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

DEPARTMENT: TEXTILES

CURRICULUM B. Tech. Textile Technology Program

> **Final Year** With Effect From 2019 - 2020



Promoting Excellence in Teaching Learning & Research

Final Year B. Tech Textile Technology Semester-I

				Teaching Scheme				
Sr. No.	Course Code	Name of the Course	Group	Theory Hrs/ Week	Tutorial / Project Hrs/ Week	Practical Hrs/ Week	Total	Credits
1	TTL401	TEXTILE MILL PLANNING AND ORGANISATION	С	3			3	3
2	TTL402	YARN & FABRIC SCIENCE	D	3			3	3
3	TTL403	UTILITY ENGINEERING IN TEXTILES	В	4			4	4
4	TTLEL1	ELECTIVE-I	С	3			3	3
5	TTLEL2	ELECTIVE-II	D	3			3	3
6	TTP410	TEXTILE MILL PLANNING AND ORGANISATION	С		1		1	1
7	TTD411	PROJECT PHASE - I	F		4		4	4
8	TTP412	YARN & FABRIC SCIENCE	D			2	2	1
Total			16	5	2	23	22	

Group Details -

- B: Engineering Science
- C: Humanities Social Science & Management
- D: Professional Core Courses & Professional
- E: Free Elective
- E: Free Elective
- F: Seminar/Training/Project

List of Elective-I

TTL404	Textile Mill Management
TTL405	Import Export Management
TTL406	Entrepreneurship Development

List of Elective-II

TTL407	Garment Technology
TTL408	Nonwoven Technology
TTL409	Maintenance of Textile Machines

Final Year B. Tech. Semester – VII TTL401 : TEXTILE MILL PLANNING AND ORGANISATION

Teaching Scheme			
Lectures	3 Hrs. / Week		
Total Credits	3		

Evaluation Scheme			
SE	25		
ТА	15		
SEE	60		
Total	100		

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 equipments used in textile industry and labour complement details

Course Contents

Hrs.

Unit 1. Project Planning - Introduction, Capital investment required for project, 6
 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 2. Techno-economic Viability - 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 3. Site Selection - Selection of site for textile mills, General location, Actual 6 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 4. Plant & Machinery Layout Significance of the concept, objectives and 6 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 5. Machinery Specification, Selection & Calculation for No. of Machines 6 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 6. Materials Handling - Definition and importance of materials handling, 6 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.

- 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.

Final Year B. Tech. Semester-VII

TTL402: YARN & FABRIC SCIENCE

Teaching Scheme		
Lectures	3 Hrs. /Week	
Total Credits	3	

Evaluation Scheme		
SE	25	
ТА	15	
SEE	60	
Total	100	

Course Objectives

- 1. To discuss geometry of different yarn structures.
- 2. To study mechanical properties of yarn.
- 3. To discuss comfort and aesthetic 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.
- Demonstrate aspects of comfort and aesthetic in relation to various fabric properties.
- 4. Explain relation between fabric structural parameters in relation to serviceability.

Unit

Course Contents

Hrs.

No.

Geometry of Twisted Yarns

Geometry of twisted yarns, idealized helical geometry, twist contraction, twist

1 and packing of fibers in yarns, idealized packing and packing in actual yarn, 04 concentrating and deviating features of actual yarn, specific volume and packing fraction,

Fiber Arrangement in Twisted Yarns

2 Fiber migration– Ideal migration, Characterization of migration behavior, Factors 04 affecting migration of man-made fibers in the yarn, tension variation as a mechanism of migration, frequency and order of migration.

Tensile Behavior of Actual Yarns

3 Ir

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

Comfort Properties of Textile Structures

a) Air Permeability

Nomenclature, Measurement, Factors affecting Air Permeability of Fabrics, significance of air permeability of fabrics

b) Compressional Resilience

Nomenclature, compressional resilience properties of textile structures, factors contributing compressional resilience, Methods of measurement.

4 c) Thermal Transmission Properties of Textile Structures

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Nomenclature, Definitions of terms –thermal properties- thermal insulation, cold feel, chillproofness, Factors affecting thermal properties, Methods of measuring thermal properties

d) Moisture Transmission

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

Aesthetic and Tactile Comfort

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

5 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

c) Luster

Subjective aspects of luster, Physics of light reflection in luster, Measurement of

Luster, effect of fabric construction on luster

Serviceability, Wear & Abrasion

6 Nomenclature, serviceability, wear & abrasion, Mechanics of abrasion, Influence 05 of fabric/yarn/fiber structural parameters on abrasion resistance of fabric

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

Final Year B.Tech. Semester- VII TTL403: UTILITY ENGINEERING IN TEXTILES

Teaching Scheme			
Lectures	4 Hrs. / Week		
Total Credits	4		

Evaluation Scheme			
SE	25		
TA	15		
SEE	60		
Total	100		

Course Objectives

- 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.

- 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.
- 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.
- 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

Hrs.

Unit 1. a) Need for humidification in Textile Mills- Effect of temperature & 10 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 2. a) Humidification plant design: Considerations for a humidification 8 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 3. Pumps, Compressors and Fans used in Textile Industry:-

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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 4. a) Drives Used on Textile machines:-

Selection of drives, AC and DC motors, starters, losses, efficiency, speed control, of AC and DC motors, vector control, soft starters, inverters for speed control, factors affecting energy consumption in induction motors.

Design features of energy efficient motors, motor capacity calculation for Air compressors, blowers, pumps, hydraulic systems. Motors used in textile industry, operation of compressor and its power consumption and tips.

Unit 5. a) Energy Management:- Electrical power required in Textile mills. 8 Maximum demand, Average demand, Power factor, Load factor, Calculation related to energy requirement. Methods of power measurement, introduction to power analyzer and tariff. Control of maximum demand for saving. Power factor control for saving. Load factor and saving. Receiving and Distribution of Power in Textiles
b) Power Quality Improvement: Concept of power quality, harmonics & methods of harmonics elimination, Concept of power triangle, active power, apparent and reactive power, various modern methods of improving power factor and its importance in industries.

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Unit 6. a) Electricity Transmission & its application - High Tension 6 substation Transformers, Capacitors, Switch yard, Panels, etc. Types of cables-sizes andcalculations. Methods of Power distribution in the department. Methods of procuring 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, calculation of techno-economic viability. Energy Audit -Principle, energy measurement and energy conservation. Recent developments in energy efficient equipments. Harmonics in supply. Concept of power quality. Concept of payback and investment in the corrective action taken after auditing. Scope for energy audit in various dept. in text. Industry.

b) Unconventional energy sources – solar energy, solar photovoltaic cell, wind energy, Tidal energy, bio-energy, fuel cell.

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

Final Year B. Tech. Semester – VII TTLEL1- TTL404: TEXTILE MILL MANAGEMENT (ELECTIVE-I)

Teaching Scheme			
Lectures	3 Hrs. / Week		
Total Credits	3		

Evaluation Scheme			
SE	25		
ТА	15		
SEE	60		
Total	100		

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. Understand significance of functions of management
- 2. Understand and Apply the leadership, controlling and costing system in organization
- 3. Understand thoroughly concept of organizing and staffing.
- 4. Know the marketing techniques for selling the product and services of organization

	Course Contents	Hrs.
Unit 1.	Management	6
	Nature, Importance, Elements, Levels of Management, Fundamental Managerial Skills, Functions of Management – Henry Fayol's Principles of Management - Social responsibilities a Manager	
Unit 2.	Planning & Organizing	6
	The Nature, Characteristics & Process of Planning – Forms of Planning, The Nature, Importance& Steps involved in the process of organizing	
Unit 3.	Staffing & Leadership	7
	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 4.	Communication & Controlling	6
	Meaning, communication process, effective communication. Meaning, Concept, Definitions, Steps in control process, Techniques and Types of control, Requirements of an effective control system.	

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- Unit 5. Financial Management 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.
- Unit 6. Marketing Evolution of marketing, Nature of Marketing, Core 7 concepts of marketing – Marketing Mix, Product Life Cycle, Meaning, Scope, Limitations of Marketing Research - Marketing Research Procedure – Types & Techniques.

- 1 Essential of Management by Harold Koontz & Heinz, Weihrich Tata McGraw-Hill Publishing Company Ltd., New Delhi.
- 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.
- 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 Enterpreneurial Development by S.S. Khanta , S. chand & Company Ltd., Delhi 110 055.
- 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.

Final Year B. Tech. Semester – VII TTLEL1- TTL405: IMPORT EXPORT MANAGEMENT (ELECTIVE-I)

Teaching Scheme			
Lectures 3 Hrs. / Week			
Total Credits	3		

Evaluation Scheme			
SE	25		
ТА	15		
SEE 60			
Total	100		

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

Hrs.

- Unit 1. Introduction to international trade: Introduction, trade policy, foreign trade, simplification of documentation, The emerging global scenario-The 6 business of international trade- Trade barriers- Foreign exchange-Exchange rate determination (Spot & forward), the euro dollar market-WTO- Trade liberalization
- Unit 2. International marketing: Introduction- International marketing channels-Market selection and market profiling-Product strategies- Promotion Strategies-Export Pricing-Export finance- Export risk insurance-Export
 7 packaging and labeling- Quality control and pre-shipment inspection
- Unit 3. Foreign trade: Foreign trade control and-Exim policy-Export Promotions-Export procedures and documents- Major problem of India's 5 export sector
- **Unit 4. Export Preliminaries**: Introduction, Establishment a business firm, importer exporter code number, Alignment documentation system, 5 commercial documents, Regulatory documents.
- Unit 5. Foreign Trade Documents: 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 8 Hypothecation – Bank Certificate For Payment – Document Relating To Inspection – Certificate Of Inspection – Gsp And Other Forms

Unit 6. Shipment and Customs: Pre-Shipment Inspection and Quality Control

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

- 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.

Final Year B. Tech. Semester – VII TTLEL1- TTL406: ENTREPRENEURSHIP DEVELOPMENT (ELECTIVE-I)

Teaching Scheme			
Lectures 3 Hrs. / Week			
Total Credits	3		

Evaluation SchemeSE25TA15SEE60Total100

Course Objectives

- 1. To know and understand important concepts related to entrepreneurship.
- 2. To identify environmental factors affecting entrepreneur and project appraisal techniques.
- 3. To make students understand the policy framework in India for entrepreneurship development.
- 4. To know and understand the social entrepreneurship concept.

Course Outcomes

At the end of the course students will be able to

- 1. Understand the significance of entrepreneurship in any economy with business opportunity identification.
- 2. Understand the environmental factors affecting entrepreneur and project appraisal techniques.
- 3. Understand various schemes and institutions promoting entrepreneurship in India.
- 4. Understand the social entrepreneurship concept.

Course Contents

Unit 1. Entrepreneurship Perspectives

- Concepts of entrepreneur, entrepreneurship and start-ups. Importance and Characteristics of entrepreneurs, Types of entrepreneurs, Entrepreneur Vs Manager, Entrepreneur Vs. Intrapreneur. Benefits and potential risks of entrepreneurship, Factors affecting growth of Entrepreneurship in India, Role of Entrepreneurship in Economic Development.
- **Unit 2.** Business Opportunity Identification Business ideas, methods of generating ideas, and opportunity

Hrs. 7

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recognition, Meaning and significance of a business plan, components of a business plan, and feasibility study.

- **Unit 3.** Environment and Entrepreneurship Environment factors affecting entrepreneurship, institutional finance and Entrepreneurship. Local mobility of entrepreneurs Unit
- Unit 4. Project Appraisal Project Appraisal techniques, economic, Steps Analysis, Financial Analysis; Market Analysis, Technical Feasibility.
- Unit 5. Institutions Supporting Entrepreneurs Central level Institutions: 6
 NABARD; SIDBI, NIC, KVIC; SIDIO; NSIC Ltd; etc. state level
 Institutions –DICs- SFC- SSIDC- Other financial assistance.
- Unit 6. Social Entrepreneurship Need, Types, characteristics and benefits 7 of social enterprises/social entrepreneurship. Rural entrepreneurship: Need and problems of rural entrepreneurship, challenges and opportunities. Women entrepreneurship: Role of government.

- 1 Vasant Desai (2010), "The Dynamics of Entrepreneurship Development and Management", Sixth edition, Himalaya Publishing House.
- S.Anil Kumar, S.C. Poornima, Mini.K.Abraham and K.Jayashree (2003),
 "Entrepreneurship Development", First Edition, New Age International Publishers.
- 3 Dr. S.S. Khanka (2013), "Entrepreneurial Development", Revised Edition, S. Chand and Company Ltd.
- 4 Ashish Gupta (2010), "Indian Entrepreneurial Culture", First Edition, New Age International Publishers.
- 5 Peter F. Drucker, Innovation and Entrepreneurship.
- 6 A.Sahay, M. S. Chhikara, New Vistas of Entrepreneurship: Challenges & Opportunities.
- 7 Poornima M.CH., Entrepreneurship Development –Small Business Enterprises, Pearson, Delhi,2009.

Final Year B. Tech. Semester – VII

TTLEL2- TTL407: GARMENT TECHNOLOGY (ELECTIVE-II)

Teaching Scheme		Evaluation Scheme		
Lectures	3 Hrs. / Week		SE	25
Total Credits	3		ТА	15
			SEE	60
			Total	100

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 its types.
- 4. Discuss the applications of CAD-CAM in apparel industry.

Course Contents

- **Unit 1.** The Garment Industry: Structure of the garment Industry, sectors of 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 2. Basic Pattern Making: Measurement Taking Size chart and 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 3.** Manufacturing Technology: Types of Fabric Packages, 10 Spreading, Marker preparation and its planning, Types and functions of cutting machine, preparation for sewing processes, Sewing

Hrs. 6

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 4.** Fusing Technology: Concerned factors, fusing process, Fusing 4 machinery, quality control. Pressing Technology: Purpose, categories, means and equipment's
- Unit 5. Garment Finishing and Inspection: 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 6. Production Technology: Manual systems, making through, section 6 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.

- 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 Bowers, Manetta Knttunen — The Macmillan co New York
- 5 Garment Technology by Dr. V.Subramaniam Winter School booklets 1990
- 6 BIS publications 1989.

Final Year B. Tech. Semester – VII TTLEL2- TTL408: NONWOVEN TECHNOLOGY (ELECTIVE-II)

Teaching Scheme			
Lectures 3 Hrs. / Week			
Total Credits	3		

Evaluation Scheme			
SE	25		
ТА	15		
SEE 60			
Total 100			

Course Objectives

- 1. To understand the concept of Nonwoven Textiles
- 2. To define Nonwovens and Understand Basics
- 3. To classify Nonwovens
- 4. To analyze and identify the Nonwoven products and to apply knowledge of Nonwovens in testing and product development.

Course Outcomes

At the end of the course students will be able to

- 1. Describe the logic and processes involved in Nonwovens.
- 2. Classify the Nonwovens.
- 3. Prepare technical data sheet of each sector of Nonwovens and Compile the fibres used, technology applied in manufacturing of Nonwovens.
- 4. Evaluate the performance of Nonwovens with different Indian and International standards.

Course Contents

- **Unit 1.** Historical background of nonwovens, non woven definition, stages in 4 Non-woven manufacturing. Web Forming Techniques: carding, air laid, wet process, polymer extrusion.
- Unit 2. Classification of nonwoven On the basis of use, on the basis of 4 manufacturing process, on the basis of web formation, on the basis of bonding.
- Unit 3. Dry laid webs fibre selection, fibre preparation, web formation, 8 layering, Wet laid nonwoven Raw materials, production process, special features of the wet laid process and its product. Spun laced webs.
- **Unit 4. Mechanically bonded webs** needle punched nonwovens, 8 Application of needle punching, stitch bonded nonwovens, applications.

Hrs.

Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications.

- Unit 5. Thermally bonded nonwovens binder, binding fibres, binding 8 powder, binding webs, methods of thermal bonding Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding. Melt blown nonwovens
- **Unit 6.** Chemically bonded nonwoven Latex binder, other types of 4 nonwoven binders, formulation, order of formulation, bonding technology. Application of chemical bonded nonwovens.

- Handbook of Nonwovens
 1st Edition By: S Russell, Woodhead Publishing 2007
- 2 Nonwoven Process Performance & Testing Turbak
- 3 Nonwovens Technology Market & Product Potential, Proceedings of the Seminar IIT New Delhi,2007
- 4 NPTEL on Nonwoven Technology
- 5 Nonwovens: Monogram by BTRA
- 6 Nonwovens BY DR.P.K. Bannerjee

Final Year B.Tech. Semester- VII TTLEL2- TTL409 : MAINTENANCE OF TEXTILE MACHINES (ELECTIVE-II)

Teaching Scheme			
Lectures 3 Hrs. / Week			
Total Credits	3		

Evaluation Scheme			
SE 25			
ТА	15		
SEE 60			
Total 100			

Course Objectives

- 1. To teach need of maintenance, its functions, types & scheduling.
- 2. To elaborate maintenance practices in Spinning preparatory & Spinning processes.
- 3. To describe maintenance practices in Weaving preparatory & Weaving processes.
- 4. To explain concepts and procedure of maintenance audit, SQC

synchronization & recording of maintenance activities.

Course Outcomes

At the end of the course students will be able to

- 1. Understand and explain need of maintenance, its functions, types & scheduling
- 2. explain & use maintenance practices in Spinning preparatory & Spinning processes
- 3. explain & use maintenance practices in Weaving preparatory & Weaving processes
- 4. explain concepts of maintenance audit, SQC synchronization & recording of maintenance activities

Course Contents

- Unit 1. a) Maintenance concept, importance, objectives of maintenance, Breakdown & planned maintenance subclassification of planned maintenance, Procedure for planning, schedules for preventive maintenance.
 - b) Maintenance of spinning preparatory machines schedules, staff, precautions & methods to be followed during maintenance activities, tools & gauges used for maintenance.
- Unit 2. a) Maintenance of Ringframe & Compact Spinning Mechanisms
 8 schedules, staff, precautions & methods to be followed, Tools & gauges used, Maintenance of Rotor Spinning Machines Schedules, Precautions, Methods etc.
 - b) Study of aprons & cots used in spinning & their maintenance

Hrs.

8

- Unit 3. a) Machine audit concept and auditing of spinning machines. Energy 5 conservation in spinning
 - SQC synchronization with maintenance SQC activities useful for maintenance in various departments of spinning.
- Unit 4. a) Maintenance of weaving preparatory machines, schedules, 8 critical points of maintenance, precautions to be taken during maintenance operations for Winding, Warping, & Sizing machines.
 - b) Maintenance of plain & automatic loom Schedules, critical points, precautions, mechanism wise auditing of plain & automatic looms.
- Unit 5. a) Maintenance of shuttleless weaving machines Approach 5 towards maintenance of latest weaving machines, Critical maintenance points of various shuttleless weaving machines like projectile, rapier, air jet.
- **Unit 6.** c) Recording of maintenance activities & its importance.
 - **d)** Introduction to logic & approach of maintenance of chemical processing machines.

Reference Books

- 1. Maintenance manuals by BTRA for various spinning & weaving machines.
- 2. BTRA monograph series.
- 3. Spinning machinery maintenance by SITRA
- 4. Maintenance manuals of different machinery manufacturers of spinning & weaving machines.
- 5. Modern approach to maintenance in spinning, Woodhead publication.

3

Final Year B. Tech. Semester – VII TTP410: TEXTILE MILL PLANNING AND ORGANISATION

Teaching Scheme			
Tutorial 1 Hrs. / Week			
Total Credits	1		

Evaluation Scheme			
CIE 50			
Total	50		

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

Final Year B. Tech Semester- VII TTD411: PROJECT PHASE – I

Teaching Scheme]	Evaluation	n Scheme
Project Hours 4 Hrs. /Week			CIE	50
Total Credits	4		Total	50

Course Objective

- 1 To identify the problem /idea and review and summarize the literature for the topic of the identified problem
- 2 To describe the process for undertaking the research.
- 3 To explain various tools of testing and analysis for the data in order to draw relevant conclusions.
- 4 To demonstrate effective communication skills and team work.

Course Outcomes - Students will be able to

- 1 Able to identify the problem /idea and review and summarize the literature for the topic of the identified problem
- 2 Able to formulate and design suitable experimental plan.
- 3 Able to understand and use various tools of testing and analysis for the data in order to draw relevant conclusions.
- 4 Able to communicate effectively as a member of team

Guidelines for Project Phase-I

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.

Final Year B. Tech. Semester- VII TTP412: YARN & FABRIC SCIENCE LAB

Teaching Scheme		
Practical	2 Hrs. /Week	
Total Credits	1	

Evaluation Scheme		
CIE	50	
SEE	50	
Total 100		

List of Experiments

- 1. To estimate the fibre migration in twisted yarn.
- 2. To determine wickability of fabrics.
- 3. To determine stretchaility of fabrics.
- 4. Estimation of fabric wear performance by using universal wear tester.
- 5. To estimate crease recovery of different fabrics.
- To compare thermal insulation behavior of staple yarn & filament yarn, woven
- 6. fabric.
- 7. To estimate the water proofing ability of fabric by water head tester.
 - To study the bending behavior for filament & staple yarn fabric by cyclic bending
- 8. tester.
- 9. To determine air permeability of different fabrics.
- 10. Estimation of Fabric Wear performance by using Universal Wear Tester.

Submission

1. Completed Journal

Final Year B. Tech Textile Technology Semester-II

				Teaching Scheme				
Sr. No.	Course Code	Name of the Course	Grou p	Theory Hrs/ Week	Tutorial / Project Hrs/ Week	Practical Hrs/ Week	Total	Credits
1	TTL413	PROCESS MANAGEMENT IN YARN FORMING	С	3			3	3
2	TTL414	PROCESS MANAGEMENT IN FABRIC FORMING	С	3			3	3
3	TTLEL3	ELECTIVE -III	D	3			3	3
4	TTLEL4	ELECTIVE -IV	D	3			3	3
5	TTP421	PROCESS MANAGEMENT IN YARN FORMING LAB	С			3	3	1.5
6	TTP422	PROCESS MANAGEMENT IN FABRIC FORMING LAB	С			3	3	1.5
7	TTD423	PROJECT PHASE -II	F		8		8	8
8	TTD424	INTERNSHIP-II**	F					3
		Total		12	8	6	26	26

Group Details -

- A: Basic Science
- B: Engineering Science
- C: Humanities Social Science & Management
- D: Professional Core Courses & Professional Elective
- E: Free Elective
- F: Seminar/Training/Project

List of Elective-III

TTL415	Technical Textiles
TTL416	Manufacturing of Special Fabrics
TTL417	Energy Management

List of Elective-IV

TTL418	Textile Product Engineering
TTL419	Maintenance Management
TTL420	Merchandizing

Final Year B. Tech. Semester – VIII TTL413: PROCESS MANAGEMENT IN YARN FORMING

Teaching Scheme		
Lectures	3Hrs. / Week	
Total Credits	3	

Evaluation Scheme		
SE	25	
ТА	15	
SEE	60	
Total	100	

Course Objectives

- 1. Explain the principals of process management, concepts of total quality management and ISO 9000 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 role of machine technology and parameters on product quality.
- 2. Understand the principles of process management and quality management.
- 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.

Unit 1.	Course Contents a) Introduction to process management –	Hrs. 2
	Meaning of process management, various phases of process management like planning, organizing, linking of customer feedback and process management, cycle of process management.	2
	b) The Cost of Quality –	
	Definition, three views of quality costs, measuring quality costs, use of quality cost, information, accounting systems, and activity based costing.	2

c) Concepts of ISO -

Concepts of ISO 9000 series, other quality systems, implementation,

documentation, post certification, ISO / QS 9000 elements, internal auditing.

a) Total Quality Management (TQM) – Fundamental concepts of 3 Unit 2. TQM, Basic approach, quality & business performance service quality versus product quality, obstacles. b) Customer focus & satisfaction -2 Customer perception of quality, process versus customer, feedback, service quality customer relation & profitability, buyer supplier relationship, supplier partnership, continuous process improvement 1 c) Production Costing and Parameters influencing the production cost Unit 3. a) Raw material management -Importance, need of instrumental evaluation, traditional 2 methods of cotton selection, importance of cost in raw material, use of linear programming for mixing, bale management, yarn engineering. 2 b) Yarn Realization -Importance, estimation process, norms for various varns like 3 cotton, blended etc., analysis of yarn realization from mills. c) Process management in blow room & card -Blow room & card as integrated system, control of waste, cleaning efficiency, neps& fibre rupture, contamination control, selection of proper sequence process and its parameters. a) Process management at Comber preparatory & combing -Unit 4. Significance & importance of good lap for comber, evaluation 3 of comber performance, fractionating efficiency of comber, comber waste analysis, influence of various factors on combing performance. 3 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 1 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 stretch in roving and its control at speed frame. Unit 5. Process management in Ring Spinning – a) Influence of various machine and material parameters on yarn 1 quality. b) Control of yarn count and strength, within and between bobbin 3 variation, Control of yarn evenness and imperfections, Types of yarn irregularities, measurement causes and assessment. Control of yarn

2

2

1

2

Hairiness- measurement, role played by fibre properties and process parameters.

d) End breaks in spinning –Importance, assessment and controls

e) Control of Yarn and package faults -

Influence of fibre properties, machine parameters on classimat faults, control of faults. Study and control of faults like slubs, crackers, spinners double bad piecing, double gaiting, slough off, hard/soft packages etc.

Unit 6. a) Role of maintenance in product quality -

Specific maintenance activities from blow room to ring spinning which directly reflect on yarn quality. Total productive maintenance.

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

c) Productivity –

Importance, definition of indices of productivity, analysis & shortfall in productivity, productivity indices, standards, means to improve productivity, productivity of different sections in spinning, comparison & reasons for losses.

- 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. Salhotr, ATIRA Publications.
- 5 Process Management in Spinning by R.Senthil Kumar
- 6 ISO 9000 Meeting the new international standards by Perry L. Johnson McGraw Hill Inc.Uster Statistics

Final Year B. Tech. Semester- VIII TTL414: PROCESS MANAGEMENT IN FABRIC FORMING

Teaching Scheme		
Lectures	3 Hrs. / Week	
Total Credits	3	

Evaluation Scheme		
SE	25	
ТА	15	
SEE	60	
Total	100	

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 production

Unit 1.	Course Contents 1) Introduction to process management:	Hrs. 3
	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 2.	Quality and production management in winding:	7
	Control of splice quality Yarn clearing – Yarn fault classification, Yarn fault classification system,	
Unit 3.	Assessment of clearing performance Control of Unwinding and winding tension, Control of Package quality Process management in warping:	5
	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 4. Process management in sizing:

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 5. Process management in weaving for productivity

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 6. Process management in weaving for quality

6

7

8

Causes and remedies for fabric defects. Manual and automatic fabric inspection methods, various point grading systems

- 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

Final Year B. Tech. Semester – VIII TTLEL3- TTL415: TECHNICAL TEXTILES (ELECTIVE-III)

Teaching Scheme		
Lectures	3 Hrs. / Week	
Total Credits	3	

Evaluation Scheme		
SE	25	
ТА	15	
SEE	60	
Total 100		

Course Objectives

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

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 1. Introduction Definition and scope of Technical Textiles 04
 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 2. Filtration Application Introduction –Fabric construction & 08
 Finishing Treatments, Solid-liquid separation, liquid liquid filtration, liquid-gas separation, Mechanism of filtration.

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

Unit 3.Textiles in Transportation – Introduction, Textiles in passenger08cars – Textiles in other road vehicles – Rail applications – Textiles

Hrs.

in Air crafts – Marine application.

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

Unit 4. Heat and Flame Protection - Flammability, thermal characteristics 08 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 5. Fibre Reinforced Composites (FRC) – Introduction to composite 06 materials –Types- functions of Fibre and Matrix- Mechanics-Applications of composites.

Miscellaneous Applications – Electrical insulation – Battery separators –synthetic turf and sports application – sound insulation –power transmission, parachute textiles, ropes, cordage and twines.

Narrow fabric production methods – Applications in technical textiles.

Unit 6. Coating & Lamination - Introduction – difference - materials for 02 coating – Substrate for coating – Coating methods - Fusible interlinings – physical properties of coated fabrics – Advantages and Applications..

- 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, <u>https://nptel.ac.in</u>
- 6 Automotive Textiles by Warner Fung

Final Year B. Tech. Semester- VIII TTLEL3- TTL416: MANUFACTURING OF SPECIAL FABRICS (ELECTIVE-III)

Teaching Scheme		
Lectures	3 Hrs./ Week	
Total Credits	3	

Evaluation Scheme	
SE	25
ТА	15
SEE	60
Total	100

Course Objectives

- 1. To explain denim fabric and worsted fabric manufacturing
- 2. To explain Home textile and carpet fabric manufacturing
- 3. To explain terry fabric, narrow fabric, tyre cord and net fabrics
- 4. To explain various industrial fabrics manufacturing used for sports, automobile, canvas and coated fabrics

Course Outcomes

At the end of the course students will be able to

- 1. Explain denim fabric and worsted fabric manufacturing
- 2. Explain Home textile and carpet fabric manufacturing
- 3. Explain terry fabric, narrow fabric, tyre cord and net fabrics
- 4. Explain various industrial fabrics manufacturing used for sports, automobile, canvas and coated fabrics technology

	Course Contents	Hrs.
Unit 1.	a) Denim Fabric - Introduction to denim, history of denim	07
	manufacturing, yarn properties required, spinning of yarn for denim	
	fabric manufacturing, weaving preparatory, dyeing and sizing	
	concept, weaving machine suitable for denim manufacturing,	
	modifications required in weaving process, wet processing of denim,	
	special treatments used	
	b) Worsted Suiting Fabric - Yarn quality required, spinning of	
	worsted yarn in brief, preparation and weaving of worsted yarns,	

weaving machines requirement and modifications. wet processing

and special treatments requirements

Unit 2. a) Home Textiles - Definition, applications

i) Bed sheet - required qualities, sizes of different bed sheets, woven and printed bed sheets manufacturing processes, quality parameters of yarn used, preparatory and weaving processes, weaving machine parameters and its selection, wet processes and finishing of bed sheets

ii) Curtains - Curtains and blinds, Basic requirements, quality requirements, types of fabric with respect to woven and knitting, quality parameters of yarn used, preparatory and weaving processes, weaving machine parameters and its selection, wet processes and finishing of curtain fabric. Knitted curtain manufacturing

b) **Carpet Manufacturing** - Introduction, applications, construction, types of piles – woven and non woven, woven – Wilton, patterned, plain, cord, Brussels, Axminister, Production of carpet worldwide, Moquette woven carpet, embroidered carpet, Tufted, cut pile, loop pile, Nonwoven Carpets – bonded, electro statically flocked, needle punched. Carpet selection criteria, carpet care

Unit 3. a) Terry Towel Fabric - Introduction, Basic requirements of towel 07 fabric, types of towel fabric, importance of the terry towels, mechanisms of pile formation, terry towel parts, yarn quality requirements, process flow chart, preparatory and weaving of terry fabric, weaving machines specifications, wet processes and finishing of terry fabric, quality control in terry towel manufacturing

b) Narrow Fabric - Definition, applications, properties required, specifications and manufacturing of flexible and rigid tapes, finishing processes involved

Unit 4. a) Sports Fabric - Applications of different fabrics in various sports, 05 fabric specifications for different sportswear and sports accessories, woven and knitted sportswear, statistics of fabric consumption, leading brands available

b) Net Fabric Manufacturing - definition, types of nets, yarn and fabric quality requirements for various applications, manufacturing

06

processes.

Unit 5. a) Automobile Fabric - Applications of different fabrics in 07 automobile, fabric specifications for different applications in automobiles, woven and knitted automobile fabrics, statistics of automobile fabric consumption

b) **Tyre cord fabric -** Basic requirements of tyre, importance of tyre cord fabric, parts of tyre cord, structure of tyre cord, yarn quality requirement, preparation and weaving of tyre cord fabric, fabric quality requirements, machines used and finishing of the fabric

Unit 6 a) Canvas Fabric - Introduction, applications, yarn quality requirements, preparation and weaving machine modifications for canvas fabric preparation, wet process sequence and modifications
 b) Coated and Laminated Fabric - Importance of coating, definitions, applications, coating machines, special polymers for coating of different applications, methods of coating rain wears manufacturing, yarn and fabric quality requirements for rainwear

- 1. Hand book of weaving by Sabit Adanur
- 2. Advances in knitting technology, Edited by K. F. Au
- 3. Woven Fabric Structure : Design and Product Planning, J. Hayavadana
- 4. Wellington Sears Handbook of Industrial Textiles by Sabit Adanur.
- 5. Handbook of Technical Textiles by A.R. Horrocks & S C Anand
- 6. Textiles in Automotive Engineering by W. Fung & M. Hardcastle.
- 7. Coated Textiles Principles and Applications by Dr. A. K. Sen
- 8. <u>www.technicaltextiles.net</u>
- 9. Textile advances in the automotive Industry by R. Shishoo
- 10. Automotive textiles by Textile progress Vol. 29 by S. K. Mukhopadhyay.
- 11. Performance of Home Textiles, 1st Edition , Subrata Das

FinalYear B.Tech.Semester- VIII TTLEL3- TTL417: ENERGY MANAGEMENT (ELECTIVE-III)

Teaching Scheme	
Lectures	3 Hrs. /Week
Total Credits	3

Evaluation Scheme	
TA	15
SE	25
SEE	60
Total	100

Course Objectives

- 1. To explain importance, need, sources of energy required in Textiles.
- 2. To teach methods to measure and calculate power intextile processes.
- 3. To describe methods of conservation of various forms of energy and utilities.
- 4. To explain methods of energy generation, auditing and its conservation.

Course Outcomes

At the end of the course students will be able to

- 1. Describe sources, importance and economics of energy in Textiles.
- 2. Able to audit and calculate energy consumption of machines.
- 3. Understand and select right method to conserve energy in textile machines.
- 4. Able toadopt measures of Conservation of Electrical Energy in Textiles.

Course Contents

Unit 1. Energy - Basic types of energy, Basic energy, Fuels. Calculations related to measurement of electrical & thermal energy. Concept of energy management.

- Unit 2. Various Energy Sources Used in Textile Process Compressed air, steam, fuel, electricity applications in textile processes. Methods of estimation methods of generation of compressed air & steam. Quality requirements of steam & compressed air.
- Unit 3. Electrical Energy Methods of electricity generation, quality of electric supply, leakages, voltage fluctuations, (economic aspects, limitations)
 power transmission, cables etc.
- Unit 4. Energy Generation From Fuels Need of thermal energy in textiles, methods, quality & efficiency of fuels, economics of co-generation, efficient steam generation & utilization.
- Unit 5. Energy Audit Need of energy audit, method & types of energy audits, energy audit performance, and instruments required. Energy

6

Hrs.

consumption of various textile machines.

Unit 6. Conservation of Electrical Energy in Textiles - Methods of energy conservation in various departments of spinning, weaving and chemical ³ wet processing.

Conservation of electrical energy in compressor and humidification 3 plants.

Non-conventional energy sources and their application areas in textile – 3 wind energy, biogas, solar energy etc.

Energy conservation for lighting, water supply, compressed air in 2 Textile Industry.

- Energy Conservation in Industries Vol.I & II, Centre of Plant Engg. Services Hydrabad.
- 2. Conventional Energy Technology By S.B. Pandya.
- ATIRA Circular Report June, 1988, Mill Endavours to conserve electricity by D.H. Shah, J.S. Parajia.
- 4. Energy Consumption & Conservation in Fibre Producing & Textile Industries
 Textile Progress Vol.13, No.3.
- 5. Renewable Energy Resources by John Twidell.
- Economy Energy & Environment in Textile Wet Processing by Editor S.S. Trivedi.

Final Year B. Tech. Semester – VIII TTLEL4- TTL418: TEXTILE PRODUCT ENGINEERING (ELECTIVE-IV)

Teaching Scheme	
Lectures	3 Hrs. / Week
Total Credits	3

Evaluation Scheme		
SE	25	
ТА	15	
SEE	60	
Total	100	

Course Objectives

- 1. To describe the concept, scope and logic of 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 simulation of textile products including simulation tools available like FABCAD, MECHFAB.
- To discuss the different case studies related to the product development of textile products

Course Outcomes

At the end of the course students will be able to

- 1. Understand significance 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. Apply the knowledge of simulation for the product development
- 4. Study & Analyze the techno economics of each of the case studies

Course Contents

Unit 1. Product Engineering

Objectives and Scope of product development in textiles and clothing. 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. Maintainability, Reliability & Redundancy, Final Design, selection of product.

Unit 2. Market Research & Customer Requirement Analysis Product research, Market Research, Material Research, Product life cycle, Bench mark analysis, Functional, aesthetic, Manufacturing and economical analysis.

Unit 3. Textile Design

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

Unit 4. Simulation of specified properties or structures leading to design Computer simulation for 2D nonwovens, Design requirements for air filters, Matrix of fibres used and nonwoven technologies, Grosberg & Leaf model,

Hrs. 10

05

05

05

Engineering design of woven structures.

Unit 5. Concept of overall designing

Procedure, Texture by using computer graphics, CAD, FABCAD and MECHFAB.

Unit 6. Case studies Related to product development of textiles such as r

Related to product development of textiles such as parachute textiles, Medical sutures, nonwovens for earthen dams, QFD etc.

Reference 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 andM. N. Suresh. The Textile Institute Publication.
- 3 Engineering Design by George Dieter.
- 4 Total Quality Management by Dale H. Besterfield.
- 5 Proceedings of the Seminar Non woven Technology, Market and Product Potential, IIT, New Delhi, December 2006.
- 6 New product development in textiles: Innovation and production, Edited by L. Horne, Published by Woodhead Publishing Limited in association with The Textile Institute,2012

05

06

Final Year B.Tech. Semester-VIII TTLEL4- TTL419: MAINTENANCE MANAGEMENT (ELECTIVE-IV)

Teaching Scheme		
Lectures	3 Hrs. / Week	
Total Credits	3	

Evaluation Scheme		
SE	25	
TA	15	
SEE	60	
Total 100		

Course Objectives

- To explain management concept applied to maintenance of machines, basic functions, methodology and application to planned maintenance, condition based maintenance.
- 2. To describe management functions planning, scheduling, organizing, controlling, budgeting, record keeping related to machine maintenance.
- 3. Explanation to enumerate indices related to machine downtime, utilization, spare part management and inventory.
- To explain use of value analysis, value engineering, machine replacement, modernization decisions to improve profitability of company using maintenance management.

Course Outcomes

At the end of the course students will be able to

- 1. Able to explain maintenance management, basic functions, methodology and application to planned maintenance, condition based maintenance.
- 2. To understand and describe management functions planning, scheduling, organizing, controlling, budgeting, record keeping related to machine maintenance.
- 3. Able to calculate and use indices related to machine downtime, utilization, spare part management and inventory.
- 4. To explain use of value analysis, value engineering, machine replacement, modernization decisions to improve profitability of company using maintenance management.

Course Contents

Hrs.

Unit 1. Basic concept of maintenance management its role in profitability of company, planned maintenance and breakdown maintenance & economic aspects, subclasses of planned maintenance, Mechanism of planned maintenance optimum planned maintenance, Computer

	applications in maintenance management.	5
Unit 2.	Condition based maintenance – Importance, subjective & objective inspections, types of condition monitoring techniques, Detailed study of (NDT) non-destructive testings, performance evaluation, debris analysis, dynamic analysis.	5
	Equipment Replacement – Need for replacement, Selection of appropriate alternative of replacement.	2
Unit 3.	Performance Evaluation of maintenance function – Control – Methods of control and use of various indices.	3
	Spare parts management – Importance & means of inventory control.	5
Unit 4.	Failure Analysis – Classification of failures, method of failure analysis, use of trouble shooting charts & other techniques. Planning, scheduling, maintenance organization, performance evaluation of maintenance function, PERT, CPM and other techniques for planning.	4
	lor planning.	4
Unit 5.	Value Analysis & value Engineering – concept and techniques of value analysis & value engineering Lubrication management – Importance, measures for economy in	3
	lubrication management.	3
11	Manager and the location of Market and the state of the s	_

Maintenance budgeting – Methods of budgeting, selective budgeting Unit 6. 5 control, techno economics of maintenance.

Reference Books

Maintenance Management volumes 1 to 21, by IMME Delhi. 1.

2. Maintenance Management, SITRA Publication.

Final Year B. Tech. Semester –VIII TTLEL4- TTL420: MERCHANDISING (ELECTIVE-IV)

Teaching Scheme	
Lectures	3 Hrs. / Week
Total Credits	3

Evaluation Scheme	
SE	25
ТА	15
SEE	60
Total	100

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 1. Organization of the Apparel Business:

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 2. Marketing:

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

Unit 3. Product development :

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).

Hrs.

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Unit 4. Merchandising:

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 5. Sourcing:

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 6. Export Documentation:

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 inco-terms, WTO / GATT / MFA - Functions and objectives, successes and failures.

Reference Books

- Marketing Management by Philip Kotler. 15th edition Pearson Education. ISBN: 978-9332557185
- 2 Cooklin's Garment Technology for Fashion Designers, 2nd Edition by Gerry Cooklin, Steven Hayes, John McLoughlin, Dorothy Fairclough, Blackwell Publications, ISBN: 978-1-4051-9974-2
- 3 Garment Manufacturing: Processes, Practices and Technology by Prasanta Sarkar, Online Clothing Study. ISBN: 978-9383701759
- 4 Fashion Buying by Elaine Stone. McGraw-Hill In publication ISBN: 978-0070617469
- 5 Apparel Merchandising by kumar . Abhishek Publications, ISBN: 978-8182473010
- 6 Fashion Marketing by Mike Easey . john Wiley & Sons publication. ISBN: 978-0632034598

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Final Year B. Tech. Semester –VIII TTP421: PROCESS MANAGEMENT IN YARN FORMING LAB

Teaching Scheme	
Practical	3Hrs. / Week
Total Credits	1.5

Evaluation Scheme		
CIE	50	
SEE	50	
Total	100	

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 evaluate performance of a blow room for given cotton.
- 3. To study effects of various parameters on transfer efficiency of card.
- 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 cylinder speed at comber.
- 7. To study effect of coil spacing at speed frame on stretch in roving & effect on U%.
- 8. To study break draft at speed frame & its effect on roving quality.
- 9. To study effect of break draft at ring frame on yarn quality
- 10. To study effect of yarn conditioning on yarn properties.
- 11. Mill visit To observe idle spindle, end breaks & material channelling.
- 12. Mill visit To evaluate blow room cleaning, waste Noil % & Soft waste

Submission – Completed Journal.

Final Year B. Tech. Semester –VIII TTP422: PROCESS MANAGEMENT IN FABRIC FORMING LAB

Teaching	J Scheme	Evaluation	n Scheme
Practical	3 Hrs. / Week	CIE	50
Total Credits	1.5	SEE	50
		Total	100

List Of Experiments

- 1. To determine the end breakage rate of warping machine in the visiting unit.
- 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
- To find cost per meter for the given woven fabric considering all elements of the cost in the small scale manufacturing unit
- To find cost per meter for the given knitted fabric considering all elements of the cost in the small scale manufacturing unit
- Working of air jet machine with different air pressure combinations, blast timings and blast durations
- 9. Inspection of fabric defects and determination of the packing percent of the given Fabric length in the visiting unit
- 10. Fabric Analysis 2 samples
- 11. Fabric Analysis 2 samples
- 12. Fabric Analysis 2 samples

Submission – Completed Journal.

Final Year B. Tech Semester- VIII TTD423: PROJECT PHASE -II

Teaching Scheme	
Project Hours	8 Hrs. /Week
Total Credits	8

Evaluation Scheme	
CIE	100
SEE	100
Total	200

Course Objective

- 1 To identify the problem /idea and review and summarize the literature for the topic of the identified problem
- 2 To describe the process for undertaking the research/survey
- 3 To explain various tools of testing and analysis for the data in order to draw relevant conclusions.
- 4 To demonstrate effective communication skills and team work.

Course Outcomes - Students will be able to

- 1 Able to identify the problem /idea and review and summarize the literature for the topic of the identified problem
- 2 Able to formulate and design suitable experimental plan.
- 3 Able to understand and use various tools of testing and analysis for the data in order to draw relevant conclusions.
- 4 Able to communicate effectivelyas amemberofteam

Guidelines for Project Phase-II

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.

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 and one soft copy.

Final Year B. Tech. Semester - VIII TTD424: INTERNSHIP-II

Teaching Scheme	
Training Period	04 weeks during
	winter vacation
Total Credits	3

Evaluation Scheme	
CIE	50
SEE	
Total	50

Course Objectives

- 1. To expose the students to the industrial environment and its work culture.
- 2. To expose the students to machineries and processes.
- 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 machines and instruments

Course Outcomes

Students will be able to

- 1. Students will be able to understand the industrial environment and work culture.
- 2. Students will be able to understand the machineries and processes of industries.
- 3. Students will be able to reproduce the techniques like Production Planning, Quality Assurance, Students will be able to maintenance practices, Environment and Pollution Control, Management Information System.
- 4. Students will be able to use hand on training skills.

Course Contents

Unit 1. 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.

Unit 2. 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 3. Project:

Objectives, Procedures, Observations, Analysis and Conclusion of the projects carried-out.

Reference: Specific guideline points given in daily diary.