 2nd edition. ISBN: 978-0198061151
6. Retail Management by S.C. Bhatia Atlantic publication, ISBN: 9788126909827

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLEL1-TML449: TEXTILE MILL MANAGEMENT

Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To understand the functions and Principles of Management.
2. To explain the term planning, organizing, staffing.
3. To understand the term leadership, Communication & Controlling.
4. To explain basic concepts of financial management and marketing

Course Outcomes:

At the end of the course, students will be able to

1. Explain the significance of management and its various functions
2. Discuss and apply the leadership, controlling and costing system in organization
3. Describe the concept of organizing and staffing
4. Utilizing the marketing techniques for selling the product and services of organization

Course Contents

Unit I	Management	06 Hours

Nature, Importance, Elements, Levels of Management, Fundamental Managerial Skills, Functions of Management – Henry Fayol's Principles of Management - Social responsibilities of a manager

Unit II	Planning & organizing	04 Hours

The Nature, Characteristics & Process of Planning – Forms of Planning
The Nature, Importance & Steps involved in the process of organizing

Unit III	Staffing & Leadership	06 Hours

Meaning, definition, importance, and process of staffing. Types of organization structure, Human resource management & selection, Performance appraisal, Meaning & Importance of leadership, Motivation: Theory X and Y

Unit IV	Communication & Controlling	06 Hours

Meaning, communication process, effective communication. Meaning, Concept, Definitions, Steps in control process, Techniques and Types of control, Requirements of an effective control system

Unit V	Financial Management	07 Hours

Balance sheet – Profit loss statement –Financial ratios. Cost Accounting, Meaning of Budget, Objectives, Advantages & Limitations of Budget, and Types of Budget and Budgetary control,

Introduction to Costs, Types of cost, Depreciation, Breakeven analysis, calculations

Unit VI	Marketing Evolution	07 Hours

Nature of Marketing, Core concepts of marketing – Digital Marketing, Marketing Mix, Product Life Cycle, Meaning, Scope, Limitations of Marketing Research - Marketing Research Procedure – Types & Techniques

References Books:

1. Essential of Management – by Harold Koontz & Heinz, Weihrich – Tata McGraw-Hill Publishing Company Ltd., New Delhi.
2. Advanced Cost & Management Accounting by P.K. Sikdar – Viva Books Pvt. Ltd., New Delhi.
3. Industrial Engineering & Management by O.P. Khanna & A. Sarup, Dhanapat Rai Publications (P) Ltd., Delhi.
4. Dynamics of Entrepreneurial Development & Management by Vasant Desai – Himalaya Publishing House – Delhi.
5. How to Read a Balance Sheet – An ILO Programmed Book – Oxford & IBH Publishing Co. Pvt. Ltd., Delhi.
6. Entrepreneurial Development by S.S. Khanta , S. chand & Company Ltd., Delhi 110 055.
7. Fundamentals of Marketing by W.J. Stanton, M.J. Etzel B.J. Walker – McGrawHill, Inc – New York, St. Laouis etc.
8. Industrial Organisation & Engineering Economics by S.C. Sharma & T.R. Banga Khanna Publishers – 2-B, Nath Market, Nai Sorak, Delhi – 110 006.
9. Marketing Management By Philip Kotler – Prentice – Hall of India Pvt. Ltd., New Delhi – 110 001.
10. Managing Human Resource by Luis R. Gomer Mejia, D.B. Balkin & R. L. Cardy. Pearson Education (Singapore) Pvt. Ltd., Indian Branch, 482 FIE Delhi, India.
11. Cost Accounting by M.E. Thukaram Rao, New Age Internation (P) Ltd., Publishers New Delhi.
12. Project Management by K. Nagaraja, New Age Internation (P) Ltd., Publishers – New Delhi, Bangalore etc.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLEL1-TML450: IMPORT EXPORT MANAGEMENT

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 25 Marks SEE: 50 Marks

Course Objectives:

1. To explain international trade, Exchange rate determination WTO & Trade liberalization.
2. To explain international marketing and foreign trade policies
3. To explain and identify firm establishment process and foreign trade documents.
4. To understand the import procedure, shipment and customs procedure.

Course Outcomes:

At the end of the course, students will be able to

1. Understand international trade, Exchange rate determination WTO & Trade liberalization
2. Understand international marketing and forging trade policies
3. Understand and identify the firm establishment process and foreign trade documents
4. Understand the import procedure and shipment and customs procedure.

Course Contents

Unit I	**Introduction to international trade**	**06 Hours**

Introduction, trade policy, foreign trade, simplification of documentation, The emerging global scenario-The business of international trade- Trade barriers- Foreign exchange-Exchange rate determination (Spot & forward), the euro dollar market-WTO- Trade liberalization

Unit II	**International marketing**	**07 Hours**

Introduction- International marketing channels-Market selection and market profiling-Product strategies- Promotion Strategies-Export Pricing-Export finance- Export risk insurance-Export packaging and labeling- Quality control and pre-shipment inspection

Unit III	**Foreign trade**	**05 Hours**

Foreign trade control and-Exim policy-Export Promotions-Export procedures and documents- Major problem of India's export sector

Unit IV	**Export Preliminaries**	**05 Hours**

Introduction, Establishment a business firm, importer exporter code number, Alignment documentation system, commercial documents, Regulatory documents.

Unit V	**Foreign Trade Documents**	**08 Hours**

Need, Rationale And Types Of Documents Relating To Goods – Invoice – Packing Note And List – Certificate Of Origin – Certificate Relating To Shipments – Mate Receipt – Shipping Bill

Certificate Of Measurement – Bill Of Lading – Air Way Bill – Documents Relating To Payment – Letter Of Credit – Bill Of Exchange – Letter Of Hypothecation – Bank Certificate For Payment – Document Relating To Inspection – Certificate Of Inspection – Gsp And Other Forms

Unit VI	Shipment and Customs	08 Hours

Pre-Shipment Inspection and Quality Control – Foreign Exchange Formalities – Pre-Shipment Documents. Shipment of Goods and Port Procedures – Customs Clearance Post Shipment: Formalities and Procedures – Claiming Duty Drawback and Other Benefits – Role of Clearing and Forwarding Agents

References Books:

1. Export Import procedure, C. Rama Gopal, New age international publication, New Delhi
2. International trade and Export management – Himalaya Publication, Mumbai (1998) Francis Cherunilam.
3. Exim Policy input Output norms – Duty exemption Scheme 2002-2007, Centax publication Pvt. Ltd. New Delhi (April 2003 Fourth Edition.) R.K. Jain.
4. Hand Book of Import And Export Procedures - Paras Ram
5. Govt. Of India: Hand Book of Import and Export Procedures.
6. Export Import Procedures – Documentation and Logistics , C ram Gopal, New Age International Publishers

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMLEL1-TML451: GARMENT TECHNOLOGY

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To explain the basics of apparel industry
2. To describe pre-production and post-production processes of apparel industry.
3. To describe production processes of apparel industry.
4. To explain applications of CAD-CAM in apparel industry.

Course Outcomes:

At the end of the course, students will be able to

1. Describe the structure and classification of Apparel industries as per size, labor, and product and understand the development of apparel industry in India.
2. Describe the various requirements and importance of pattern making, cutting, sewing, finishing and Inspection.
3. Compare various production technologies and their types.
4. Discuss the applications of CAD-CAM in the apparel industry.

Course Contents

Unit I	The Garment Industry	06 Hours

Structure of the garment Industry, sectors of 6
Industry, product types and organization. Apparel industry in India, Domestic industry, size of the industry, nature of the industry, and its developments in recent years. Export industry: Size and nature of the industry.

Unit II	Basic Pattern Making	06 Hours

Measurement Taking – Size chart and 6 Measuring of Sizes. Definition of various garments parts & positions. Methods: Bespoke method & Industrial method (Using Blocks) – Basic block construction – Block preparation & correction. Figure analysis: Body ideals, body proportion, height, weight distribution, body parts, individual figure analysis, study of body measurement of all age groups. Muslin pattern, commercial pattern, sizes and its understanding, fabric preparation for garment construction.

Unit III	Manufacturing Technology	06 Hours

Types of Fabric Packages, Spreading, Marker preparation and its planning, Types and functions of cutting machine, preparation for sewing processes, Sewing Technology: feed systems, types of sewing machinery and equipment, Parts of needles and their function, Properties of sewing threads, ticket number, Federal classification of seam and stitches.

Unit IV	Fusing Technology	06 Hours
Concerned factors, fusing process, Fusing machinery, quality control. Pressing Technology: Purpose, categories, means and equipment.		
Unit V	**Garment Finishing and Inspection**	**06 Hours**
Study of various components such as buttons, zips, underlining, Hooks, and ornamental materials, attaching buttons, marking, sewing labels, cleaning, final touch, fitting quality, live models, measurements, viewing the garments, quality standards.		
Unit VI	**Production Technology**	**06 Hours**
Manual systems, making through, section system, progressive bundle system, straight line system, mechanical transport systems, selective conveyor belt system, unit production system, quick response sewing system. Ware Housing: Handling equipment, storage equipment, packing equipment. CAD/CAM in Garment Manufacturing.		

References Books:

1. Introduction to clothing Manufacture by Gerry Cooklin
2. Technology of clothing manufacture by Harrold carr & Barbara Lathem
3. Apparel Manufacturing Handbook by Jacob Solinger.,
4. Clothing construction and wardrobe planning by Dora S. Lewin, Mabel Goode
5. Bowers, Manetta Knttunen — The Macmillan co New York
6. Garment Technology by Dr. V.Subramaniam — Winter School booklets 1990 6 BIS publications 1989

DKTES Textile and Engineering Institute, Ichalkaranji Final Year B. Tech. Man Made Textile Technology (Semester – VII) TMP452: TEXTILE MILL PLANNING AND ORGANISATION		
Teaching Scheme: Tutorial: 01 Hrs /Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
THEME: The Tutorial conducted would be based on the syllabus for the present subject. It is preferably on data collection and techno economic interpretation.		

Submission – Completed Assignment.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Textile Technology (Semester – VII)
TMP453: YARN AND FABRIC SCIENCE LAB

Teaching Scheme:	Credits	Evaluation Scheme:
Practical: 02 Hrs /Week	01	CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	To study weak link effect.
2	To Study effect of twist on yarn strength.
3	Determination of hair count in spun yarn.
4	To determine fabric assistance in warp and weft direction of a woven fabric.
5	To determine stretchability of fabrics.
6	To estimate thermal insulation value of fabric.
7	To determine air permeability of different fabrics.
8	Estimation of Fabric Wear performance by using Universal Wear Tester.
9	To compare of crease recovery of grey & resin finished cotton fabric.
10	To study the bending behavior of fabric by cyclic bending tester.
11	To determine drape of different fabrics.
12	To evaluate stiffness parameters of different fabrics.

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VII)
TMD454: PROJECT PHASE- I

Teaching Scheme:	Credits	Evaluation Scheme:
Tutorial: 04 Hrs/Week	04	CIE: 50 Marks

Course Objectives:

1. To assist the students in identifying problem, searching relevant literature.
2. To guide the students in preparation of plan of work.
3. To encourage, promote and assist the students at various stages.
4. To encourage them to work in group.

Course Outcomes:

At the end of the course, students will be able to

1. Identify problem, Prepare Literature Review, Prepare and submit Plan of work
2. Timely submit Literature Review based on problem identified and plan of work.
3. Make availability and testing of raw materials, designing of product, initial trials, etc.
4. Work in team

Course Contents

Selection of Topic and Registration

Students based on their interest and availability of resources select the topic in one of the following area-

i. Process optimization.
ii. Product Development.
iii. Fabrication.
iv. Software in textiles.

Students should submit the registration form to dissertation committee filling all the details.

Literature review

Literature related to topic selected should be searched from Reputed Research Journals, Books, and internet. Literature review should be prepared as per the standard format.

Plan of work

Proposed plan of work in consultation with guide should be prepared. Plan of work consists of

- Raw Material details.
- Methodology to be adopted.
- Testing to be carried out.

	Submission of Literature review and plan of work	
Spiral bound copy of Introduction, Literature review and plan of work as per the standard format should be submitted to dissertation committee.		
	Evaluation of Plan of work	
Students should present all above details of project work in front of project evaluation committee. If any recommendations are suggested by committee, those should be implemented and resubmitted.		
	Continuous Internal Evaluation (CIE)	
Term work marks are allotted by continuous monitoring of the progress in the work and submission of spiral bound copy.		

Submission

1. Spiral copy of Introduction, literature review and plan of work, duly signed by all team members and Guide.

Final Year B. Tech Man Made Textile Technology
Semester-II

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits
				L	T	P	Contact Hrs/wk	
1	TML461	Process Management in Yarn Forming	PCC	3	-	-	3	3
2	TML462	Process Management in Fabric Forming	PCC	3	-	-	3	3
3	TMLEL2	Elective - II	PEC	3	-	-	3	3
4	TMLEL3	Elective - III	PEC	3	-	-	3	3
5	TMD469	Project Phase - II	PST	-	5	-	5	5
6	TMD470	Internship - II *	PST	-	-	-	-	3
7	TMP471	Process Management in Yarn Forming Lab	PCC	-	-	2	2	1
8	TMP472	Process Management in Fabric Forming Lab	PCC	-	-	2	2	1
		Total		12	5	4	**21**	**22**

Course Category	**List of Electives - TMLEL2**
HSMC - Hum. & Social Sc., Mgt	TML463 - Technical Textiles
BSC - Basic Science	TML464 – Fibre Reinforced Composites
ESC - Engineering Science	TML465 - Sustainable Textiles
PCC - Prof. Core Courses	
PEC - Prof. Elect. Courses	**List of Electives - TMLEL3**
OEC- Open Elct. Courses	TML466 - Textile Product Engineering
MC - Mandatory Courses	TML467 – Nano-fibre Technology
PST - Project / Seminar / Ind. Training	TML468 - Merchandizing

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TML461: PROCESS MANAGEMENT IN YARN FORMING

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. Explain the principals of process management, concepts of total quality management, the wastage and its effect on cost of production.
2. Explain the process of choosing process parameters and application of the chosen parameters at preparatory and ring spinning stages.
3. Illustrate the methodology of process and product performance evaluation and role of norms.
4. Describe the role of machine parameters and machine technology on process and product quality and cost.

Course Outcomes:

At the end of the course, students will be able to

1. Understand the principles of process management and quality management.
2. Understand the role of machine technology and parameters on product quality.
3. Understand the process of choosing process parameters at preparatory and ring spinning stages.
4. Apply the chosen process parameters and assess the influence of parameters at different ring spinning process stages. Test the product properties and compare with norms of the industry.

Course Contents

Unit I	Introduction to Process Management and Quality Cost	06 Hours

a) Introduction to process management – Meaning of process management, various phases of process management like planning, organizing, linking of customer feedback and process management, cycle of process management.

b) The Cost of Quality – Definition, three views of quality costs, measuring quality costs, use of quality cost, accounting systems, and activity based costing.

Unit II	TQM, Customer Focus and Production Costing	06 Hours

a) Total Quality Management (TQM) – Fundamental concepts of TQM, Elements of TQM, service quality versus product quality, Obstacles for implementation of TQM.

b) Customer focus & satisfaction – Determinants of customer satisfaction and

dissatisfaction, Customer perception of quality, Factors affecting the product quality, Customer relation & profitability, buyer supplier relationship, supplier partnership, continuous process improvement.

c) Production Costing and Parameters influencing the production cost.

Unit III	Raw Material Management and Yarn Realization	07 Hours

a) Raw material management – Importance, Effect and Factors affecting raw material management, Importance and factors affecting the cost of raw material, Bale management, Yarn engineering.

b) Yarn Realization – Importance and factors affecting yarn realization, Estimation process, norms for various yarns like cotton, blended etc.

c) Process management in blow room & card – Blow room & card as integrated system, Factors deciding amount of waste during process, Neps & fibre rupture, contamination control, selection of proper blow room sequence and its parameters.

Unit IV	Process Management in Combing, Draw Frame and S/F	05 Hours

a) Process management at Comber preparatory & Combing - Significance & importance of good lap for comber, Factors deciding the comber performance, evaluation of comber performance, Fractionating efficiency of comber, comber waste analysis.

b) Process management at Draw frame – Drafting wave & its significance, Roller nip movement, Roller speed variation, Roller vibration, influence of parameters like speed, setting, Role of auto leveler, Role of material channelizing in spinning.

c) Process management at Speed frame – Influence of process parameters like flyer speed, twist, break draft and settings on roving quality. Reasons for high count C.V. in roving and its control at speed frame.

Unit V	Process Management in R/F and End Break	05 Hours

a) Process management in Ring Spinning – Influence of various machine and material parameters on yarn quality. Control of yarn count and strength, Within and Between bobbin variation, Control of yarn evenness and imperfections, Types of yarn irregularities, measurement causes and assessment. Control of yarn Hairiness- factors affecting.

b) End breaks in spinning – Importance and controls.

Unit VI	Yarn Faults, On Off Monitoring and Productivity	05 Hours

a) Control of Yarn and package faults – Effect of machine parameters on classimate faults, control of faults. Study and control of yarn faults.

b) Role of on & off line monitoring and centralized data collection systems in spinning process.

c) Productivity – Importance, Productivity indices, Reasons for shortfall in productivity, Means to improve productivity.

References Books:

1. Textile Quality Physical method of Product & Process Control by Mairio Bona COMMETT program of EEC.
2. Process Control in Spinning by A. R. Garde & T. R. Subramaniam, ATIRA Publication. SITRA publication.
3. Total Quality Management – A How to program for high performance business by John M. Kelly, Published by Aleycuder, Hamitton Institute Inc.
4. Process Control in Spinning – Dr. K. R. Salhotra, ATIRA Publications.
5. Process Management in Spinning by R. Senthil Kumar.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TML462: PROCESS MANAGEMENT IN FABRIC FORMING

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE:25 Marks ISE:15 Marks SEE:60 Marks

Course Objectives:

1. To explain scope, approach and methodology of process management
2. To explain process management in weaving preparatory to optimize quality and improvement in efficiency after each process
3. To explain process management in weaving with respect to fabric productivity
4. To explain process management in weaving with respect to fabric quality

Course Outcomes:

At the end of the course, students will be able to

1. Understand scope, approach and methodology of process management
2. Understand process management in weaving preparatory to optimize quality and improvement in efficiency after each process
3. Understand process management in weaving with respect to fabric production
4. Understand process management in weaving with respect to fabric quality

Course Contents

Unit I	**Introduction to process management**	**03 Hours**

Object, scope and approach to achieve quality and productivity in fabric production, and Methodology adopted for the same (SQC, Direct Approach, and online monitoring).

Unit II	**Quality and production management in winding**	**07 Hours**

Control of splice quality, Yarn clearing – Yarn fault classification, Yarn fault classification system, Assessment of clearing performance, Control of Unwinding and winding tension, Control of Package quality

Unit III	**Process management in warping**	**05 Hours**

Characteristics of perfect beam and monitoring the beam quality. Machine parameters adjustment and machine condition maintenance for minimizing end breaks, Method of assessing productivity of warping machine & measures to improve the productivity.

Unit IV	**Process management in sizing**	**08 Hours**

Deciding the size recipe according to material and count of yarn, Preparation of quality size pastes. Determination and achieving the correct size pick up by controlling various sizing conditions, Stretch and moisture level control, Characteristics of perfect sized beam and its achievement. Method to increase weavability, Control of productivity.

Unit V	Process management in weaving for productivity	07 Hours
Control of Technical, Human and organizational factors affecting loom shed efficiency. Assessment of loom performance after corrective actions. Control of down time through SMED technique, Use of snap study in controlling efficiency losses, MIS to control productivity		
Unit VI	**Process management in weaving for quality**	**06 Hours**
Causes and remedies for fabric defects. Manual and automatic fabric inspection methods, various point grading systems		

References Books:

1. Process Control in Weaving by M.C. Paliwal & P.D. Kimothi
2. Weaving: Technology and Operations by Allan Ormerod.
3. Weaving Machine, Mechanisms, Management by Dr. Talukdar, Ajagaonkar, Sriramulu.
4. Machine Manuals of Various Shuttle less Looms and – Preparatory Machines
5. Shuttle less Weaving: NCUTE Publication.
6. Fundamentals of Yarn Winding by Milind Koranne

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL2-TML463: TECHNICAL TEXTILES

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To explain market size, scope and difference between normal and technical textiles
2. To describe the 12 sectors of technical textiles and examples
3. To discuss the various applications of technical textiles in filtration, Defence, medical etc.
4. To explain the coating and lamination technology

Course Outcomes:

At the end of the course, students will be able to

1. Describe technical textiles and its importance
2. Explain the twelve sectors of technical textiles and suitable products
3. Explain various technical applications of technical textiles like filtration, medical, composite and transportation
4. Illustrate the fabric properties and requirements for military applications and other properties like insulation, electrical, sport including coating and lamination

Course Contents

Unit I	Introduction of Technical Textile	02 Hours

Definition and scope of Technical Textiles – Development stages in Technical Textiles – present market and future trends in Technical Textiles – Differentiate with traditional textiles-Raw materials used- sectors of technical textiles.

Unit II	Coating & Lamination	04 Hours

Introduction – difference - materials for coating – Substrate for coating – Coating methods - Physical properties of coated fabrics for various applications – Advantages and Applications.
Methods of Lamination & applications.

Unit III	Filtration & Geotextile	08 Hours

Filtration Application – Introduction – Mechanism of filtration - Fabric construction & Finishing Treatments, Solid-liquid separation, liquid – liquid filtration, liquid-gas separation,

Geotextiles – scope, definition, types, advantages and disadvantages of woven and nonwoven geotextiles, Raw material, Manufacturing-Testing-Applications.

Unit IV	Mobile Tech and Defence Textiles	08 Hours

Textiles in Transportation – Introduction, Textiles in passenger cars – Textiles in other road vehicles – Rail applications – Textiles in Air crafts – Marine application.

Textiles in Defence – Introduction, Criteria for modern military textiles materials – various application of Textiles in various areas of Defence such as environmental protection, thermal insulation, water proof water vapor permeable materials – ballistic protection – heat protection – biological and chemical warfare protection, High altitude fabrics, etc.

Unit V	Flame Retardant and Medical Textiles	06 Hours

Heat and Flame Protection - Flammability, thermal characteristics and combustion mechanisms of fibres, prevention of combustion – Flame retardant fibres suitable for protective clothing –Factors affecting-Testing of Flame retardant and Flame proof fabrics.

Medical Textiles – Introduction – special fibres- Non implantable materials, Extra corporeal devices – Implantable materials - Health care / hygiene products.

Unit VI	Fibre Reinforced Composites & Technical Textile Case Studies	08 Hours

FRC- Introduction to composite materials –Types- functions of Fibre and Matrix- Mechanics- Applications of composites.

Case Studies - Electrical insulation – Battery separators –synthetic turf and sports application – sound insulation (Acoustic Textiles) –power transmission, parachute textiles, ropes, cordage and twines.

Narrow fabric production methods –Applications in technical textiles.

References Books:

1. Handbook of Technical Textiles by A.R. Horrocks and S. C. Anand
2. Coated Textiles Principles and Applications by Dr. A. K. Sen
3. Medical Textiles by Subhash Anand
4. Wellington Sear's Hand book of Industrial Textile by Rd. Sabit Adnur.
5. NPTEL, https://nptel.ac.in
6. Automotive Textiles by Warner Fung

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL2-TML464: FIBRE REINFORCED COMPOSITES

Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To describe the concept of fibre reinforced composites.
2. To describe manufacturing techniques of fibre reinforced composites.
3. To explain testing of important properties of fibre reinforced composites.
4. To discuss the different applications of fibre reinforced composites.

Course Outcomes:

At the end of the course, students will be able to

1. describe concept of FRC
2. explain manufacturing techniques of fibre reinforced composites.
3. describe explain testing of important properties of fibre reinforced composites.
4. discuss the different applications of fibre reinforced composites

Course Contents

Unit I	Introduction	04 Hours

Concept of composites, Basic Terms - Reinforcing phase, Continuous phase, Matrix, Interface, Classification of composites

Unit II	Components of Composites	04 Hours

Fibres - Fibers suitable for composites, advantage &disadvantages
Matrix - Types of matrices, advantage & disadvantages
Study of Adhesives, Resin, Hardener etc.

Unit III	Manufacturing of composites	08 Hours

General Process Flow, Various techniques to fabricate the composite - Hand Lay-up, Vacuum Bagging, Resin Transfer Molding (RTM), Resin Infusion, Filament winding, Autoclave/ Oven, Compression molding, Injection moldings, Pultrusion.

Unit IV	Properties of FRC	08 Hours

Factors affecting composite properties, Failure Mechanism, Bond strength, Tensile strength and Tensile modulus, Compression strength and Compression modulus, interlaminate shear strength (ILSS), Bending/Flexural strength, Thermogravimetric analysis (TGA)

Unit V	General applications	06 Hours
Automobile, Sports, Construction, Aerospace, Wind Mill, Marine, etc		
Unit VI	**Developments in FRC**	**06 Hours**
Fibre reinforced Concrete, Hybrid composites, Natural fiber reinforced composites, Nanocomposites, Smart Composites		

References Books:

1. Fibre reinforced composites: Materials, manufacturing & Design, CRC Press, New York, 2007, P. K. Mallick.
2. Composite materials: Engineering & science, Frank L Matthews & R. D. Rawlings, CRC Press, New York, 1999.
3. Introduction to composites, D Hull & T W Clyne, second edition, Cambridge University Press, 1996.
4. New millennium fibres by T. Hongu & G. O. Phillips, CRC Press, New York, Woodhead Publications, 2000.
5. 3-D Textile reinforcements in composite materials by Prof. A. Miravete, CRC Press, New York, Woodhead Publications, 2000.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL2-TML465: SUSTAINABLE TEXTILES

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To explain the concept, benefits and importance of sustainability in textile manufacturing
2. To explain key issues and compliances related to sustainability in textile industry
3. To explain sustainable textile products and processes
4. To explain sustainable practices in textile manufacturing

Course Outcomes:

At the end of the course, students will be able to

1. Understand the concept, benefits and importance of sustainability
2. Identify key issues and compliances related to sustainability in textile industry
3. Analyze sustainable textile products and processes
4. Apply sustainable practices in textile manufacturing

Course Contents

Unit I	**Introduction to sustainability**	**06 Hours**

Concept of Sustainability. Benefits of Sustainability. Challenges and opportunities in sustainable textile production, Pillars of sustainability - environment, society, and economy. Life Cycle Analysis, Circular Economy

Unit II	**Sustainability issues and compliances**	**06 Hours**

Sustainability issues with use phase of fabrics and garments. Innovations to reduce the impact of use phase. Compliance, certification, social accountability and ethical practices.

Unit III	**Sustainable raw materials**	**06 Hours**

Sustainable raw materials for textiles: Natural fibres, manmade fibres. Renewable Products for the Textile Industry

Unit IV	**Sustainable Textile Processes**	**06 Hours**

Green Processing technologies. Sustainability issues in current textile production, Sustainable processing,

Unit V	**Sustainability innovation in production**	**06 Hours**

Technology based innovation, Innovation driven by legislation, Best practices in textile product manufacturing-spinning, weaving and chemical processing

Unit VI	Reuse. Recycle and zero waste:	06Hours
Textile waste, textile waste management strategies, reuse, repair and reconditioning of products, recycling,		

References Books:

1. Sustainable Fashion and Textiles: Design Journeys by Kate Fletcher Published by Routledge; 1st edition, ISBN: 9781844074631
2. Textiles and Clothing Sustainability: Implications in Textiles and Fashion by Subramanian Senthilkannan Muthu (Editor) ISBN: 9789811021817
3. Sustainable Fibres and Textiles, Edited by Subramanian Senthilkannan Muthu, Woodhead Publishing Ltd. UK, Elsevier, 2017, ISBN: 978-0-08-102041-8
4. Biodegradable and sustainable fibres, edited by R. S. Blackburn, Woodhead Publishing Limited, USA, 2005, ISBN-13: 978-1-85573-916-1
5. Handbook of Sustainable Apparel Production by Subramanian Senthilkannan Muthu (Editor), ISBN: 9781482299373
6. Textiles and Clothing Sustainability- Sustainable Technologies, edited by Subramanian Senthilkannan Muthu, Springer Nature Singapore Pte Ltd. 2017 ISBN 978-981-10-2473-3, DOI 10.1007/978-981-10-2474-0

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL3-TML466: TEXTILE PRODUCT ENGINEERING

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To describe the concept, scope, and logic of new product development in Textiles
2. To describe the stages of product development such as market research, product life cycle and bench marking
3. To illustrate the scope and merits of computer applications and simulation of textile products
4. To discuss the case studies related to the product development of textile products

Course Outcomes:

At the end of the course, students will be able to

1. Describe the concept of product development in textiles and its overall design logic
2. Explain the market research, product life cycle and bench marking with suitable examples in textiles
3. Analyze and apply the knowledge of computer aided and simulation for the product development
4. Summarize the techno economics of each of the case studies of the product development

Course Contents

Unit I	New Product Development (NPD)	10 Hours

Objectives and Scope of product development in textiles and clothing. General overview of innovation and textile product development, Practical aspects of innovation in the textile industry, New product development process, New product failures. Performance and serviceability concepts in textiles. Effect of changes in fibre, yarn type and fabric construction and finishing on performance and serviceability of textile products. Consideration of a good product design, selection of product.

Unit II	Market Research & Customer Requirement Analysis	05 Hours

- Product research, Market Research, Material Research, Product life cycle, Bench mark analysis, Functional, aesthetic, Manufacturing, and economical analysis.

Unit III	Textile Design	05 Hours

- Textile designer functions, types, Range planning, Range development, Range presentation, Retailing business, Merchanding Taxonomy, Merchandiser functions.

Unit IV	Simulation of specified properties or structures leading to design	05 Hours

- Introduction to Simulation, Simulation with and without computer, Simulation of fibrous structures and yarns, Computer simulation for 2D nonwovens, Design requirements for air filters, Yarn engineering using an artificial neural network, Grosberg & Leaf model, Engineering design of woven structures.

Unit V	Concept of overall designing	05 Hours

- Conventional design, development and production processes for apparel, Simultaneous design of textile and garment utilizing digital technology, Role of computer technology in textile design, Main computer technologies in textile design, Procedure, Texture by using computer graphics, CAD, FABCAD and MECHFAB., Benefits and limitations of computers for textile design, Future trends.

Unit VI	Case studies	06Hours

- Related to product development of textiles such as parachute textiles, medical sutures, nonwovens for earthen dams, QFD etc. Nanotechnology innovation for future development in the textile industry, New product development for e-textiles.

References Books:

1. Hand book of Textile Design Principles, Process and Practice by Jacquie Wilson, Textile Institute Publication.
2. The Design Logic of Textile Products, Textile progress vol. 27, No. 3, T Matuo and M. N. Suresh. The Textile Institute Publication.
3. Engineering Design by George Dieter.
4. Proceedings of the Seminar – Non woven Technology, Market and Product Potential, IIT, New Delhi, December 2006.
5. New product development in textiles: Innovation and production, Edited by L. Horne, published by Woodhead Publishing Limited in association with The Textile Institute,2012
6. Computer technology for textiles and apparel, Edited by Jinlian Hu, published by Woodhead Publishing Limited in association with The Textile Institute,2011
7. Simulation in textile technology, Edited by D. Veit, published by Woodhead Publishing Limited in association with The Textile Institute,2012
8. Soft computing in textile engineering, Edited by A. Majumdar, published by Woodhead Publishing Limited in association with The Textile Institute,2012

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL3-TML467: NANO-FIBRE TECHNOLOGY

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To explain nano fiber concepts and significance.
2. To describe the manufacturing of electro spun nanofibres
3. To explain useful properties of nano fibres
4. To explain developments in nano-fibres

Course Outcomes:

At the end of the course, students will be able to

1. Understand the importance and concept of nano fibres
2. Explain the manufacturing of nano fibres by different methods
3. Analyse the diversified applications and properties of nano fibres and nano composites
4. Describe the developments in nano fibres

Course Contents

Unit I	**Introduction**	**06 Hours**

Definition of nano fibres, concept, overview of nano fibres, types of nano fibres.

Unit II	**Types and processing of structured functional nanofibers:**	**06 Hours**

Core-shell, aligned, porous and gradient nanofibers, Core-shell nanofibers, Aligned nanofibers, Porous nanofibers Gradient nanofibers, Applications

Unit III	**Manufacturing of Nano fibres**	**06 Hours**

Introduction, principles of electrostatic atomization, Electrospraying and electrospinning by the capillary method, Electrospraying and electrospinning by the charge injection method, Solution electrospinning, Melt electrospinning. Advantages & Disadvantages.

Unit IV	**Process control in electrospun nano fibre production**	**06 Hours**

Morphologies of electrospun nanofibres, Polymer concentration and fibre diameter, Fibre bead formation and fibre surface morphology, Controlling fibre alignment and web

Unit V	**Properties of Nano fibres**	**06 Hours**

Physical and mechanical properties, surface properties, optical

Unit VI	Applications & developments - Nano fibres	06 Hours
Applications & developments of various types of Nano fibres		

References Books:

1. Nanofibers and nanotechnology in textiles, Edited by P. J. Brown and K. Stevens, Wood head Publishing Limited Cambridge, England, 2007
2. Functional nanofibers and their applications, Edited by Qufu Wei, Wood head Publishing Limited, 2012
3. Fundamentals of Fibre Formation: The Science of Fibre Spinning and Drawing,Andrzej Ziabicki, Wiley, 1976.
4. High speed spinning - Ziabicki and Kawai , Woodhead Publishing
5. Electrospinning: A Practical Guide to Nanofibers (De Gruyter Textbook) Kindle Edition
6. High performance fibres, J W S Hearle, CRC & Woodhead Publishing Limited, 2001.
7. New Millenium fibres, Tatsuya Hongu, Glyn O. Phillips and Machiko Takigami, CRC , WP, 2005

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMLEL3-TML468: MERCHANDISING

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	MSE: 25 Marks ISE: 15 Marks SEE: 60 Marks

Course Objectives:

1. To explain the organization of the Apparel business
2. To describe the Fashion marketing and merchandising process.
3. To describe product development and Sourcing Strategies
4. To describe various documents for exports.

Course Outcomes:

At the end of the course, students will be able to

1. Explain the organization of the Apparel business.
2. Describe the Fashion marketing and merchandising process.
3. Describe product development and Sourcing Strategies
4. Describe various documents for exports.

Course Contents

Unit I	Organization of the Apparel Business	06 Hours

Introduction to apparel industry – Different types of organization structure.
The Garment manufacturing process: Apparel production process flow, order booking, pre-production meeting, production planning and control, cutting, sewing, finishing, quality control, printing process, embroidery process, sub-contracting work.
Various departments of garment unit: Marketing, designing, merchandising, patternmaking, sampling, fabric & trim store, testing, cutting, sewing, finishing, IE, maintenance, quality control, account, HR, EDP.

Unit II	Marketing	06 Hours

Definition, steps involved in marketing, Marketing evolution, selling vs marketing, marketing environment, marketing research, marketing objectives and Strategies, marketing mix, fashion marketing planning.

Unit III	Product Development	06 Hours

Different types of samples, sample approval procedure, sample review, pilot run, merchandiser's role in product development, pre-production activities and its importance purchase order, Bill of material, pricing terminologies (FOB, CMT).

Unit IV	Merchandising	06 Hours
Introduction to fashion merchandising and its process, roles and responsibilities of merchandiser in different organizations, categories of apparel merchandising, Buying cycles and tools of merchandising – buying cycle, time and action calender, range planning, critical path, Costing techniques and Spec Sheets. Visual Merchandising.		
Unit V	**Sourcing**	**06 Hours**
Need for sourcing, Resource Planning – Global Sourcing Strategies, Supply Chain and demand chain analysis, Supply chain management and its importance. JIT technology. Buying house –Its function and role in garment industry.		
Unit VI	**Export Documentation**	**06 Hours**
Various types of export documents, Pre-shipment Post -shipment documentation, Terms of sale, payment, shipment etc. Export incentives: Duty drawback, DEPB, I / E license - exchange control regulation – (FEMA) foreign exchange management acts - export management risk - export finance. Various terms, WTO / GATT / MFA - Functions and objectives, success and failures.		

References Books:

1. Marketing Management by Philip Kotler. 15th edition Pearson Education. ISBN: 978-9332557185
2. Cooklin's Garment Technology for Fashion Designers, 2nd Edition by Gerry
3. Cooklin, Steven Hayes, John McLoughlin, Dorothy Fairclough, Blackwell
4. Publications, ISBN: 978-1-4051-9974-2
5. Garment Manufacturing: Processes, Practices and Technology by Prasanta Sarkar, Online Clothing Study. ISBN: 978-9383701759
6. Fashion Buying by Elaine Stone. McGraw-Hill In publication ISBN: 978- 0070617469
7. Apparel Merchandising by kumar . Abhishek Publications, ISBN: 9788182473010
8. Fashion Marketing by Mike Easey . john Wiley & Sons publication. ISBN: 978-0632034598

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMD469: PROJECT PHASE-II

Teaching Scheme:	Credits	Evaluation Scheme:
Tutorial: 05 Hrs/Week	05	CIE: 50 Marks SEE: 50 Marks

Course Objectives:

1. To guide the students in their experiment work as per the plan of work.
2. To teach various tools of testing and analyze the test results.
3. To get the report prepared in the form of thesis as per the prescribed format.
4. To encourage them to work in group.

Course Outcomes:

At the end of the course, students will be able to

1. Carry the experiment work as per the plan of work.
2. Use various tools of testing and analyze the test results.
3. Write the thesis as per the prescribed format.
4. Work in a group.

Course Contents

Experimentation work

Students should start their experimental work as per the approved plan of work in consultation with Guide.

Progress Evaluation

Dissertation committee evaluates the progress in project and confirm the work as per the approved plan of work.as per the standard format.

Report Writing

After completion of work, students should prepare the report as per the standard format and guidelines in consultation with guide.

Submission of Final Report

Two bound copies of the report duly signed by Project Guide, Head of The Department and Principal along with a soft copy in the form of a CD should be submitted to Dissertation committee.

Continuous Internal Evaluation (CIE)

Term work marks will be allotted by continuous monitoring of the progress in the work and submission of final report.

Semester End Evaluation (SEE)

Students have to present their work in front of Internal and External examiner. Examiners assess the project work and allocate the marks.

Submission

1. Two hard bound copies of final thesis duly signed by all the team members, Guide, HOD, and Director along with one soft copy.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMD470: INTERNSHIP-II

Teaching Scheme:	Credits	Evaluation Scheme:
Training Period four weeks during Winter vacation	03	CIE: 50 Marks SEE: -- Marks Total: 50 Marks

Course Objectives:

1. To expose the students to the industrial practice, environment its work culture and industrial practices.
2. To expose the students to machineries, processes and modern tools used in industries.
3. To develop understanding of techniques like Production Planning, Quality Assurance, Maintenance practices, Environment and Pollution Control, Management Information System.
4. To provide hands-on training on machineries and equipments.

Course Outcomes:

At the end of the course, students will be able to

1. Understand the industrial, environment, work culture and industrial practices.
2. Understand the machineries, processes and modern tools used in industries.
3. Reproduce the techniques like Production Planning, Quality Assurance, Students will be able to maintenance practices, Environment and Pollution Control, Management Information System.
4. Acquire skills and techniques to work in industries.

Course Contents

Unit I **Training**

Training in Spinning, Weaving, Knitting, Machinery Manufacturing, Yarn, Fabric, Garment Chemical Processing, Machinery Manufacturing, Erection and Commissioning, Garment Manufacturing, Synthetics Fibre and Yarn Manufacturing, Technical Textiles, Non-Wovens, R & D Lab, Marketing etc. for study of:

Process Flow Chart, Visit to various departments and study of machineries, Important adjustments and settings, Speed of Important Parts, Modern Developments in machines/process, Chemicals, Dyes used for carrying out various process, Process parameters and effect on quality of product, Actual Production and Efficiency, Production Planning and Control, Maintenance Practices, Maintenance tools and gauges, Maintenance schedule, Study of lubrications, Process Control and Quality Control activities, Roles and responsibilities of various categories of workers/technical staffs, Labour allocation, Lay-out of the unit.

Unit II **Special Studies**

Management information systems, Waste study, Costing, Production planning and control, Target achievement, Information regarding humidification plant, Utility, Electrical supply, Store, purchase, Marketing, Sales, Samples, Lay-out of Plant.

Unit III	Project	
Objectives, Procedures, Observations, Analysis and conclusion of the project carried out.		
References Books:		
Specific guideline points given in Daily Diary.		

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMP471: PROCESS MANAGEMENT IN YARN FORMING
LAB

Teaching Scheme:	Credits	Evaluation Scheme:
Practical: 02 Hrs /Week	01	CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Testing of various cotton samples & their suitability for various counts, Setting up of standards for given cotton to process carded & combed counts.
2	To study effects of various parameters on transfer efficiency of card.
3	To study the card cleaning efficiency, waste percentage and nep removal efficiency.
4	To study influence of number of draw frame passages on fibre orientation in sliver.
5	To study Influence of step gauge setting on sliver quality.
6	To study effect of coil spacing at speed frame on stretch in roving & effect on U%.
7	To study break draft at speed frame & its effect on roving quality.
8	To study effect of break draft at ring frame on yarn quality.
9	To study the effect of ring traveller on ring yarn quality.
10	To study the effect of ring frame spacer on ring yarn quality.
11	Mill visit – To observe idle spindle, end breaks & material channeling.
12	Mill visit – To evaluate blow room cleaning, waste Noil % & Soft waste.

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Final Year B. Tech. Man Made Textile Technology (Semester – VIII)
TMP472: PROCESS MANAGEMENT IN FABRIC FORMING LAB

Teaching Scheme:	Credits	Evaluation Scheme:
Practical: 02 Hrs /Week	1.0	CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	To determine the end breakage rate of warping machine in the visiting unit.
2	To study the effect of machine speed and squeezing pressure on sized yarn properties.
3	To prepare beam on the sample warping machine.
4	To weave fabric of various weaves on sample weaving.
5	To determine the % loss of efficiency for probable reasons through snap study in the visiting weaving unit.
6	To find cost per meter for the given woven fabric considering all elements of the cost in the small scale manufacturing unit.
7	To find cost per meter for the given knitted fabric considering all elements of the cost in the small scale manufacturing unit.
8	Design preparation on CAD software for Electronic Jacquard
9	Inspection of fabric defects and determination of the packing percent of the given Fabric length in the visiting unit.
10	Study of control panel of Dornier rigid rapier machine.
11	Fabric Analysis 2 samples.
12	Fabric Analysis 2 samples.

Submission – Completed Journal.