

SYLLABUS OF B.TEXT. ENGG. SEM. III & IV [C.B.C.S.]

3 TX 01 Textile Fibre -I

Course objectives:

- 1) To gain basic knowledge about classification of textile fiber and their essential and desirable properties.
- 2) To gain the knowledge about various natural textile fibers.
- 3) To understand the various methods of textile fibre analysis.

Course outcomes:

After the completion of Textile Fibre –I course, students will able to,

- 1) Classify different textile fibres
- 2) Explain physical, chemical and biological properties of cotton fibre
- 3) Compare physical, chemical and biological properties of jute, flax, hemp and ramie fibre
- 4) Discuss physical, chemical and biological properties of wool fibre
- 5) Summaries the physical, chemical and biological properties of silk fibre
- 6) Analyze the structure of different fibres.

SECTION-A

Unit-I: Definition of fibre, Classification of Textile fibres, Essential and desirable properties of Textile fibres, Polymers: Definition, Types of polymers, Requirements of fibre forming polymers. Basic structure of fibre: Concept of molecular weight, Degree of polymerization, Orientation and crystallinity, effect of orientation and crystallinity on the properties of fibres.

Unit-II: Cotton: Introduction, structure of Cotton fibre, fibre morphology, cotton polymer system, Physical, chemical and biological properties, Applications. Introduction to Banana, Pineapple fibres and their distinctive features and applications.

Unit-III: Jute: Cultivation and Extraction of Jute fibre, Structure of jute fibre, physical, chemical and biological properties, Applications. Flax: Retting and extraction process, structure of flax fibre, physical, chemical and biological properties, Applications. Introduction to hemp, ramie fibres and their distinctive features and applications.

SECTION-B

Unit-IV: Wool: Types of wool, grading of wool, Structure of wool, chemical composition, polymer system of wool, Physical, chemical and biological properties, Applications. Introduction to fibres like, mohair, camel, alpaca and their distinctive features and applications.

Unit-V: Silk: Types of silk, Production of silk (life cycle, reeling), Structure of silk, chemical composition, polymer system of silk, Physical, chemical and biological properties, Applications, blending opportunities in silk.

Unit-VI: Analysis of fibre structure: Introduction, crystal structure, and polymer crystals. i) X-ray diffraction: Bragg's law, X-ray diffractometer. ii) Electron microscopy: Principle and working of Transmission and scanning electron microscope. iii) Spectroscopy: Principle and working of IR-Spectroscopy and NMR-Spectroscopy. Introduction to thermal analysis of polymers.

Text Books :

1. Textile Fibres – Vol.-I by V.A.Shenai
2. Fibre Science and Technology by S.P. Mishra.

Reference Books :

1. Textile Fibres by H.V.S. Murthy
2. Textile Science- Gohl and Vilensky
3. Hand book of Textile Fibres Vol. I & II by Gordon & Cook.

4. Polymer science- V. Gowarikar

5. Investigation of Physical Properties of textile fibres- Hearle & Meredith.

3TX02 YARN MANUFACTURING – I

Course Objectives:

1. To gain basic knowledge about various blowroom, carding, drawing and combing processes.
2. To gain the knowledge about modern aspects of blow room, carding, drawing and combing processes.
3. To understand various parameters influencing performance of preparatory spinning processes.

Course Outcomes:

After the completion of Yarn Manufacturing-I course, students will able to -

1. Explain the concept of ginning process and description regarding ginning machines.
2. Discuss blowroom process and description regarding blowroom machines.
3. Describe carding process and description about carding machines.
4. Summarize drawing process and description about drawframe machines.
5. Express concept of combing preparatory and description regarding combing preparatory machines .
6. Memorize combing process and description regarding combing machines.

SECTION-A

Unit-I Ginning: Objectives, classification, different ginning machines, machine parameters, ginning performance. Baling and pressing—objectives, baling and pressing machines, bale specifications and recent developments in ginning machine. Blowroom: Basics of opening and cleaning, historical review of conventional blowroom machines, degree of opening and cleaning, opening intensity and cleaning efficiency, process flow chart of spinning process.

Unit-II Modern blowroom: Introduction, objectives, its features, modern opening and cleaning machines- automatic bale openers, pre-cleaners, fine openers, fine cleaners, multi roll technology, multi-function separators. Chute feed system, automatic waste collection system. Production and cleaning efficiency calculations. Mixing-objectives, need of mixing, modern mixing machines. Blending-objectives, selection of blend constituents, blending techniques, modern blending machines, compatibility requirements, blend irregularity.

Unit-III Carding: Objectives, modern carding machines, features of new generation cards, operating regions, selection of card clothing, transfer efficiency-definition, importance, factors affecting transfer efficiency, autolevellers-basic principle, types, working, different settings of card, production and cleaning efficiency calculations, recent developments in carding machine-on line nep control, auto can changer, automatic suction system, sliver information system etc.

SECTION -B

Unit-IV Drawing: Objectives, principle of drafting, modern drawframe machine, types of drafting system, types of draft, roller setting, rollers slip and drafting waves. Autolevellers- principle, types, working, process parameters affecting drawing performance. Production and draft calculations. Recent developments in drawframe machine.

Unit-V Combing preparatory: Objectives, importance, parameters of comber lap, methods of comber lap preparation, different sequences of combing preparatory machines. Process parameters, production calculations and recent developments in combing preparatory machines. Combing: Objectives, basics of combing process and combing operation

Unit-VI Combing: Modern comber, combing cycle, timing diagram, settings and its importance, fractionating efficiency. Forward and backward feed. Comber noil, influence of combing operation on sliver

quality. Automation in comber-automatic noil collection, automatic material handling. Production calculations and technical specifications of modern comber machine.

Text Books :

1. 'Manual of Textile Technology', by Klein W, Vol. I – III.
2. 'Spun Yarn Technology', by Oxtoby E.
3. 'Fundamental of Spun Yarn Technology,' by Lawrence C A.
4. 'Handbook of Yarn Production', by Lord P R.

Reference Books :

1. Manual of Cotton Spinning Vol. II, Part-I by P. Lord.
2. Manual of Cotton Spinning Vol. II, Part-II by Shirley.
3. Opening Cleaning and Picking by Dr. Zoltan S. Szaloki,
4. Cotton Ginning, Textile Progress, The Textile Institute Publication.
5. Blow room and Carding- Training Program conducted by NCUTE, IIT, Delhi.
6. Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
7. Elements of Blowroom and Carding by Dr. A. R. Khare.

3TX03 FABRIC MANUFACTURING – I

Course objectives:

- 1) To gain basic knowledge about winding, warping and sizing processes.
- 2) To gain the knowledge about modern aspects of winding, warping and sizing processes
- 3) To understand various key parameters of influencing performance of winding, warping and sizing processes.

Course Outcomes:

After the completion of Fabric Manufacturing –I course, students will able to

- 1) Explain the concept of winding process and description regarding high speed winding machines.
- 2) Summarize the technical features and operating principles of automatic winding machines
- 3) Explain about the concept of warping process and description about high speed warping machines
- 4) Describe the technical features and operating principles of automatic warping machines
- 5) Describe the concept of sizing and description of sizing machines
- 6) Discuss the various control systems and size paste ingredients used in sizing process

Section A

Unit I: Brief outline of the process involve in weaving, Yarn quality attributes, Uster yarn quality, objectionable faults & its classification as per Uster calssimate. Winding: Objectives:- High speed winding process, geometrical aspects of winding machines, description about tensioners, slub catchers, winding unit, anti-patterning and safety devices. Concept of cone angle, angle of wind, wind per traverse, production efficiency speed, time, calculation related to winding process.

UNIT II: Automatic cone and cheese winding machines, methods of yarn joining, splicing and knotting. Concept of P& Q winding and their applications, construction details of automatic winding machines:- Creel, unwinding tension regulation unit, splicer, EYC, automatic package doffing clearing and dust removal Splicing: - Types viz. mechanical, pneumatic, aqua and thermal. Splice quality assessment. EYC: - optical and capacitance

UNIT III: Internal and between machine material flow with respect to winding, brief description about pirn winding process. Warping: - Objectives and classification of warping process, construction details about beam warping: viz. Creel, tensioner, stop motions and head stock drive. Modern developments in warping: - Designing creels, various modern types of creel, pre tensioner, automatic tension regulation system.

Section B

UNIT IV: Modern developments with respect to head stock of beam warping. Auto leasing, drive, breaks and doffing and donning systems. Sectional warping: - objective, constructional details of sectional warping process, auto-leasing, drum traverse, cone angle adjustment and beam traverse. Calculation related to production, speed, time, efficiency of warping machines

UNIT V: Concept of yarn weaveability. Sizing :- Necessity and objectives, constructional details and calculations regarding slasher sizing and multi-cylinder sizing. Study of modern sizing elements viz. creels, unwinding tension control, saw box, yarn drying methods, head stock weavers beam pressing and doffing.

Unit VI: Sizing control systems viz. size paste level, temperature, stretch, moisture control, driving arrangement of sizing machines, crawl speed, production calculation speed, time, and efficiency. Concept of optimum size pick up and add-on different sizing ingredients with respect to properties, cooking methods and there testing. Description about size paste cooking plants, types of sizing: Heavy, medium, light and pure. Sizing of polyester, PV, PC, blends.

Text Books:

1. Yarn Preparation (Vol-1 and 2) By R.Sengupta.
2. Sizing Method, Material and Mechanism By D.B.Ajgaokar Andtalukdar.

Reference Books:

1. 'Weaving Calculutions', By R. Sengupta
2. 'Textile Mathematics (Vol-3)', By J.E.Booth
3. 'Weaving Technology And Operation', By Allan Armored Andwalter S Sondhelm.
4. 'Weaving Technology', By N.M.Kulkarni
5. 'Weaving Machine : Mechanism And Material', By M.K.Talukdar.

3TX04 Textile Testing- I

Course objectives:

- 1) To gain basic knowledge about various statistical techniques used in textile testing field
- 2) To learn the various fibre characteristics evaluation and testing methods.
- 3) To understand the evaluation of basic yarn properties and testing methods.

Course outcomes:

After the completion of Textile Testing –I course, students will able to

- 1) Apply statistical tools in textile testing field
- 2) Explain the test of significance used in textile testing
- 3) Perform the measurement and evaluation of basic fibre properties
- 4) Perform the measurement and evaluation of fibre moisture
- 5) Demonstrate the measurement and evaluation of fineness and maturity of fibre
- 6) Define the sample selection technique used in textile testing

SECTION A

Unit- I: Introduction to textile testing, Tested quality schemes, Element of Statistics: Graphical presentation of Data, Measures of Location like Mean, Mode, Median, Quartiles, Percentiles. Measures of Dispersion: Range, Quartile Deviation, Percentage Mean Deviation, Standard Deviation,

Coefficient of Variation %, Variance. Comparison of frequency distribution

Unit -II : Population values and sample values, estimation of population characteristics from samples and the use of confidence intervals; determination of number of tests to be carried out to give chosen degree of accuracy; test of significance of means and variance, quality control charts, selection of samples for testing; random and biased samples,

Unit -III: Different types of sampling methods of textile materials, sampling for raw cotton testing. selection of sample for testing, fibre sampling from combed slivers, roving and yarns, yarn sampling, fabric sampling. Moisture regain, moisture content and RH %, effect of regain on fibre properties

Testing of Fibre properties - Historical review of fibre length and strength testing: fibre sorter, analysis of sorter diagram, Stelometer.

SECTION B

Unit IV: Fibre fineness: Airflow principle, Micronaire testers. Maturity: Maturity ratio, Maturity Coefficient – testing methods of maturity, Shirley trash analyzer. Advance Fibre Testing: High Volume Instruments (HVI): length, strength, maturity, trash and color modules. Advanced Fibre Information System (AFIS): length, nep and trash modules, Introduction to Instron testing.

Unit V: Yarn Dimension: Count, Direct and Indirect yarn numbering , Count conversion , Measurement of count: Spun and plied yarns. Measurement of Yarn diameter Twist: Helical geometry, Twist angle, Effect of twist on yarn and fabric properties, measurement of twist by different methods.

Unit VI: Tensile Testing : Terminology and definitions load elongation curves, stress strain curve, initial young modulus, yield point, work of rupture, work factor, elastic recovery, instantaneous and time dependent effects, creep, Types of tensile testing machines: CRL, CRE and CRT principle, various types of measuring instruments and their working principles, factors affecting tensile properties. Evenness: Principle of measurement, Periodic Variation and Spectrogram. Electronic capacitance tester, Causes and effect of Irregularity.

Reference Books:

- 1) Principles of Textile Testing -J.E. Booth
- 2) Physical Testing of Textiles - B.P.Saville
- 3) Textile Testing - Grover and Hamby.
- 4) Handbook of Technical Textiles:- Anand and Harrocks.
- 5) Testing and Quality Management- V. K. Kothari

3 TX 05 Thermal Science and Air Conditioning

Course Objectives :

- To understand the properties of steam and use of boilers in textile industries.
- To understand the basic knowledge about fluid dynamics and its application in textile industry.
- To understand the basic knowledge about refrigeration, air conditioning and their applications in textile industries.

Course Outcomes :

After the completion of Thermal Science and Air Conditioning course, students will able to

CO1- Explain the properties of steam, its types and applications in textile field.

CO2- Discuss the construction and working of different types of steam boilers, their accessories and mountings.

CO3- State the concept of fluid dynamics and fluid flow applications in textile industries.

CO4- Describe the function of different types of compressors and their applications in textile industry.

CO5- Describe the function of different types of pumps and refrigeration systems.

CO6- Express the function of the air conditioning system and their applications in textile industries.

SECTION-A

UNIT I: Properties of Steam: Brief overview about the use of steam in textile industries, Formation of Steam, Triple Point and Critical Point, Sensible Heat, Latent Heat, Superheat and Total Heat of Steam. Wet Steam, Dryness Fraction, Internal energy of steam, External work of Evaporation, Specific Volume, Enthalpy, Internal Energy and Entropy of Steam. T-S Diagram and Steam Table and their use. Difference between Vapor and Gas, Dryness Fraction and Measurement of by Separating, Throttling, and Combine Calorimeter, Specific application of steam in textile industries and processes.

UNIT II: Steam Boiler: Flow Diagram for Steam Power Plant with basic units such as Steam Generator, Turbine, Condenser and Pump, Classification of Boilers, Principal Parts of Steam Boiler and their functions, Characteristics of a Good Steam Boiler, Factor Affecting the Selection of Boilers, Historical Review of Fire Tube Boiler and Water Tube Boiler. Introduction of High Pressure Boilers such as LaMont Boiler, Loeffler Boiler, Benson Boiler, and Velox Boiler. Uses of Boiler in Textile Industry such as Spinning, Weaving, Chemical Processing and others.

Boiler Mounting and Accessories :- Boiler Mountings- Devices for proper functioning and safety such as Safety Valve, Water Level Indicator, Pressure Gauge, Fusible Plug, Blow-off Cock, Feed Check Valve, Steam Stop Valves, Man Hole and Mud Box. Boiler Accessories-Devices for improving Boiler Efficiency such as Superheater, Economizer, Air Preheater. Boiler Draught (Draft), Function of Draught, Classification of Boiler Draught.

UNIT III: Fluid Dynamics: Introduction to the study of fluid motion its uses in textile industry, Mechanical

Properties of Fluids and their influence on flow characteristics, Types of Flows, Stream Lines, Potential Lines, Flow Net, Continuity Equation, Bernoulli's Equation, Venturimeter. Fluid flow applications in Textile Processing- Air Jet Spinning, Nozzle design and performance in Air Jet Spinning, Spun bonding process of Non-Woven, Fabric like Structures, Textile Wet Processing, Air-Jet and Water Jet weft insertion mechanisms.

SECTION- B

UNIT IV: Air Compressor : Introduction, Classification of Air Compressor, Cycle of operation, Use of Compressed air in Textile Industry such as spinning machine and weaving machine, Introduction to Pneumatic System, Study of various Pneumatic Circuit, and its Component, like Valves Filter, Regulator, Accumulator, Lubricator. Application of Pneumatic circuits in Textile Machines.

UNIT V: Pump and Refrigeration: Introduction of Pump used in Textile Industry, Classification of Pump, Centrifugal Pumps, main parts & working, work done, efficiency, Brief Introduction of Reciprocating Pump. Refrigeration- Introduction to Refrigeration, Application of Refrigeration, Elements of Refrigeration System, Unit of Refrigeration, Coefficient of Performance (COP), Various Refrigeration System such as Ice Refrigeration, Air Refrigeration System, Vapour Compression Refrigeration System, Vapour Absorption Refrigeration System.

UNIT VI: Air Conditioning: Concept of Psychrometry and Psychometrics terms, Definitions, Psychometric Relations, Psychometric Chart, Psychometric Processes- Mixing of Air Streams, Sensible Heating, Sensible Cooling, Humidification, Dehumidification. Methods and Features of Modern Humidification plant in Textile Mills, Effect of Moisture on Textile Fibers, sling Psychrometer, Use of psychometric chart. (Numerical related to psychometric). Importance of Humidity Control in Textile Processing. Air Conditioning System- Introduction, Air Conditioning Cycle, Classification of Air Conditioning System, Central System, Zoned System, Unitary System, Unitary Central System.

Books Recommended:-

Text Books :

- 1) Thermal Engineering-P.L.Balaney.(Khanna Publication)
- 2) Fluid Mechanics and Hydraulic Machine by Dr.R.K.Bansal
- 3) A course in Refrigeration and Air Conditioning – S. C. Arora, S. Domkundwar.(Khanna Publication.)

References Books :

- 1) Refrigeration & Air Conditioning – P. N. Ananthnarayanan. (TMH Publication)
- 2) Elements of Heat Engine–R.C.Patel, C.J.Karamchandani.(Charter Publication)
- 3) Thermal Engineering B.K.Sarkar.(TMH Publication)
- 4) Thermal Engineering-S.Domkundalwar.(Khanna Publication)
- 5) A Textbook of Engineering Thermodynamics by R.K.Rajput.
- 6) Thermal Engineering by R.S.Khurmi & Gupta.
- 7) Refrigeration & Air conditioning by R. K.Rajput.
- 8) Pneumatic Systems by Majumdar.
- 9) Hydraulics & Pneumatics by Andrew &Parr.
- 10) Humidification & Air conditioning by S. P.Patel.
- 11) Textile Humidification by K. G.Vaze.

Semester-IV**4 TX 01 Textile Fibre – II****Course objectives :**

- 1) To gain basic knowledge about polymers and their extrusion methods.
- 2) To gain the knowledge about major synthetic fibres and their properties.
- 3) To understand texturing and its various methods.

Course outcomes :

After the completion of Textile Fibre –II course, students will able to,

- 1) Discuss various extrusion methods used in production of synthetic fibres
- 2) Explain the manufacturing and properties of regenerated fibres
- 3) Explain the manufacturing and properties of polyamide and polyester fibres
- 4) Explain the manufacturing and properties of polyacrylonitrile, polyvinyl and polyethylene fibres
- 5) Describe concepts of mechanical, thermal and optical properties of fibers
- 6) Summarize the various methods of texturing

SECTION-A

Unit-I: Manmade fibres: Definitions of regenerated & synthetic fibres, heterochain and carbon chain fibres, Addition and condensation polymerization, Study of intra-polymer and inter-polymer forces in fibre polymer. Concept of thermoplastic and thermoset material. Introduction to melt spinning, dry spinning and wet spinning.

Unit-II: Regenerated fibres: i)Viscose rayon: Manufacturing process, Physical and chemical properties, Applications, ii)Cuprammnum rayon: Manufacturing process, Physical and chemical properties, applications. iii) High wet modulus and Polynosic rayon: Manufacturing process, Physical and chemical properties, Applications. iv)Introduction to Acetate & Triacetate fibres

Unit-III: Synthetic fibres: i) Polyamide Fibres: Nylon-6, Nylon-66, Raw materials, manufacturing process, Microscopic structure, Physical and chemical properties, Applications. ii) Polyester fibre: Raw materials, manufacturing process, Microscopic structure, Physical and chemical properties, Applications.

SECTION-B

Unit-IV: Synthetic fibres: i) Polyacrylonitrile fibres: Acrylic and Modacrylic fibres: Raw materials, manufacturing process, Microscopic structure, Physical and chemical properties, Applications. ii) Polyvinyl alcohol and Polyvinyl chloride fibres: Raw materials, manufacturing process, Microscopic structure, Physical and chemical properties, Applications. iii) Polyethylene & Polypropylene fibres: Raw materials, manufacturing process, Microscopic structure, Physical and chemical properties, Applications.

Unit-V: Tensile properties: Terms and definitions, Study of stress-strain curve and related properties, importance of tensile properties, factors influencing tensile properties of fibres, Bending and Shear properties, Torsion and Compression properties, Introduction to optical, thermal, frictional and dielectric properties.

Unit-VI: Texturizing: Introduction to various methods of texturizing: Draw Texturising, - sequential (False twist process) and simultaneous draw texturising,. Air Jet Texturizing: - Principle and working of machine. Other Texturising Methods:- Stuffer box crimping, Edge Crimping, Knit-de-knit, Gear crimping. Properties of air and draw textured yarn.

Text Books:

1. Textile Science- Gohl and Vilensky
2. Man Made Fibres – R.W. Moncrieff.

References Books:

1. Hand book of Textile Fibres Vol. I & II by Gordon & Cook.
2. Textile Fibres – Vol.-I by V.A.Shenai
3. Physical Properties of Textile Fibres by W.E. Morton and J.W.S. Hearle,
4. Textile Fibres by H.V.S. Murthy Man Made Fibres – R.W. Moncrieff.

4TX02 Yarn Manufacturing – II

Course Objectives:

1. To gain basic knowledge about speed frame, ring spinning and doubling processes.
2. To gain the knowledge about modern aspects of speed frame, ring spinning and doubling processes.
3. To understand various parameters influencing performance of speed frame, ring spinning and doubling processes.

Course Outcomes:

After the completion of Yarn Manufacturing-II course, students will able to -

1. Explain the concept of speed frame process and description regarding speed frame machines.
- 2 Explain the concept of ring spinning process and description regarding ring spinning machines.
3. Explain the concept of ring spinning process and description about ring spinning machines.
4. Discuss the concept of spinning geometry and spinning triangle.
5. Describe the concept of doubling process and description regarding doubling machines.
6. Summarize different methods of fancy yarn manufacturing.

SECTION- A

Unit-I Speed frame: Objectives, modern speed frame machine, top arm drafting system, flyer, spindle and presser, bobbin and flyer leading winding principle. Differential and building mechanisms. Various parameters affecting roving quality and production. Draft, twist and production calculations. Recent developments in speed frame machine-Auto bobbin transport system etc.

Unit-II Ring frame: Objectives, principle of ring spinning, modern ring frame machine. Details of creel, rings, travelers, importance of ring and traveler profile, balloon control ring, lappet, traveler clearers, suction system. Types of spindles, spindle drives and spindle centering. Building mechanism, building of cops. Compact spinning principle, different compact spinning systems, structure and properties of compact yarns.

Unit-III Drafting process: Importance, principle of drafting, types of drafting system, top arm drafting system and its advantages, offset drafting, types of draft, top and bottom rollers, cots, aprons, spacers, drafting parameters, different weighing systems- advantages and limitations, factors affecting roller settings and drafting performance, drafting force, roller slip, drafting waves and floating fibres. Production and draft calculations.

SECTION - B

Unit-IV Spinning geometry: Importance, ideal yarn geometry, formation of twist, spinning triangle, spinning angle, spinning tension, balloon formation. Yarn structure and properties. Yarn faults-causes and remedies, end breakages causes and remedies. Recent developments in ring spinning- ring/travelers systems, automatic doffing, on line quality control, individual spindle monitoring, automatic data acquisition and automatic cop transfer.

Unit-V Doubling: Objectives, types of doubled yarn, effects of twist direction, concept of balance of twist, properties of folded yarn, methods of ply twisting–ring doubling machines, two stage twisting and up twister. Two for one twister- principle, design and constructional details of TFO machine, advantages over ring doubling machine, recent developments in TFO machines, production calculations.

Unit-VI Fancy yarns: Basic principle of fancy yarn, classification of fancy yarns, different methods of fancy yarn production - spinning techniques used for the production of fancy yarns, structure of multi-count, slub yarn, spiral, gimp, loop, snarl, knop, covered yarns, diamond, boucle yarns, caterpillar and metallic yarns. Properties and applications of fancy yarns.

Text Books :

1. Manual of Textile Technology by Klein W,
2. A Practical Guide to Ring Spinning by Klein W,
3. Fundamental of Spun Yarn Technology by Lawrence C A,
4. Handbook of Yarn Production by Lord P R,

Reference Books:

1. Drawing, Combing and speed frame by Zoltan, S. Szaloki,
2. Draw frame, combing and speed frame by J. H. Black;
3. Spun Yarn Technology by Eric Oxtoby.
5. Elements of ring frame and doublings by Dr. A. R. Kahre.
6. Advances in Spinning by S. M. Ishtiaque
7. Two for one twister technology by H. S. Kulkarni and HVS Murthy.

4TX03 Fabric Manufacturing –II

Course objectives :

- 1) To gain basic knowledge about fabric formation by weaving processes.
- 2) To gain the knowledge about technical features of automatic weaving and dobby shedding machines.
- 3) To gain the knowledge about jacquard shedding, fabric faults and machines defects.

Course outcomes :

After the completion of Fabric Manufacturing –II course, students will able to

- 1) Express the concept of fabric forming by weaving process
- 2) Demonstrate the various weaving mechanisms.
- 3) Analyse the kinematics, energy utilization and productivity aspects of shuttle weaving machines

- 4) Recall about the dobby shedding principle and its related machineries
- 5) Describe the jacquard shedding principle and related machineries.
- 6) Identify and analyze the fabric faults and loom defects.

SECTION-A

Unit I: Classification of different fabric forming process viz. weaving, knitting, breading. Non woven: - Brief description of all methods & their application. Looming: - Working principle of drawing in with respect to plan, twill and satin weave. Study of warp tying, leasing, reaching in, warp knotting and drop pinning processes

Unit II: Weaving:- classification of motions, Shedding:- Classification of shedding principle, types of shed, head movement, shed geometry, reversing motion Brief description about shuttle picking and crank beat up

Unit III: Brief description about warp protection system, weft stop motion and temple. Complexity of shuttle picking, kinematics of sley, weaving resistance, bumping condition. Analysis of energy utilization in shuttle picking, limitation of conventional let-up, take-up system. Calculation regarding reed count, average pick, efficiency and production of weaving machine. Automatic loom: - limitation of plain loom and brief description about automatic loom, cop changing mechanism, shuttle protector.

SECTION-B

Unit IV: Historical review of shuttle changing looms. Automatic let-off and positive take up system Historical review of about weft mixing by drop box motion. Dobby shedding: - objectives, classification, climax cam dobby, positive and rotary dobby, method of pegging, dobby setting during weave change

Unit V: Jacquard shedding:- objectives, classification, principal parts, figuring capacity, harness, working principle of Double lift double cylinder jacquard, open shed jacquard, electronic jacquard comparison between various electronic jacquards weave setting of jacquard during weave change

Unit VI: Fabric defect & value less:- Various fabric grading system and its procedure. Fabric defects:- warp and weft defects with causes and remedies, various loom faults with respect to their causes and remedies, various dobby & jacquard related machines and fabric faults with their causes and remedies.

Text Book:

Weaving Machine, Mechanism Management By D.B.Ajagaonkar And M.K.Talukdar .

References Books:

- 1) Weaving Operation by Allen Armorod
- 2) Fancy Weaving by K.T. Aswani.
- 3) Weaving Mechanism vol.II by N.N.Bannarji.
- 4) Principle of weaving by R. Marks and A.T.C. Robinson.

4TX04 TEXTILE TESTING — II

Course objectives:

- 1) To gain knowledge about evaluation and testing of basic fabric properties.
- 2) To gain knowledge about evaluation and testing of comfort properties of fabric
- 3) To gain knowledge about evaluation and testing of basic garment properties.

Course outcomes:

After the completion of Textile Testing-II course, students will be able to

- 1) Evaluate the serviceability of textile fabric
- 2) Demonstrate the testing and evaluation of fabric dimensional stability
- 3) Explain the testing and evaluation of fabric low stress mechanical properties.
- 4) Explain the testing and evaluation of fabric thermal properties.
- 5) Explain the testing and evaluation of garments
- 6) Summarize the quality evaluation process of garments

SECTION-A

Unit -I: Fabric Dimension: Length, Width, Thickness, their measurement, Fabric weight per unit area and per length, threads per inch in woven fabric, ends and picks per inch, crimp of yarn in fabric, shrinkage. Measurement of crimp, cloth cover and fabric geometry. Serviceability: Introduction, Snagging, Pilling, Factors affecting pilling of fabric Pilling test, Abrasion resistance, factors affecting abrasion resistance. Abrasion tests, wear. Wearer Trials.

Unit -II : Dimensional stability: Introduction, hygral expansion, relaxation shrinkage, swelling shrinkage, felting shrinkage, methods of measuring dimensional stability. Hydraulic bursting strength tester. Tear strength tester. Flammability terms used relating to flammability, factors affecting flame resistance, flammability testing and flame proofing.

Unit- III : Fabric handle evaluation (Total hand value), Low stress mechanical properties viz.: tensile, shearing, bending, compression and surface friction, Drape, crease recovery, Kawabata system. Colour fastness testing: Introduction, outline of colour fastness tests. Colour fastness to washing, rubbing, light, heat (sublimation), perspiration, sea water, chlorinated water, dry cleaning agents.

SECTION- B

Unit- IV: Comfort: Introduction. Thermal Comfort, heat balance, heat loss, air permeability and its measurement, Effect of air permeability on fabric properties, Measurement of thermal resistance and transmittance of fabrics. Moisture transport, sensorial comfort, water absorption, water repellency. Measurement of water vapour permeability and water permeability.

Unit- V: Testing of Garments : Test related to garment appearance and performance such as measurement of seam pucker, seams slippage, seam strength and buffer strength, stitching defects. Different types of defects in fabrics major and minor faults, fabric inspection system-4 point system

Unit- VI: Quality control in pattern making, grading-maker making, spreading – Quality control of trims and accessories-zippers and buttons. Garments Inspection and measuring guide processing. cutting, stitching in garment industry, tolerance and quality standard for finished garments.

REFERENCE BOOKS :

- 1) Principles of Textile Testing – J.E. Booth
- 2) Physical Testing of Textiles – B.P. Saville
- 3) Science of Clothing Comfort – V.K.Kothari
- 4) Testing and Quality Management – V.K. Kothari
- 5) An Introduction of Quality Control for the Apparel Industry- Pradip V. Mehta.
- 6) Managing Quality in Apparel Industry – S.K. Bhardwaj and Pradip V. Mehata

4TX05 GARMENT MANUFACTURING TECHNOLOGY

Course Objectives :

1. To provide the understanding about the scenario of industrial apparel sector.
2. To provide the knowledge about various production processes involved in garment manufacturing.
3. To provide the knowledge about the various industrial production systems and use of CAD and CAM in garment industry.

Course Outcomes :

After completion of the course students will be able to :

1. Explain the apparel industry scenario in form of its structure, types, size, labor, products etc.
2. Discuss the various technological aspects and production process involved in pattern making and sizing.
3. Discuss the various technological aspects and production process involved in cutting and sewing operations.

4. Discuss the various technological aspects and production process involved fusing process.
5. Discuss the various technological aspects and production process involved in garment finishing and inspection.
6. Analyze the various production systems and use of CAD-CAM in garment manufacturing.

SECTION A

UNIT-I :

World and Indian Scenario of garment industry: Size, various sectors, structure, type of products and business developments in recent years. Overview of export related activities in apparel industry. Brief outline of various steps involved in industrial garment manufacturing process. Pattern making: easurement process, size chart and measuring of sizes, definition of various garments parts and positions.

UNIT-II :

Pattern making methods: Bespoke, industrial block method, basic block construction, block preparation and corrections. Figure analysis- body ideals, body proportion, height and weight distribution, body parts, individual figure analysis and body measurement of all age groups. Muslin pattern, commercial pattern, sizes and fabric preparation for garment manufacturing.

UNIT-III :

Types of fabric packages, spreading, marker preparation and its planning, types and functions of cutting machine, preparation for sewing processes, Sewing: feed systems, types of sewing machinery and equipment, parts of needles and their function,

UNIT-IV :

Sewing thread- Properties, ticket number, classification of seams and stitches. Fusing- Importance, fusing process, fusing machineries, control of fusing quality. Pressing- Importance, types, pressing equipments.

UNIT-V :

Finishing and inspection: Various components used in garments viz: buttons, zips, underlining, hooks, ornamental materials, sewing labels, motif etc. Garment cleaning and inspection- fitting quality, live models, final inspection of garments, quality standards.

UNIT-VI :

Industrial line production methods: 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- equipments used in garment handling, storage and packing. Application of CAD and CAM in garment production.

Reference Books :

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

SYLLABUS OF B.TEXT. ENGG. SEM. V

5TX 01 FABRIC STRUCTURE AND DESIGN

Course Objectives:

- 1) To gain knowledge about basic fabrics weave structures
- 2) To understand derivatives of basic fabric weave structures
- 3) To gain knowledge about advance fabric weaves structures

Course Outcomes:

After the completion of Fabric Structure and Design course, students will able to demonstrate the

- 1) Construction of plain, twill, and satin sateen weaves
- 2) Construction of honeycomb, mockleno and felt structures
- 3) Knowledge of colour and weave effects
- 4) Knowledge of backed, Bedford and double cloth structures
- 5) Knowledge of leno and weft pile structure
- 6) Knowledge of terry pile and tapestry structure

SECTION-A

UNIT- I : Methods of fabric representation; repeat of weave; drafts; lifting plan; construction of weave from a given draft and lifting plan; construction of draft from a given lifting plan and weave. Plain weave; twill weaves; satin and sateen & their derivatives.

UNIT -II : Diamonds designs and diaper designs; honey comb (ordinary & Brighton), huck-a-back; mock leno; Stripe and check weave combination: Welts and piques: Ordinary, wadded, fast back welts; piques; idea of loose back, half fast back and fast back fabrics.

Unit- III : Light & pigment theory of colour, Elements of colour; simple colour and weave effects; construction of line effects; Hound's tooth pattern; Bird's eye & spot effects; Hairline effects; step pattern; idea of compound color and weave effects

SECTION- B

UNIT- IV : Bed ford cords- plain face, wadded, twill face Bedford cords. Backed cloth: Warp backed cloth; weft backed cloth; backed cloth with wadding threads; warp and weft wadded cloths; reversible backed cloths. Classifications of double cloth construction; concept of self stitched; stitched by thread interchange; stitch by cloth interchange; centre stitched.

UNIT -V : Leno structure: Principles of leno structures; methods of producing leno and idea of simple constructions, Weft-pile introduction; concept of simple constructions; Jacquard design-Introduction, Card cutting.

UNIT -VI : Terry pile introduction; formation of pile; simple terry weaves; idea of a terry pile forming mechanism. Tapestry structures: Introduction; idea of simple weft faced structures; carpet structures, Different types of selvages and their applications, Introduction to Autotex CAD software.

Reference Books :

- 1) Grammar of Textile Design: Nisbet
- 2) Fabric Design: Blinov
- 3) Textile Design and Colour: Watson
- 4) Advanced Textile Design & colour: Watson
- 5) NCUTE- Woven fabric

5TX02 ADVANCE YARN MANUFACTURING TECHNOLOGY

Course Objectives:

- 1) To gain basic knowledge about various new spinning systems viz rotor, air jet, air vortex, friction, wrap and siro spinning.
- 2) To gain the knowledge about modern aspects of various new spinning systems.
- 3) To understand various parameters influencing performance of new spinning systems.

Course Outcomes:

After completion of Advance Yarn Manufacturing course the students will be able to demonstrate knowledge about the concept of,

- 1) Rotor spinning and description regarding rotor spinning machines.
- 2) Friction spinning and description regarding friction spinning machines.
- 3) Air jet and air vortex spinning and description regarding air jet and air vortex spinning machines.
- 4) Siro and wrap spinning and description regarding siro and wrap spinning machines.
- 5) Self-twist and twist-less spinning and description regarding self-twist and twist-less spinning machines.
- 6) Core, electro-static, woollen and worsted spinning and description regarding core, electro-static, woollen and worsted spinning machines.

SECTION- A

UNIT-I: Rotor spinning: Introduction, open end spinning principle, sequence of operations, advantages and limitation of ring and rotor spinning, concept of break spinning, construction details of rotor spinning machines, different types groove and naval, profiles of opening rollers, process parameters influencing yarn quality, properties of rotor yarn, details of yarn structure, applications of rotor yarn, comparison of properties of rotor and ring yarn, recent developments in rotor spinning.

UNIT-II: Friction spinning: Introduction, principle of friction spinning, sequence of operation in friction spinning, construction details of different friction spinning machines-dref-I, dref-II, dref-III, dref-2000 and dref-3000. Advantages and limitations of friction spinning, process parameters influencing yarn quality, details of yarn structure, properties of friction yarn, applications of friction yarn, recent developments in friction spinning.

UNIT-III: Air jet spinning: Introduction, principle of air jet spinning, idealized structure of fasciated yarn, construction details of air jet spinning machines, sequence of operation in air jet spinning, details of yarn structure, properties and applications of air jet yarn, recent developments in air jet spinning.

Air vortex spinning: Introduction, principle of air vortex spinning, sequence of operation in air vortex spinning, construction details of air vortex spinning machine, details of yarn structure, properties and application of air vortex yarn.

SECTION- B

UNIT-IV: Siro Spinning: Introduction, principle and importance of siro spinning, working and construction details of siro spinning machine, details of yarn structure and properties of siro yarn, applications of siro yarns, advantages and limitations of siro spinning. Concept of compact siro spinning. Wrap spinning: Introduction, principle of wrap spinning, construction details of wrap spinning machine, details of yarn structure, properties and applications of wrap yarn. Recent developments in wrap spinning.

UNIT-V: Self-twist spinning: Introduction, principle of self-twist spinning and yarn formation mechanism, concept and importance of phase shifting, structure, properties and applications of self twist yarn. Twistless spinning- Introduction, principle of twistless spinning, different techniques of

twistless spinning. Process parameters, yarn quality and structure, properties and applications of twistless yarn, limitations of twistless spinning.

UNIT-VI: Core spinning: Introduction, concept of core yarn spinning, different techniques of core yarn manufacturing, process parameters, yarn quality and structure of core spun yarn, properties and application of core spun yarn. Electrostatics spinning: Introduction, principle of electrostatic spinning, yarn formation mechanism, yarn structure, properties and application of electro-static yarn. Woollen and worsted spinning: Introduction, construction details and working principle of woollen and worsted spinning machines, yarn structure, properties and applications.

Reference Books:

1. The Textile Institute Manual of Textile Technology – Short staple spinning Series, Vol.V – New Spinning System by W. Klein.
2. New Spinning System by R.V.Gowda
3. Hand Book of Yarn Production by P. R. Lord
4. Spun Yarn Technology by Carl A. Lawrence
5. Spun Yarn Technology by Eric Oxtoby
6. Textile Yarns by Martindale and Goswami.
7. Research papers, pamphlets, brochures, manuals of above machines
8. The Economics of Science and Technology of yarn production – Vol.-I and II
9. Air jet spinning – Textile Progress, Textile Institute Publication.

5 TX 03 CHEMICAL PROCESSING –I

Course Objectives:

- 1) To study the textile wet processing sequence
- 2) To understand various dyeing machineries
- 3) To study the different class of dyes and its applications

Course outcomes:

After completion of Chemical Processing-I course the students will be able to understand the,

- 1) Textile wet processing sequence
- 2) Different preparatory processes required for dyeing
- 3) Different dye class
- 4) Various dyeing machineries
- 5) Dyes applied on various cellulosic fibre
- 6) Dyes applied on various synthetic and protein fibre

SECTION A

UNIT-I: Sequence of wet processing for cotton material: Grey inspection, shearing, cropping, singeing and different singeing methods. Desizing- Object, chemistry and technology of different desizing process (Acid, enzymatic, oxidative, novel methods), batch and continuous methods of desizing.

UNIT-II: Scouring: object, chemistry of scouring (saponification, emulsification, detergency, surface tension), technology of scouring (caustic boiling, soap soda ash process for colour goods), bio-scouring batch and continuous scouring process. Introduction to Silk degumming, Wool scouring. Bleaching- Objective, Chemistry and technology of Hypochlorite, peroxide & chlorite bleaching. Preparation process for synthetic and blended fabric in brief, batch and continuous process.

UNIT-III: Mercerization: Chemistry and technology (Chainless, Padless, Pad chain), Physical chemical effect of mercerization. Evaluation of Desizing, scouring (Copper number method, methylene blue absorption method) bleaching and mercerization performance (test methods).

SECTION B

UNIT-IV: Dyeing : Define dye, classification of dyes based on method of application, chemical constitution and different term used in dyeing. Dyeing machines – Principal and working of

different dyeing machines for fibre, yarn and fabrics. Latest Technological features of different dyeing machines.

UNIT-V: Dyeing of cellulosic fibres : Direct dye, Reactive dye, Vat dye, Azoic dye and Sulphur dye. Effect of Process parameters on dyeing performance. Various dyeing faults their causes and remedies.

UNIT-VI: Dyeing of Protein and synthetic fibres: Acid, Basic, Mordant and Disperse dyes. Dyeing of blend like polyester-cotton, polyester-viscose and polyester-wool. Effect of process and material parameter on dye performances, various dyeing faults their causes and remedies

Reference Books:

- 1) Textile Scouring and Bleaching by E.R. Trotman
- 2) Technology of Bleaching and Mercerising by V.A. Shenai,
- 3) Mercerization by J.T. Marsh
- 4) Technology of Textile processing, Vol. II, by V.A. Shenai
- 5) Chemistry of Dyes and Principles of Dyeing by V.A. Shenai,
- 6) Technology of Dyeing by V.A. Shenai,
- 7) Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman,
- 8) Chemical Processing of Synthetic Fibres and Blends by K.V. Datye and A. A. Vaidya.
- 9) Textile Preparation and Dyeing by Asim Kumar Roychowdhury.

**5TX04 ADVANCE GARMENT MANUFACTURING TECHNOLOGY
PROFESSIONAL ELECTIVE-I**

Course Objective:

- 1) To understand the technological advancements in the industrial manufacturing processes of garment.
- 2) To learn the use of lean tools and time-motion analysis for industrial garment manufacturing process.
- 3) To understand the use of various computational tools in the industrial manufacturing processes of garment.

Course Outcomes:

After completion of Advance Garment Manufacturing Technology course students will be able to demonstrate the knowledge about the,

- 1) Technological advancement taken placed in the spreading and cutting operations of garment manufacturing.
- 2) Technological advancement taken placed in sewing and material handling operations of garment manufacturing.
- 3) Technological advancement taken placed in garment finishing and printing operations.
- 4) Use of lean tools and time-motion studies involved in garment manufacturing industry.
- 5) Application of various softwares in garment manufacturing industry.
- 6) Use of CAD, 3D Simulation and 3D Scanning technologies in the garment industry.

SECTION-A

UNIT-I: Technological advancement in spreading and cutting: Salient features, advantages, and functional details about automatic spreading machine with data capturing, Plasma Cutting, water jet cutting, Laser cutting machine, CAM based automatic cutting machines and automatic single ply cutting machine. Use of fabric cut planning software for fabric utilization and saving during cutting, material cut planning.

UNIT-II: Technological advancement in sewing: Salient features, advantages, and functional details about computerized sewing machine. Selection of stitch type, stitch number and auto stop motion. General Sewing Data (GSD), Digital measurement 'Digital Tape' and thread consumption estimating software, application of robotics in sewing operation, Profile stitching/ Automatic workstation. Automated and flexible material handling system ETON: Salient features, technical details, and advantages of ETON system.

UNIT-III: Technological advancement in garment finishing: Salient features, advantages and functional details about Automatic vapor or steam press, use of a buck press machine for automatic pressing, Automatic folding machine. Advancement in garment printing and embroidery: Digital garment printing, Direct to Garment Printing (DTG), 3D garment printing and computerized embroidery and quilting machine,

SECTION-B

UNIT-IV: Lean tools for garment industry: Concepts and applications of single piece flow, quick change-over (SMED), total productive maintenance (TPM), Heijunka, cellular production system, visual controls (And-on), poka-yoke, supermarket concept, Kanban etc. Standard Time: Rating factor, allowances, SAM, SMV and SAM in garment manufacturing process.

UNIT-V: Work measurement in garment manufacturing process: Definition, need, importance, objective, techniques of time motion studies, steps in time study, breaking the job into elements, stopwatch procedure, predetermined motion time study. Application of various computer based software for garment manufacturing activities: PMTS based software for SAM estimation, time and motion study and real-time production tracking system. PLM software for Product lifecycle management (PLM), use of apparel Enterprise Resource Planning solution.

UNIT-VI: Application of CAD, Simulation and 3D scanning in garment Manufacturing: Salient features, advantages and functional details about the use of computer aided design (CAD) technology in pattern making , various CAD tools, digitization of paper pattern (manual pattern) pattern grading, nesting, marker making and fabric consumption analysis. Application of 3D simulation: Salient features, advantages, and functional details about development of 3D garment on the digital platform and pattern fitting. Application of 3D body scanning: Salient features, advantages, and functional details about full body measurement of the human body by 3D scanning. Use of virtual fitting room in sample approving process.

Reference Books:

- 1) Introduction to Clothing Manufacture by Cooklin Gerry Blackwell Science Ltd., 1995.
- 2) Lean Manufacturing Implementation: A Complete Execution Manual for any Size Manufacturer by Hobbs Dennis P, Cengage Learning India Private Ltd, NewDelhi, 2009
- 3) Industrial Engineering by Khan M.I, New Age International, 2004. 09.12.2019 Regulations-2015R Regulations-2014
- 4) Design and Analysis of Lean Production Systems by Goldberg Jeffrey B, Askin Ronald G; John Wiley & Sons Inc, 2003.

5 TX 04 HIGH PERFORMANCE FIBRES PROFESSIONAL ELECTIVE-I

Course Objectives:

- 1) To study the high performance fibres
- 2) To study the high function fibres
- 3) To study the specialty applications of fibre

Course outcomes:

After completion of High Performance Fibres course students will be able to demonstrate the basic knowledge about structure, preparation, properties and applications of ,

- 1) High performance fibres
- 2) High-tech fibres.
- 3) Carbon and glass fibres
- 4) High function fibres
- 5) Specialty applications of fibre
- 6) Thermally resistant fibres

SECTION-A

UNIT-I: Introduction to high performance fibres: High-tech fibres, natural versus synthetic fibre, artificial fibre by bio-mimetics, fibre characteristics and shapes in the field of high performance fibres and textiles and their applications.

UNIT-II: Aramid Fibres: Introduction, polymer preparation, spinning of aramids, structure and properties of aramid fibres, applications of aramid fibres; Gel-spun high-performance polyethylene fibres- Introduction, manufacturing of Gel-spun high-performance polyethylene fibres, its properties and applications.

UNIT-III: Carbon Fibres: Introduction, PAN-based and pitch-based carbon fibre, properties and applications of carbon fibres. Glass fibres- Introduction, raw material, manufacturing, fibre finishes, properties and applications.

SECTION-B

UNIT-IV: High function fibres: Introduction, sportswear using the high function fibre, Fibres in ocean, biomimetic and intelligent fibres, introduction to chlorinated and fluorinated fibres. Super fibres.

UNIT-V: Specialty fibres: Introduction, fibres for health, Dietary fibre – in health and disease Fibres produced by bacteria, Fibres for space, Perfumed fibres, Electronics and fibres.

UNIT-VI: Thermally resistant fibres- Introduction, thermosets, aromatic polyamides and polyaramids, Polybenzimidazole(PBI), Polybenzoxazoles (PBO).

Reference Books:

- 1) High Performance Fibres, Woodhead Publishing Ltd., Edited By J. W. S. Hearle
- 2) New millennium fibers, Woodhead Publishing in Textiles, by Tatsuya Hongu, Glyn O. Phillips and Machiko Takigami
- 3) New Fibres, by Tatsuya Hongu, Glyn O. Phillips
- 4) Handbook of Textile Fibre Structure, Volume 1: Fundamentals and Manufactured Polymer Fibres, by S Eichhorn, J. W. S. Hearle, M Jaffe and T Kikutani
- 5) Handbook of Textile Fibre Structure, Volume 2: Natural, Regenerated, Inorganic and Specialist Fibres, by S Eichhorn, J. W. S. Hearle, M Jaffe and T Kikutani

**5 TX 05 FASHION TECHNOLOGY
OPEN ELECTIVE-I****Course Objectives:**

- 1) To study the different terms and categories of fashion
- 2) To study different aspects of fashion forecasting and marketing
- 3) To study analysis and developing of fashion resources and buying behaviour

Course Outcomes:

After completion of Fashion Technology the students will be able to understand the knowledge about ,

- 1) Different terms of fashion
- 2) Different categories of fashion and its adoption
- 3) Fashion research and its analysis
- 4) Concept and promotion of fashion
- 5) Different aspects of fashion marketing
- 6) Analysis and developing of fashion resources and buying behaviour

SECTION-A

UNIT-I: Fashion Styling: Concept and scope of styling, difference between fashion designing and fashion styling, types of styling. Elements of Style- Accessing styles and trends, elements of style, Achieve Visual balance, making trends and trend setting

UNIT-II: Fashion Forecasting: Meaning, Short-term and long-term forecasting, Colour forecasting, Textile forecasting, style forecasting and sales forecasting.

UNIT-III: Fashion Illustration and photography: Figure proportions, Real vs Fashion figures, Technical drawing of garments – Flats and specs. Focus techniques: full shot, medium shot, knee shot, waist shot, close-up, extreme close-up and detail shot.

SECTION-B

UNIT-IV: Fashion Promotion: Fashion Promotion, factors influencing fashion promotion, Publicity, fashion show, Personal selling and communication process, visual merchandising

UNIT-V: Fashion Marketing: Marketing concepts, fashion marketing, role of fashion marketer, market segmentation, Fashion marketing planning, Mass marketing, Marketing management, Franchising and goal of merchandiser and pricing policies.

UNIT-VI: Fashion Buying: Interpreting customer demand, Developing fashion images, Analyzing and selection of resources. Buying in domestic & foreign market. Consumer Behavior: Psychological, Social, Economical, Practical, Family Background and other.

Reference Books:

- 1) Concept of Consumer by Stephen Fringes, Fairchild Publication.
- 2) Fashion Merchandising by Stephen Fringes, Stone and samples publisher.
- 3) Creative fashion presentation by Polly Guerin, Stone and samples publisher.
- 4) Fashion Marketing by Easey, Stone and samples publisher.
- 5) Fashion Advertising and Promotion by Winter& Standlay Goodman, Stone and samples publisher.
- 6) Fashion from concept to consumer by Gini Stephens Frings.

5TX05 COMPUTER AIDED TEXTILE DESIGNING
OPEN ELECTIVE-I

Course objectives:

- 1) To gain basic knowledge about various textile fibers and Yarns
- 2) To gain the knowledge about fabric design & parameters
- 3) To understand various Computers aided textile design software's.

Course Outcomes:

After the completion of Computer Aided Textile Designing course, students will able to demonstrate the knowledge about,

- 1) Terms and parameters of textile fibers & yarns
- 2) Basic fabric properties
- 3) Fashion fundamentals
- 4) Software application for fashion creation
- 5) Various module used for creating Computer Aided Textile design
- 6) Control fabric simulation and report generation

SECTION- A

UNIT-I: Introduction to textiles: Fibers; Natural and synthetic, Parameters, uses. Yarn: Types of yarns, numbering system, Quality parameter of yarns and uses. Fabric: Types of fabric,

UNIT-II: Fabric weaves, concept of fashion: Basic fabric properties, fabric design, Basic weave, comforts properties of fabric and uses, Comparison of various fabrics Fashion: Introduction to fashion and apparel design Origin of fashion, Fashion Theories: Fashion of different eras, French and Greek revolutions, fashion promotion, style-fad trends.

UNIT-III: Fashion Design fundamentals: Fashion principle Elements of art, Definition of line shape, form, size, space, texture and colour. Display of fashion materials: definition and importance, source technique and window display, classic fashion shows. Important fashion centers of the world and India.

SECTION- B

UNIT-IV: Fashion software: Reach Fashion & Reach CAD, Configuration and Installation, commands, library, model E-fashion style, photo, and material studio.

UNIT-V: Computer aided designing-1: Fashion sketching, color matching and computer graphics. Autotex software Introduction, Configuration and Installation, Colour Library, Weave library, Checks & stripes, yarn library, Dobby, CAD in Dobby industry

UNIT-VI: Computer aided designing-II : fabric simulation, generation of Peg plan report, generation of report colour combination, Create design in weave library, Electronic jacquard, printing of weave, use of digital pen.

Reference Books:

- 1) Textile Science CBS Publishers & Distributors, by E.P.G Gohl, New Delhi, (India)
- 2) Textiles Fiber to Fabric by Bernard P. Corbman, McGraw-Hill International Editions, Singapore
- 3) Inside fashion design by Tate and Sharon Lee, Harper Publication Inc., UK (1976).
- 4) Individuality in Clothing – Selection and Personal Appearance by Mary Kefgen, Mac Millan Publications, New York (1981). Page |41
- 5) Computer Aided Design and Manufacturing by Mikell P, Grover and E Mory, Prentice Hall of India
- 6) Garment Technology for Fashion Designer by Cooklin Gerry, OM Book Service, New Delhi (1997).
- 7) Product manuals of Auto tex and Reach tech softwares

SYLLABUS OF B.TEXT. ENGG. SEM. VI

6TX01 PROCESS CONTROL IN TEXTILE MANUFACTURING

Course Objectives:

- 1) To understand the role of process control in textile industry with reference to productivity, quality and cost.
- 2) To understand the influence of various key process parameters influencing the performance of spinning and weaving process.
- 3) To learn the various process control techniques used for the control of spinning and weaving process.

Course Outcomes:

After the completion of Process Control in Textile Manufacturing course, students will able to demonstrate the knowledge about,

- 1) Process control techniques used for control of blow room and carding process.
- 2) Process control techniques used for control of combing preparatory, combing, drawing and speed frame process.
- 3) Process control techniques used for control of ring spinning process.
- 4) Process control techniques used for control of winding and warping process.
- 5) Process control techniques used for control sizing and weaving process.
- 6) Concepts of maintenance management in textile industry for controlling productivity, quality and cost.

SECTION- A

UNIT-I: Introduction to process control: objectives and scope, importance of raw material cost and need of instrumental evaluation of fibre characteristics. Yarn realization: Importance, estimation process, factors influencing yarn realization, analysis of yarn realization in textile industry. Process control in blow room and carding: Blow room and carding, control of productivity, quality, waste, cleaning efficiency and neps, process parameters influencing performance of modern blowroom and carding.

UNIT-II: Process control in comber preparatory and combing: Importance of comber lap preparation, process parameters, influence of combing preparatory on combing performance. Importance of combing process, process parameters, factors influencing combing performance, control of productivity, quality, fractionating efficiency and comber noil. Process control in drawing: Importance, control of productivity, quality, waste, drafting irregularities, roller speed variation, roller vibration, influence of process parameters, role of auto levelers. Process control in speed frame: control of productivity, quality, waste, influence of process parameters and settings on roving quality, roving stretch and its control at speed frame.

UNIT-III: Process control in ring spinning: control of productivity, quality, waste, influence of various machine and process parameters on yarn quality, control of yarn count and strength variation, control of yarn evenness and imperfections, types of yarn irregularities- its causes and control, control of yarn hairiness and end breaks in ring spinning, control of yarn and package faults- causes & remedies.

SECTION- B

UNIT-IV: Process control in winding: control of productivity, quality, waste, control of splice quality, yarn clearing efficiency, assessment of clearing performance, control of unwinding and winding tension, control of package quality.

Process control in warping: control of productivity, quality, waste, characteristics of beam and monitoring of beam quality, control of end breaks, control of productivity & efficiency of warping machine and measures to improve the productivity.

UNIT-V: Process control in sizing: Selection of sizing ingredients, preparation of size paste, control of size pickup, size add-on, yarn stretch and moisture in sized yarn, characteristics of sized beam, optimization of weavability, control of productivity and waste. Process control in weaving: Control of productivity and fabric quality with reference to shuttle-less weaving technologies. Factors affecting loom speed, efficiency, loom stoppage and loom performance. Controlling efficiency losses, control of waste, fabric defects-causes and remedies.

UNIT-VI: Maintenance management: Objectives, basic concept of maintenance management, role of maintenance in textile industry, types of maintenance- planned and breakdown maintenance, mechanism of planned maintenance, maintenance activities from modern blow room to ring spinning, machine audit, introduction to ISO certifications.

Reference Books:

1. Process Control in Textile Manufacturing, by Abhijit Majumdar, Apurba Das, R. Alagirusamy, V. K. Kothari, Woodhead Publishing Series in Textiles, November 2012.
2. Process Management in Spinning by R. Senthil Kumar
3. Process Control in Weaving by M.C. Paliwal and P.D. Kimothi
4. Quality Control in Spinning, by Ratnam T.V. and Chellamani. K. P. - SITRA Coimbatore 1999.
5. Maintenance Management volumes 1 to 21, by IMME Delhi.
6. Maintenance Management, SITRA Publication
7. Process Control in Spinning by A. R. Garde & T. R. Subramaniam, ATIRA Publication.
8. Total Quality Management by John M. Kelly, Published by Aleycuder, Hamitton Institute Inc.
9. Process Control in Spinning by Dr. K. R. Salhotra, ATIRA Publications.
10. Weaving: Technology and Operations by Allan Ormerod.
11. Weaving Machine, Mechanisms, Management by Dr. Talukdar, Ajagaonkar, Sriramulu.
12. Loom shed, BTRA Publication, Mumbai, 1986.
13. Warping and Sizing, BTRA Publication, Mumbai, 1983.
14. Winding, BTRA Publication, Mumbai, 1986.

6TX02 ADVANCE FABRIC MANUFACTURING TECHNOLOGY

Course Objectives:

- 1) To understand the performance limitations of shuttle loom and the concept behind innovation of various shuttle-less weaving machines.
- 2) To understand the various technological designs, working principle and their implications on the application scope of various shuttle-less weaving machines.
- 3) To understand introductorily about the various diversified fabrics used in textile field.

Course Outcomes:

After completion of Advance Fabric Manufacturing Technology course, students will able to demonstrate the knowledge about,

- 1) Theories of picking power, complexities and performance limitations of shuttle loom. Also will able to demonstrate the knowledge about various technical requirements of shuttle-less weaving technology.
- 2) Technical features, design and working principle of projectile weaving machine.
- 3) Technical features, design and working principle of rapier weaving machine.
- 4) Fluid flow theories, technical features, design and working principle relating to air and water jet weaving machines.
- 5) Technical features, design and working principle of multiphase weaving machines. Also will

able to introduce the standard specifications and use of various important fabric types.

- 6) Specifications, function, properties and production process flow of Multi-axial, Multi-dimensional, Denim and Narrow fabrics.

SECTION-A

UNIT-I: Limitations and complexities of shuttle loom: Theories of shuttle velocity loom speed and picking power. Theories of beat up forces, Introduction to shuttle-less weaving technologies- Classification of shuttle-less weaving machines, theories of weft velocities and acceleration, weft accumulator, weft measuring systems, cam beat up, selvages formation on shuttle-less weaving machines, yarn quality requirements of shuttle-less weaving.

UNIT-II : Projectile weaving: Introduction, technical features, advantages, transfer of weft from projectile feeder to projectile, design of projectile, phases of weft insertion, projectile picking mechanism, timing cycle of projectile weaving, tuck in selvedge, weft tension variation, energy utilization, scope , limitations and modern developments in projectile weaving viz: Electromagnetic projection, Magnetic timing belt, FOR-Maglev etc.

UNIT-III : Rapier weaving :classification of rapier weaving machines, rigid and flexible rapiers, methods of weft insertion viz. Dewas and Gabbler, rapier driving mechanism, design of rapier heads, displacement and velocity of rapiers, weft control mechanism, weaving timings, scope, limitations and latest developments in rapier weft insertion, shedding, take up, selvedge formation and quick style change.

SECTION -B

UNIT-IV : Air jet weaving : Theories of fluid flow applicable to fluid based weft insertion, air stream, friction/ drag forces, working principle of air weaving, phases of weft insertion, air requirements, air jet nozzles, buckling of weft, traverse aids for maintaining air flow, confuser system, profile reed and relay nozzles, methods of air jet control, timings of air jet loom, scope and limitations of air jet weaving. Modern developments in air jet weaving. Water jet weaving - weft supply system, requirement of water, phages of weft insertion, hydraulic weft insertion system, timings of water jet weaving, quick style changing, weft yarn tension variation, modern developments, scope and limitations of water jet looms.

UNIT-V: Multiphase weaving: classification and warp way multiphase. Warp way principle of shedding, picking and beat up mechanism. Weft way multiphase principles of shedding, picking and beat up mechanism. Scope, limitation and advantages of multiphase weaving technology. Standard woven fabrics- Definition and quality particulars of important fabrics viz. Alpaca, bagging, belting, blankets, brocade, blazer cloth, calico, chenille, chiffon, corduroy, cashmere, cotton suiting and trousers , cheese cloth, crepe fabrics, chiffon, denim, damasks, dimity, dhotis ,drills , duck/canvas, fiber glass, filter, flannel, foulard, fustian, gabardine , gauze, georgette, gingham, jean, khadi, khaki, lawn, laminated, leno, mousseline, muslin, narrow, organdy, poplin, quilts, saris, satin, sateen, sheeting, shirting, taffeta, tartan, velvet, voile.

Unit-VI: Multi-axial, Multi-dimensional fabric: Introduction, classification, functionality, properties and applications. Brief outline of major techniques used in production of multi-axial and multi-dimensional fabrics. Denim fabric- Types, specifications, functionality, properties, applications and process flow of various production techniques. Weaving machines used in denim production. Narrow fabric- Types, specifications, properties, applications and process flow and weaving machines used in their production.

Reference Books:

- 1) Weaving operations by Allen Armord
- 2) Handbook of Weaving by Sabit Adnur
- 3) Shuttle-less loom by J.J.Vincent

- 4) Weaving machine, mechanism management by D.B.Ajagaonkar , M.K.Talukdar
- 5) Principle of Weaving by R.Marks , A.T.C.Robinson
- 6) Watson's Advance Textile Design by Z.J Grosicki
- 7) Development of the Weaving Machine and 3D Woven Spacer Fabric Structures for Lightweight Composites Materials, Dissertation by Sobhey Badawi

6 TX 03 CHEMICAL PROCESSING –II

Course objectives:

- 1) To study the textile printing processes
- 2) To study various functional finishes used in textile field
- 3) To study and understand the concept of computer colour matching

Course Outcomes:

After completion of Chemical Processing-II course the students will be able to understand the,

- 1) Basics fundamentals of textile printing
- 2) Various textile printing methods.
- 3) Printing recipes for different dyes
- 4) Basic concept about functional finishes
- 5) The evaluation of various functional finishes and their various types.
- 6) The concept of computer colour matching

SECTION A

UNIT-I: Printing: Definition of printing ,difference between dyeing and printing , different steps Involved in printing viz, preparation of material ,Ingredients of printing paste, different thickener their chemical and theological behavior , drying of print , fixation of print (after treatments of printing).

UNIT-II: Styles of printing viz direct, resist, discharge and their comparison flock printing and batik printing. Different methods of printing viz block, roller, and screen (flat bed and rotary). Nonconventional methods like transfer printing, inkjet/Digital prints machines.

UNIT-III: Printing recipe: Standard recipes for printing with various types of dyes such as direct, reactive, azoic, vat, sulphur, disperse, acid dyes and pigment colour with relevant after treatments .Different faults of printing and their prevention. Evaluation of different fastness properties(wash, light, rubbing, perspiration, sublimation and other allied fastness properties).

SECTION B

UNIT-IV: Finishing: Object of finishing, classification of finishes, concept of anti crease, wash n wear and durable press finish. Concept of specialty finishes like anti-shrink, antistatic, soil release, water repellent, water proof, flame retardant, Parchmentisation, softening finish, etc. Novel finishes –Antimicrobial finish, cool finish, Aroma finish

UNIT-V: Finishing Machineries: Detail study of various finishing machine viz calendaring (types of calendars), sanforising, Stenter, drying machine. Testing of finishes - anti crease, anti-shrink, fire retardant, water proof and water repellent, antimicrobial.

UNIT-VI: Computer Colour Matching: Concept of colour and brief idea about the relation between colour and chemical constitution, factors governing transmission, tristimulus value, kubelka munk's equation, methods of colour estimation, -manual, their limitations, instrumental, pass-fail criteria, brief idea of computer colour matching and formulation.

Reference Books:

- 1) Textile printing by L. W. C.Miles
- 2) An introduction of Textile Printing by W. Clarke.
- 3) Technology of Printing by V.A. Shenai,

- 4) Textile finishing by A. J. Hall
- 5) Introduction to textile finishing by J. T. Marsh
- 6) Technology of Finishing by V.A. Shenai,
- 7) Instrumental colour measurements and computer aided colour matchings for textiles by Shah and Gandhi
- 8) Modern concept of colour and appearance by Asim Kumar Roychowdhury.

6 TX 04 COMFORT AND CLOTHING SCIENCE PROFESSIONAL ELECTIVE-II

Course objectives:

- 1) To gain basic knowledge about clothing comfort
- 2) To gain the knowledge about general assessment of clothing comfort
- 3) To understand various aspects of thermal and moisture transmission.

Course Outcome

After the completion of Comfort and Clothing Science course, students will able to demonstrate the knowledge about,

- 1) Basic element of clothing comfort
- 2) Aspects and measurement of aesthetic comfort
- 3) Subjective and objective assessment of fabric
- 4) Comfort in relation to heat and thermal transmission
- 5) Moisture and vapour transmission in relation to clothing comfort
- 6) Clothing comfort in relation with garments
- 7)

SECTION A

UNIT-I: Clothing Comfort: Brief introduction to clothing comfort, Factors for clothing selection, basic element of clothing comfort. Scientific approaches Psychology and comfort: basic concepts, Psychological perceptions and sensorial perceptions,

UNIT-II: General aspects and measurement of aesthetic comfort: Aesthetic concept of clothing. Neurophysiological Processes of Comfort: Neurophysiologic basis of sensory perceptions, Perceptions of sensations related to mechanical, thermal and moisture stimuli.

UNIT-III: Human tactical responses: Tactical characteristics of clothing, Assessment of fabric handle characteristics: subjective assessment, objective assessment, Kawabata evaluation system of fabric assessment, Fabric assurance by simple testing (FAST)

SECTION B

UNIT-IV: Thermal transmission: Thermoregulatory mechanisms of human body, heat transfer theories, thermal conductivity of fibrous materials, and thermal comfort of clothing, transient heat flow and warm-cool feeling. Measurement of thermal transmission characteristics

UNIT-V: Moisture Transmission: transfer of liquid moisture and vapour transfer through fibrous materials. Dynamic Transmission of heat and moisture: Relationship of moisture and heat. Evaluations of moisture vapour transmission:

UNIT-VI: Fabric mechanical and tactile properties: pressure sensations like fabric prickliness, itchiness, stiffness, softness, smoothness, roughness and scratchiness, clothing comfort aspects in relations with garment size and fit, factors related to garment fit.

Reference Books :

- 1) Science in Clothing Comfort by Apurba Das and R. Alagirusamy
- 2) Principles of Textile Testing by J.E. Booth
- 3) Physical Testing of Textiles by B.P.Saville

- 4) Textile Testing by Grover & Hamby.
- 5) Handbook of Technical Textiles by Anand & Harrocks.

6 TX 04 SPECIALTY TEXTILE MATERIALS PROFESSIONAL ELECTIVE-II

Course Objectives:

- 1) To gain knowledge about speciality fibres
- 2) To gain knowledge about speciality yarns
- 3) To gain knowledge about speciality fabrics

Course outcomes:

After the completion of Speciality Textile Materials course, students will be able to understand the fundamentals about the types, structure, production and applications of

- 1) Speciality fibres
- 2) High-tech fibres and fibres for the next millennium.
- 3) Speciality yarns
- 4) High bulk and melange yarns
- 5) Speciality fabrics
- 6) Special fabrics viz. spacer, polar, multi-functional fabrics.

SECTION A

UNIT-I: Speciality fibres: Introduction and classification of Specialty textile fibres, characteristics of specialty fibres and their applications, superfibers, Superfiber as a reinforcing material, superfiber applications, introduction to High polyketone fiber

UNIT-II: High Tech fibres: Various categories of high-tech fibers, Design of specialist fibers, Biotechnology and fibers, Fibers for the next millennium : Dimensions and structural control of fibers, High-tenacity and high-modulus fibers, Microdenier (ultra-fine) fibers and biomimetics, Super-biomimetic fiber materials, Super-natural materials.

UNIT-III: Speciality yarns: Design, manufacturing, characterization and applications of specialty yarns. Hybrid yarns. Core and cover yarns: - Principles of formation of yarn, constructional details of machine, process description, production of different types of core and cover yarns, yarn properties & end uses.

SECTION B

UNIT-IV: High bulk yarns: Electro-conductive yarns. Technical sewing threads. Coated yarns. Reflective yarns. Melange Yarn: - Concepts of producing mélangé yarn. Process and sequence used for production of Melange yarn. Manufacture of some special purpose yarns like:– Slub, double twist, Knop yarn, Chenille yarn, Diamond yarn, Eccentric yarn, Boucle yarn.

UNIT-V: Speciality fabrics-I: Introduction to structural design, properties-Performance and applications of specialty fabrics. Denim. Pile fabrics. Narrow fabrics. 3D fabrics.

UNIT-VI: Speciality fabrics-II: Introduction to special textile fabrics viz. Spacer fabrics. Profiled fabrics. Contour fabrics. Polar fabrics. Spiral fabrics. Multi-functional fabrics.

References Books:

- 1) New fibres by T. Hongu, Ellis Horwood, New York 1990.
- 2) Carbon fibres by Donnet J. B. Bansol R .C , Marcel Dekkar, New York 1990.
- 3) High Performance Fibres by Hearle J.W.S., , Textile Institute, Woodhead Publishing, 2001.
- 4) Fibre science and technology by S.P. Mishra. New Age International Publishers

- 5) High Performance Fibres by Edited by J. W. S. Hearle, Published by wood head publishing Ltd., England in association with Textile Institute Manchester.
- 6) New Fibres by Tatsuya Hongu, Glyn O. Phillips

6 TX 05 FASHION & CLOTHING SCIENCE OPEN ELECTIVE-II

Course Objectives:

- 1) To study the concept of fashion design process
- 2) To study Aspects elements and principles of fashion design
- 3) To study quality parameters and properties of garment and its care

Course Outcomes:

After the completion of Fashion and Clothing Science course, students will able to demonstrate the knowledge about

- 1) Concept of fashion
- 2) Different aspects of fashion design process
- 3) Aspects elements and principles of fashion design
- 4) Different mechanical and comfort properties of fabric
- 5) Quality parameters and properties of garment
- 6) Different methods, materials used for clothing care

SECTION-A

UNIT-I: Fashion concept: Meaning of fashion, fashion life cycle, fashion terminologies, Theories of fashion movement: Trickle up, Trickle down and Trickle across theories, Types of fashion dresses: Haute couture, Designer's collection and Mass Fashion. Contemporary fashion dresses w.r.t. age, sex, nationality, etc.

UNIT-II: Fashion design process: Client brief, Innovational opportunities, Research Inspirations, Research direction, designing process, inspiration, themes, moodboard/storyboard/concept boards, illustrations, client profile, Prototyping and Collections, Portfolio development.

UNIT-III: Elements and principles of fashion design: Aspects of design: Structural, functional and decorative aspects. Elements: Line, shape, silhouette, form, size, colour, texture, pattern, typography. Principles: Balance, rhythm, proportion, emphasis, harmony and unity.

SECTION-B

UNIT-IV: Fabric properties: Fabric Properties for woven and knit clothing: concept, significance importance and evaluation of dimensional stability, serviceability, drape, pilling, abrasion, crease, thickness, surface property and texture, Low stress mechanical properties, Comfort and Handle propertie, Moisture transmission properties. Finishes used to improve these properties.

UNIT-V: Properties of garment: Comfort properties of garment, Permeability to Air, Moisture, and Light. Water Absorbency, wicking and retention properties. Quality parameters for assessing sew ability, seam strength, seam pucker, seam slippage Needle cutting and seam appearance. Tailor ability, Formability and factors affecting Tailor ability, Formability.

UNIT-VI: Clothing care detergents: Classification and function of soap and detergents. Composition of commercial detergents. Properties and application of various laundry agents like bleaching, optical, whitening agents, stiffeners, softeners, Stain removal: - Nature and classification of stains, principle and classification of stain removals, common stain and their removal.

Reference Books:

- 1) Concept of Consumer by Stephen Fringes, Fairchild Publication.
- 2) Fashion Merchandising by Stephen Fringes, Stone and samples publisher.
- 3) Creative fashion presentation, by Polly Guerin, Stone and samples publisher.
- 4) Fashion Marketing by Easey, Stone and samples publisher.
- 5) Fashion Advertising and Promotion by Winter& Standlay Goodman, Stone and samples publisher.
- 6) Physical Testing of Textile by Saville

**6 TX 05 ENVIRONMENT SCIENCE & MANAGEMENT IN INDUSTRY
OPEN ELECTIVE-II**

Course Objectives:

- 1) To study the impact of human beings upon the environment
- 2) To study the various pollutants.
- 3) To study the waste and energy management

Course outcomes:

After completion of this course the students will be able to understand the ,

- 1) Basic concepts about the environmental pollution
- 2) Waste management and its control
- 3) Water pollution and its control
- 4) Air pollution and its control
- 5) Thermal and radiation Pollution and its control
- 6) Use of renewable energy

SECTION-A

UNIT-I: Environmental Science definition: Scope & Importance- Environment- Its definition, the impact of human beings upon the environment The “ecological footprint”, how the natural world works, Different types of Industrial pollution: Water, air, soil, noise, thermal, radiation, etc.

UNIT-II: Waste management in textile industry: Types of textile wastes produced during textiles manufacturing viz. spinning, weaving, etc, 3R concept-Reduce, Reuse & Recycle, viz extracting fibres from fabrics, manufacturing polyester fibres from PET bottles, etc. Development of standards & labels.

UNIT-III: Water pollution from textile industry: Sources of water pollution at various stages of process, preconditions & means for resolving the problem, various methods for the treatment of wastewater from textile plants-primary treatment, secondary, tertiary treatment- membrane technologies, waste minimization & clean technologies Eco-friendly processes, viz.- Supercritical dyeing technique, etc.

SECTION-B

UNIT-IV: Air pollution and humidification in textile industry: Air Pollution classification according to sources, Effect of pollutants on human beings, Pollution control at various stages of textile manufacturing. Humidification requirements in different sections viz. spinning, weaving etc., Localised humidification control, Maintenance of humidity

UNIT-V: Thermal and radiation pollution: Thermal pollution: Definition, sources and classification, its impact, and management. Radiation pollution: Definition, sources and its impact, and management.

UNIT-VI: Textile industry and renewable energy: Energy use in textile industry, Energy conservation management technologies, Energy Audit, Need of Renewable energy, Why solar for textile, subsidy, Advantages & Disadvantages for textile industry, Rooftop Solar Plants & its benefits for textile industry.

Reference Books:

- 1) Wastewater treatment- Third Edition by M.N.Rao, A.K.Dutta
- 2) Humidification & ventilation management in textile industry by B.Purushothama
- 3) The textile industry & environment by UNEP
- 4) Environmental impact of textiles, production, processes & protection. by Keith Slater- Woodhead publishing
- 5) Wastewater Engineering-treatment and reuse by Metcalf and Eddy
- 6) Environmental Pollution Control by C.S.Rao

SYLLABUS OF B.TEXT.ENGG. SEM.VII (C.B.C.S.)

SEMESTERSEVENTH

7TX01 KNITTING TECHNOLOGY

Course objectives:

1. To gain basic knowledge about various knitting techniques
2. To understand various loops formation process and mechanisms of knitting machines.
3. To analyze key parameters of warp and weft knitting process

Course outcomes:

After the completion of this course, students will able to:

1. Demonstrate basic knowledge of knitting process
2. Distinguish the types of stitches in weft knitted fabrics
3. Explain the working of various knitting elements
4. Evaluate the forces acting during knitting process
5. Distinguish the types of stitches in warp knit structures
6. Interpret the various factors affecting behaviour of knitted structure

SECTION - A

UNIT-I: Knitting: - History of knitting, types of knitting, difference between woven and knitted fabric, comparison of warp and weft knitting. Terms and definitions used in knitting. Types and specification of needles: spring beard, latch, compound, knitting cycle of latch, spring bearded and compound needle. Classification of knitting machines and their application, yarn quality requirements for weft knitting process.

UNIT-II: Circular Knitting machine: - Cylinder, knitting cam, sinker, feeder, stop motions. Knitting cycle of plain, rib and interlock knitted structure. Basic principles and elements of flat knitting machines, different types of flat knitting machines, various zones of knitting machines, yarn supply arrangement, loop forming arrangement and fabric take down mechanism

UNIT-III: Weft knit structures: -Technical face and back, terms and symbolic representation of weft knit structures, anatomy of loop-stitch, cross-over points, characteristics of plain, rib, interlock and purl knit structures. Needle and cam arrangement for knit, miss, and float.

SECTION - B

UNIT-IV: Fundamentals of knit formation viz. tuck, float stitches. Derivatives of weft knit structures viz. lacoste, accordion and check effect etc. Knitting dynamics: introduction to forces acting on needle, cams, and needle breakages. Types of tension devices, positive feeders and stop motions. Concept of seamless knitting

UNIT-V: Warp knitting: - Principle, construction of warp knitted fabrics, warp beams and guide bar.

Warp knit structure: - Underlap, overlap, closed lap and open lap stitches.

Warp knitting machine- Classification, knitting elements and cycle on tricot machine and raschel machine, difference between tricot and raschel machine. Applications of warp knitted fabrics.

UNIT-VI: Structure of knitted fabric: - Design of dimensional parameters of knitted fabric such as stitch length, WPI, CPI, stitch density, GSM and tightness factor. Knitted fabric relaxation, problem of knitted structure instability, asymmetry of plain loop. Curling and spirality in knitted fabric. Production calculations of knitting machines. Faults in knitted fabrics, their causes and remedies.

Reference Books:

1. W. B. Azagoankar, "Knitting Technology", Mahajan Textile Publishers.
2. David J. Spencer, "Knitting Technology", Wood Head Publishing Company, England.
3. S.C.Ray, Fundamentals and Advances in Knitting Technology ", Woodhead Publishing.
4. C. Mazza and P.Zonda, „Knitting: Reference Book of Textile Technologies“.
5. J.E.Booth, Textile Mathematics“, Vol.–3, Textile Institute, Manchester.
6. NPTEL–Knitting Technology

7TX02TEXTILEMATHEMATICS**Course Objectives:**

1. To analyze numerical related to spinning machines
2. To evaluate weaving machine performance
3. To evaluate woven structure by numerical methods

Course Outcomes:

After completion of this course, the students will be able to,

1. Solve numerical related to fibre dimensions, trash and lint content
2. Analyze blow room, card, draw frame and comber machine performances
3. Discuss the calculations related to speed and ring frames
4. Demonstrate the winding calculations
5. Solve the warping, sizing and weft winding calculations
6. Solve fabric structure and weaving mechanism related numerical

SECTION–A

Unit-I: Calculations Based on Fibre:-Introduction, fibre Dimension, tensile strength, work of rupture. Trash and lint Content of cotton, oils, fats, sizes and resins in fibre samples. Qualitative analysis of fibre mixture.

Unit-II : Calculations Based on Spinning Preparatory:-Opening and Cleaning, gearing and drafting calculations on carding, draw frame, draft in Combing machines, production calculations of card, draw frame and comber.

Unit –III : Calculations based on Speed Frame and Ring Frame:- Draft and twist calculations , yarn dimensions, calculation of conversion multipliers and constants, calculations involving yarn diameter, twist in yarn, irregularity, Gear calculations.

SECTION-B

Unit-IV: Calculations Based on Winding:- Introduction, winding rate, traverse ratio, cone winding, yarn tension, tensioning devices, yarn clearing and clearing devices.

Unit-V: Calculations Based on Weaving Preparatory:- section build on the warping drum, sizing calculations, weft preparation- calculations based on weft consumption, pirn dimension and build.

Unit-VI: Calculations Based on Fabrics:- calculations related to take up and crimp, fabric areal density, fabric cover, loom speed, shedding and picking, beat-up, warp let off and take up. Reed calculations loom efficiency and production calculations.

Reference Books:

1. Textile Mathematics, vol.1 by J.E Booth
2. Textile Mathematics, vol.2 by J.E Booth
3. Textile Mathematics, vol.3 by J.E Booth
4. Mechanics and Calculations of Textile Machinery by N. Gokarneshan, B. Varadarajan and C.B. Senthil Kumar

7TX03 PROJECT MANAGEMENT

Course Objectives:

1. To understand the phases of project management
2. To analyze the techno-economics of project
3. To gain knowledge about resource planning and scheduling

Course Outcomes:

After completion of this course, the students will be able to:

1. Explain various phases of project management
2. Understand the techno-economic feasibility analysis
3. Interpret the project on the basis of risk and return
4. Explain the scheduling of project activities
5. Understand about industrial pollution
6. Analyze the site selection and layout selection

SECTION-A

Unit-I: Project:-Meaning, concept ,types. Project Life Cycle. Generation of project ideas. Project selection process.

Unit-II : Project Feasibility Analysis:- Market analysis-Demand forecasting, various methods. Technical analysis. Financial Analysis. Means of Financing. Capital budgeting.

Unit-III : Project Appraisal :-Appraisal criteria- Time value of money, ROI, Financial projections, Analysis of risk.Social appraisals of project-Social cost benefit analysis.

SECTION-B

Unit-IV : Resource Planning and Scheduling:- Networking- CPM, PERT, Project Monitoring and Control: Importance, objective

Unit-V : Environmental Appraisal of Projects:- Meaning of environment and pollution, pollution created by different industries, Methods of preventing pollution.

Unit- VI: Textile Plant Layout:- Factors governing site selection for textile industry. Kinds of layout their advantages and disadvantages, effect of automation on plant layout, advantages of a good layout, symptoms of bad layout.

Reference Books:

1. Project Management-A Managerial Approach by J.R.Meredith and S.J.Mantel Jr., John Wiley and Sons, Inc.
2. Projects: Planning Analysis, Financing, Implementation, and Review by P.Chandra, McGraw-Hill Education.
3. Project Management by S.Chaudhari, Tata McGraw Hill, New Delhi.
4. Project Management by B.M.Patel, Vikas publishing House Pvt.Ltd., New Delhi
5. Environmental Management by M.K.Oberoi, Excel Books, New Delhi

7TX04 APPLIED ELECTRONICS AND CONTROL SYSTEMS

Course Objectives:

1. To gain knowledge of operations and applications of semiconductor devices
2. To gain knowledge of digital circuits, microprocessor, microcontroller and PLC

3. To understand the operation of photoelectric devices and transducers
4. To understand the applications of control systems in textile industry

Course Outcomes:

After completion of this course, the students will be able to:

1. Describe the fundamentals of diode and its applications in rectifier.
2. Discuss the working of BJT, Oscillator and Multivibrators.
3. Construct basic logic gates and digital circuits.
4. Explain working principle of photoelectric device, different types of sensors and transducers.
5. Understand the working of microprocessor, microcontroller and PLC.
6. Apply the knowledge of control system in textile applications

SECTION-A

Unit- I : P-N junction diode and application:- Types of materials:- conductors, insulators and semiconductors, P- Type and N-type semiconductors, P-N junction diode principle. Diode as rectifier, Full wave rectifiers, Zener diode and its use as regulator. Introduction to semiconductor devices like FET, UJT, SCR, DIAC, TRIAC and their basic principles and working.

Unit- II : Transistor:- Principles, PNP, NPN Transistor, its use as amplifier (CE mode only), oscillators (Heartley, Colpitt, phase shift and Wien bridge), multivibrators using transistor (Astable, monostable and bistable)

Unit- III : Digital Circuits:- Study of logic gates (7400 series) flip-flops, study of basic digital counters (Asynchronous and synchronous), shift register, ADC/DAC.

SECTION-B

Unit-IV : Photoelectric Devices and Transducers :- LDR, LED, photodiode, photo transistors, photoelectric relay, LCD, 7 Segment display. Transducers : Types of transducers active, passive and primary, secondary, electrical and non-electrical, capacitive transducers, inductive transducer, measurement of temperature, pressure measurement of flow, thickness, humidity, strain, displacement.

Unit-V: Microprocessor and Microcontroller:- 8085 microprocessor features, pin diagram and architecture; 8051 microcontroller features, block diagram; PLC block diagram

Unit-VI: Electronics in Textile Industry:- Open loop, closed loop control system, position and speed control mechanism. Applications of electronics in textile machines.

ReferencesBooks:

1. Principles of Electronics: V.K.Mehta
2. Integrated Electronic: MillmanHalkies
3. Modern Digital Electronics: R.P.Jain
4. Introduction to Microprocessors: B.Ram
5. Microprocessor, Architecture and applications :Gaonkar
6. Electrical Measurement: A.K.Sawney
7. Instrumentation: RanganSharma
8. Control System: NagrathGopal
9. Automatic Control Engineering :B.C.Kuo.
10. Electronic Controls for Textile Machine–Hiren Joshiand Gouri Joshi, NCUTE

7TX05PROFESSIONALELECTIVE-III(PE-III)**(i) SUSTAINABLETEXTILETECHNOLOGIESANDCERTIFICATIONS****Course Objectives:**

1. To understand the need and importance of sustainability and its assessment in the field of engineering and management.
2. To recognize the use of sustainability related certifications and organizations that works for textile field.
3. To identify the use of various sustainable textile products and their manufacturing.
4. To apply sustainable practices and methods for various textile processes.

Course Outcomes:

After completion of this course, the students will be able to:

1. Explain the need, importance and core principles of sustainability in engineering and management field.
2. Discuss the concept of sustainability assessment related to the design and manufacturing of products.
3. Describe the various certifications and its related organizations that work for textile sustainability.
4. Summarize the information about various sustainable fibers used in textile products manufacturing.
5. Recommend sustainable production strategies for spinning and weaving industries.
6. Explain about sustainable green processing methods and strategies used in fashion and garment manufacturing industry.

SECTION-A

Unit-I: Fundamentals of Sustainability:- definition, sustainability and circularity, core principles of sustainability pertaining to various domains viz. Material, economic, life, social, spiritual. Goals of sustainability, Sustainable

development indicators.

Unit-II: Sustainability Assessment:- Sustainability assessment steps and tools. Classification of sustainability assessment methodologies, metrics for technology evaluation for sustainability, trends and methods for textile and apparel industry sustainability assessment.

Unit-III: Certifications in Textile Sustainability:-Introduction to various textile certifications and its related organizations that works for sustainability in textile field viz. Better Cotton Initiative (BCI), Bluesign,Cradle to Cradle, Fair Trade, Global Organic Textile Standards (GOTS), Global Recycle Standard, Two Organic Standard Certifications, Good Weave, Made By, OE-100, Oeko-Tex, Social Accountability Accreditation Services (SAAS), SCS Certification, USDA Certified Organic, Zque, World Fair Trade Organization (WFTO), Fair Wear Foundation, Ethical Trading Initiative (ETI),B Corporation, Sourcemap, Cotton Made In Africa, Responsible Down Standard, Responsible Wool Standard, People for the Ethical Treatment of Animals (PETA), Fashion Revolution, Sustainable Apparel Coalition, Higg Index, Ecolabel Index, Outdoor Industry Association, Textile Exchange

SECTION-B

Unit-IV: Sustainable Materials for Textile Industry:- Introduction to the use of sustainable organic, eco-friendly lingo-cellulosic natural fibers viz. cotton, Hemp, linen, bamboo, pineapple etc.Recycled fiber viz. cotton, polyester and eco-nylon fiber.Semi synthetic vegan fibers viz.modal, tencel,loycell, casein,cupra etc.animalderived

Sustainable fibers.

Unit-V: Sustainable Production Methods for Textile Industry:-Introduction to the sustainability conscious product design and production approaches. Sustainable production strategies used in spinning and weaving industry.Concept of saving of water, chemicals and energy in textile industry.

Unit-VI: Green Textile Processing Techniques: - Introduction to new sustainable dyeing, printing and finishing technologies.Sustainability Practices in Fashion and Garment Industry:-Front and back end design approach. Circular Fashion, fast and slow fashion.Sustainable material sourcing, sustainable supply chain and close loop manufacturing in garment industry.

ReferenceBooks:

1. Sustainability in the Textile and Apparel Industries, Editor-Subramanian Senthilkannan, Muthu and Miguel Angel Gardetti.
2. Handbook of SustainableTextileProduction,Editor-MarionI.Tobler-Rohr
3. Sustainable Textiles, Editor-RS Blackburn
4. Sustainable Fibers and Textiles, Editor-Subramanian Senthilkannan,
5. TextilesandClothingSustainability,Editor-SubramanianSenthilkannan,

7TX05 PROFESSIONAL ELECTIVE-III(ii) TECHNICAL TEXTILES

Course Objectives:

1. To understand the difference between traditional textile and technical textile
2. To apply the knowledge of technical textiles in the area of filtration, geotextile and transportation
3. To apply the knowledge of technical textiles in the area of medical, protective and sport textile.

Course Outcomes:

After completion of this course, students will be able to,

1. Define and classify the technical textile
2. Summarize the functioning and applications of textile material in filtration area
3. Apply the knowledge of technical textiles in the area of geotextile and transportation
4. Identify the fibre, yarn and fabric for medical textile applications
5. Apply the knowledge of technical textiles in the area of protective clothing
6. Discuss the sports and recreation textiles

SECTION-A

Unit -I: Introduction: - Definition, scope, classification, role of yarn and fabric construction, composite material. Present and future market trends in Technical Textiles, difference between traditional textile and technical textile.

Unit -II : Filtration Textiles:- Definition of filtration parameters, filtration mechanism and filtration requirements, Concept of pore size and particle size, Role of fiber, Fabric construction and finishing treatments, Dust filtration - general, protective masks and high temperature filtration purification and separation of gases - liquid filtration -solid liquid filtration, liquid - liquid separation - Textiles used for the above applications and their features.

Unit -III: Geotextiles:- Introduction, definition, basic functions of geo textiles, brief idea about geosynthetics and their uses. Essential properties of geotextiles, types, raw material, Applications of geotextile, woven geo textiles - Non-woven geo textiles - knitted geo textiles.

Textiles in Transportation:-Textiles in road vehicles- Car seat, air bag, tyre cords, seat belt, filters, carpets. Textiles in Rail applications, Textiles in aircraft and marine applications.

SECTION-B

Unit -IV: Medical Textiles: -Introduction, classification, Fibres used in Non-implantable materials, Extra-corporeal devices, Implantable devices, and Healthcare / hygiene products.

Unit-V: Protective Clothing:-Brief idea, different types and functional requirement of protective clothing. Temperature and flame retardant clothing, chemical protective clothing, water proof breathable fabrics.

Defence Textile:-Introduction, functional requirement of textiles in defence, ballistic protection, and parachute cloth.

Unit -VI: Sports and Recreation Textiles: - Functional requirements of different type of products and their constructions.

Textiles in Miscellaneous Industrial Applications: Introduction, paper making felt, bearing and sealing materials, sound insulation, battery separators, electrical insulation, textiles re-inforced products; Transports bags and sheets; Fabrics to control oil spills; Canvas cover and tarpaulins.

Reference Books:

1. "Handbook of Technical Textiles", Ed. A R Horrocks and S C Anand, Woodhead Publication Ltd., Cambridge, 2000.
2. "Wellington Sears Handbook of Industrial Textiles", Ed. Sabit Adanaur, Technomic Publishing Company, Inc., Pennsylvania, USA, 1995.
3. "Engineering with Geosynthetics", Ed. G V Rao and G V S Raju, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1990.
4. "Industrial Textile", Ed., J Svedova, Elsevier, New York, 1990.
5. "Modern Textile Characterization Methods", Ed. M Raheel, Marcel Dekker, Inc., 1996.
6. Mukhopadhyay SK and Partridge JF, "Automotive Textiles", Vol. 29, No. 1/2, The Textile Institute, 1999.
7. Sewing Threads (Textile Progress, Vol. 30, No. 3/4, 2000) J.O. Ukponmwan, A. Mukhopadhyay and K. N. Chatterjee, Textile Institute, Manchester, UK, ISBN 1 8703738 7.
8. Medical Textiles-International Conference on Medical Textiles, Bolton, Woodhead Publication, Cambridge, 1997.
9. John, N.W.M "Geotextile" Blackie publication, Glasgow, 1987
10. Industrial Textiles-Horrocks

7TX06 PROJECT AND SEMINAR

Course Objectives:

1. To identify the research problem / idea for undertaking project work.
2. To conduct survey and summarization of literature based on the identified project area
3. To design plan of work for the project work undertaken
4. To undertake and deliver the seminar work based on latest trends in textiles

Course Outcomes:

After the completion of this course, students will be able to:

1. Identify the research problem and generate project idea
2. Conduct literature survey by using various literature sources
3. Summarize the literature relevant to the identified project area
4. Design the project plan and manage the resources required for the execution of project
5. Select the seminar topic based on latest trends in textile field using various literature sources
6. Compile the seminar literature and deliver the same using suitable ICT tools

Guidelines for Project and Seminar Work:

(I) Identification of Project Topic and Registration Process: - Students will identify project topic based on present industry need, student interest, faculty expertise, social needs, available resources etc. Students may undertake the project topic in following areas

a) Product development b) Fabrication work c) Upgradation and optimization of processes d) Design of systems and software e) Survey based project in the field of textile.

(II) Survey and Summarization of Literature: - Students will conduct literature search related to their project using authenticated and standard literature sources. Further, they will summarize the literature in the direction of intended project.

(III) Plan of Work: - Students will prepare synopsis of project work of proposed research topic. This synopsis will include Objectives, Literature Review, Materials and Methods, Investigation Tools, Time scale, Cost estimation etc.

(IV) Presentation of Synopsis for Approval of Registration: - Students will present their synopsis in presence of Department level Research Recognition Panel (DRRP). After approval from DRRP students will start actual execution of project work.

(V) Seminar Completion and Presentation: - Student will select seminar topic based on recent trends in textile field. Students will compile literature related to their seminar topic and they will deliver the seminar in presence of internal examiners using suitable ICT tools.

7TX07 KNITTING TECHNOLOGY-LAB

Students will perform 8 to 10 practical's based on the syllabus given for subject 7TX01 Knitting Technology.

7TX08 PROJECT MANAGEMENT-CASE STUDIES

Students will have to undertake 1 to 2 case studies based on subject 7TX03 Project Management. Students will submit the case study report in hard copies during internal evaluation process. Further they will have to deliver the case study during internal and external evaluation process using suitable ICT tools.

7TX09 SKILL DEVELOPMENT LAB

Students will perform 1 to 2 technical or techno commercial/managerial competency task based on their undergraduate curriculum. The task performed may be from following area:

- a) Planning of industrial projects
- b) Techno- commercial studies
- c) Trouble shooting of real time technological problems
- d) Exposure to the routine technological studies conducted at industries
- e) Design of small new ideas, systems, procedures, possible solutions etc. pertaining to textile engineering field.

Students will present the skill development laboratory work before internal and external evaluators using suitable ICT tools. Also they will submit the reports in hard copies to the institute during internal evaluation process.

SEMESTER-VIII

8TX01NON-WOVEN TECHNOLOGY

Course Objectives:

1. To understand technical background and global scenario of nonwoven sector.
2. To gain knowledge about the basic nonwoven process and various fiber used in nonwoven production.
3. To analyze nonwoven fabrics and understand their applications.
4. To gain knowledge about finishing and characterization of nonwoven fabric.

Course Outcomes:

After successful completion of this course, the students will be able :

1. Discuss the introductory aspects of nonwoven sector and its market scenario.
2. Compare the various fibers and production systems of nonwoven.
3. Explain the production principle of air and wet laid web formation.
4. Explain the technical principle of polymer laid web formation and mechanical bonding methods.
5. Explain the technical principle of thermal and chemical bonding methods.
6. Summarize the finishing and characterization of nonwoven fabrics.

SECTION-A

Unit-I: Nonwovens:- Introduction, Definition as per INDA and EDANA, Historical background of nonwoven industry, Global market scenario and growth, Global nonwoven industries, Comparison between woven, knitted and nonwoven fabrics, Classification of Nonwovens on various basis. Applications of nonwoven fabrics and its role in technical textiles.

Unit-II: Non-woven Manufacturing:- basic stages, raw material for nonwoven production, function of fiber, effect of fiber properties on nonwoven fabric, special fibers for nonwoven production.

Web forming technologies:- Carded web formation- raw material, fibre selection and preparation, web formation, layering types and techniques, properties and applications of carded nonwovens.

Unit-III: Airlaid Web Formation:- Air laying technology, raw material, properties and applications of airlaid nonwoven fabrics.

Wet-laid web formation: Raw materials, fiber preparation, web forming technology, properties and applications.

SECTION-B

Unit-IV: Polymer Laid web Formation:- Spun bonding and Melt blown process, raw material, production methods, bonding, properties and application.

Web Bonding Technologies:- Mechanical Bonding- Needle punching technology, Application of needle punched nonwoven. Hydro-entangled nonwovens (spunlaced), bonding method, Evolon technology, properties and applications of spun laced nonwovens. Stitch bonded nonwovens, properties and their applications.

Unit-V: Thermal Bonded Nonwovens :- Thermoplastic binder materials and fibres, methods of thermal bonding, hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding. Structure, properties and applications of thermal bonded nonwovens.

Chemical Bonded Nonwoven: - Adhesive bonding materials, chemical bonding mechanism and technologies. Properties and application of chemical bonded nonwovens.

Nonwoven Nanostructure:- Basics of nonwoven nanostructure with reference to electrospinning.

Unit-VI: Nonwoven Finishing:- Wet finishing, dyeing, printing, Application of Chemical Finishes. Mechanical finishing of nonwovens.

Characterization and Testing of Nonwovens:- Important nonwoven fabric properties, standards for testing of nonwovens.

Reference Books:

1. Handbook of Nonwovens By: S Russell.
2. NPTEL on Nonwoven Technology.
3. Albrecht, W, Fuchs, H, Kittelmann and Walter, "Nonwoven Fabrics-Raw Materials, Manufacture, Applications, Characteristics, Testing Processes", Wiley-VLH, 2002.
4. Nonwoven Process Performance and Testing-Turbak.
5. Lunenschloss, J and W. Albrecht., "Nonwoven bonded fabrics", Ellis Horwood, London.
6. Krema, R., "Manual of Nonwovens", Textile Trade Press.

8TX02 APPAREL MERCHANDISING

Course Objectives:

1. To understand the basic knowledge about industry, business and apparel merchandising.
2. To apply the knowledge of marketing and merchandising in apparel field.
3. To understand various sourcing systems and export- import documentation process.

4. To apply ISO quality management systems for apparel industry.

Course Outcomes:

After successful completion of this course, the students will be able to,

1. Understand the concept of apparel industry and business etiquettes.
2. Summarise the responsibilities, objectives and strategies for apparel merchandising.
3. Understand the role and responsibilities of apparel merchandiser.
4. Distinguish various sourcing systems used in apparel merchandising.
5. Demonstrate procedures, rules and documentation related to export business.
6. Identify the basic requirements for ISO registration and certification in apparel industry.

SECTION-A

Unit-I: Organization of the apparel business:- Introduction to apparel industry, organization of the apparel industry, types of buyers and exporters, business concepts applied to the apparel industry- international trade (GDP, WTO).

Unit-II: Marketing:- Introduction to marketing, functional organization of an apparel firm, responsibilities of a marketing division- marketing objectives and strategies, marketing research -types of markets: retails and wholesale strategies for merchandise, distribution, retailers, sourcing flows and practices, marketing plan, labelling and licensing.

Unit-III: Apparel Merchandising:- Definition of merchandising, functions of merchandising division, role and responsibilities of merchandiser, different types of communications with the buyers, awareness of current market trends, product development- line planning and line presentation.

SECTION-B

Unit-IV: Sourcing:- Need for sourcing, sourcing materials, manufacturing resource planning principles of MRP- overseas sourcing, sourcing strategies, supply chain and demand chain analysis, materials management for quick response, JIT technology.

Unit-V: Documentation:- Order confirmation, various types of export documents, pre and post- shipment documentation, terms of sale, payment, shipment etc., Export incentives: duty drawback, DEPB, I/E incentives duty drawback, DEPB, I/E: license exchange control regulation, foreign exchange regulation acts, export management risk and export finance. WTO / GATT / MFA -functions and objectives, advantages, and disadvantages.

Unit-VI: Quality management system:- ISO 9000 quality policy, data, records and traceability, documenting the quality system, quality manual, quality audit, ISO 9000 registration ISO 14000: objectives, advantages and disadvantages.

Reference Books

1. Management of Textile Industry- Dr.V.D. Dudeja,

2. Export Planning and Promotion-II-D.Sinha(1989).
3. Import-Export Finance-TuninKNandi(1989).
4. Export Marketing- A practical guide to Exporters-S.Shivaramu.
5. Inside the Fashion Business, J.A.Jamow, M,Guerreiro. B.Judelle

8TX03ELEMENTSOFCOSTINGANDECONOMICS

Course Objectives:

- 1) To gain knowledge about various costing methods
- 2) To understand concepts of inventory control
- 3) To gain knowledge of the micro and macro economics

Course Outcomes:

After the completion of this course, students will able to:

- 1) Explain the costing fundamentals and its different methods
- 2) Discuss about industrial raw material procurement and storage process.
- 3) Understand the concept of inventory management systems
- 4) Analyse demand- supply and its interaction
- 5) Explain the different market types
- 6) Describe about banking and taxation system

SECTION-A

Unit-I: Costing:- Meaning and various methods of costing Elements of cost, prime cost, factory overheads, factory cost, selling and distribution overheads. Total cost. Concept of BEP. Fixed cost, Variable cost.

Unit-II: Raw materials:- Purchase Procedure, Issue of raw materials, bin cards, store ledger, materials requisition slip, material transfer and return slip, different pricing basis of raw materials (FIFO, LIFO and Average)

Unit-III: Inventory:- Importance and meaning, Considerations for fixing maximum and minimum stock to be maintained. Annual stock taking and perpetual inventory, ABC system of inventory control. EOQ, inventor system.

SECTION-B

Unit-IV: Economics:- Definition and scope. Characteristics and classification of wants. Meaning of demand, supply, law of demand, law of supply, price elasticity of demand, factors affecting elasticity of demand. Demand supply interaction.

Unit-V: Type of Markets: - Perfect Market, Imperfect market (Monopoly, Oligopoly. etc.) Money functions, price

level, inflation.

Unit-VI: Banking:- Functions of commercial bank, central bank, National income - Definition, concepts, measurement, Difficulties in measurement of NI. Taxation: meaning, type, Canons of taxation,

ReferenceBooks:

1. Elementary Economic Theory, by K. K. Dewett and J.D Verma
2. Industrial Engineering and Management by O.P. Khanna
3. Cost Accounting Methods and Problems by B.K. Bhar.

STX04PROFESIONALELECTIVE-IV(P.E.-IV)

(i) IMPORTEXPORTMANAGEMENTINTEXTILE

Course Objectives:

1. To understand the international trade, export market, Exchange rate determination
2. To gain knowledge about foreign trade policies and process
3. To understand about foreign trade documentation, shipments and customs procedure

Course Outcomes:

After the completion of this course, students will able to:

1. Explain international trade, exchange rate determination
2. Evaluate market selection, export pricing and packaging
3. Identify the firm establishment process and foreign trade documents
4. Recommend various important documents required during foreign trade
5. Describe the shipment and customs procedure.
1. 6. Interpret the present scenario of textile and garment industry.

SECTION-A

Unit-I: Introduction to international trade:- Introduction, its scope, world economic scenario. International trade- Trade barriers- Foreign exchange- Exchange rate determination. Functions and objectives of WTO-Concepts of GATT and MFA.

Unit-II: International marketing:- Introduction- Market selection and Product strategies- Export pricing; export logistics management, Documentation and processing of an export trade.-Export finance. Export risk insurance- Export packaging, labelling and risk insurance

Unit-III: Foreign trade:- India's Export-import policy and its control. Export Promotions- Export intensives, duty drawback, Regulatory requirements for foreign trader, Major problem of India's export sector

SECTION-B

Unit-IV: Foreign Trade Documents:- Importance and scope of various documents-Certificate of origin, Packing note, invoice, etc. Bill of Lading – Air Way Bill

Documents Relating to Payment- Letter of credit, Bill of exchange, Letter of hypothecation, Bank certificate for payment.

Unit-V: 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: Formalities and Procedures, Role of Clearing and Forwarding Agents.

Unit VI: Scenario of Indian textile and garment industry: - Size, various sectors, output, contribution in total export. Govt. schemes and policies for promoting textile export, focused textile sector / product.

Reference Books:

1. Export Marketing – A practical Guide to Exporters, by Ramus Shivawheeler publication
2. Export Marketing, - A practical Guide to Exporters, by S. Shivaramu, McGraw-Hill Book
3. Export Import procedure, by C. Rama Gopal, New age international publication, New Delhi
4. International trade and Export management by Francis Cherunilam – Himalaya Publication, Mumbai
5. Hand Book of Import And Export Procedures - Paras Ram
6. Govt. Of India: Hand Book of Import and Export Procedures.

8TX04 PROFESIONAL ELECTIVE-IV (PE-IV)

(ii) TOTAL QUALITY MANAGEMENT IN TEXTILE

Course Objectives:

1. To Acquire knowledge of Total Quality Management concepts
2. To understand the various quality systems
3. Apply Total Quality Management tools for domain specific applications

Course Outcomes:

After the completion of this course, students will be able to,

1. Apply Total Quality Management principles and concepts
2. Analyze quality by using various statistical tools.

3. Evaluate various parameters to improve quality of product.
4. Understand the Total Quality Management tools as a means to improve quality
5. Describe different quality systems and procedures for total quality management.
6. Apply various quality assurance systems for quality management.

SECTION A

Unit-I: Quality Management: Definition of Quality, Dimensions of Quality, Quality costs, Top Management Commitment, Quality Council, Quality Statements, Barriers to TQM Implementation Concepts and various systems, need, relevance and tools. Documentation and standardization. Various standards for management systems.

Unit-II: TQM Principles: Fundamental concepts of TQM, Basic approach, quality and business performance, service quality versus product quality.

Customer satisfaction – Customer perception of quality, Customer complaints, Service quality, Customer retention, Continuous process improvement, 5S, Kaizen, Just-In-Time and Concepts of zero defects, right first time (FTR).

Unit-III: Statistical Quality Control: The seven tools of quality, New seven Management tools, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma. Application of six sigma in textile industry.

SECTION B

Unit-IV: TQM Tools: Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM). TQM protection act SA 8000 etc. Application of TQM tools in textile industry.

Unit-V: Quality Systems: ISO 9000- Importance and Implementation procedures. Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System-Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004. Application of quality systems in textile industry.

Unit-VI: Quality Assurance: National and international standardization, quality assurance systems, implementation of mandatory quality assurance systems. Quality circles: Back ground to quality circle, essential preconditions for successful quality circles, organizing and training for quality control. Application of quality assurance systems in textile industry.

Reference Books:

1. Total Quality Management, Pears on Education- Dale H. Besterfield,
2. Total Quality Management, Mc Graw Hill-Feigenbaum.A.V.
3. Total Quality Management, Butterworth–HcinemannLtd.,Oxford-Oakland.J.S.

4. Total Quality Management- Baidya
5. Quality Management-J.M. Juran
6. Quality Planning and Analysis-J. M.JuranQualityControlandTQM-P.L. Jain
7. The Management and Control of Quality, South-Western (Thomson Learning), 2008- James R. Evans and William M. Lindsay,
8. Quality Management-ConceptsandTasks,NewAgeInternational2007-NarayanaV.andSreenivasan, N.S.,
9. Total Quality Management for Engineers, Wood Head Publishers-Zeiri.
10. PracticalHandbookofTextileTestingandQualityControl-HambyandGroover
11. Publications of TRAs and other agencies on qualitymanagement, ISO9000,TQMandenvironment.
12. G.Shanmmugam,T. Sivasantaran,D.Sarvanan NCUTE publicationsQualityControlTechnique.

8TX05PROJECTANDSEMINAR

Course Objectives:

1. To execute the experimental work and material resourcing required for the project work
2. To perform testing and result analysis as required by project work undertaken
3. To compile project thesis and present the same during internal and external evaluation process

Course Outcomes:

After the completion of this course, students will able to:

1. Manage the various materials and research facilities required for the project work
2. Perform the experimental work as per the requirement of project work
3. Perform the various scientific and standard testings as needed by the project
4. Analyze and interpret the research data and draw the meaningful conclusions from their project work
5. Apply various research tools for the project data analysis
6. Compile the project thesis as per the standard format along with scientific articulation approach..

Guidelines for Project Work:

(I) Experimentation Work: - Students will initiate their experimental work as per the approved synopsis of project.

During experimentation work following activities will be executed.

- a) Experimental Material Sourcing
- b) Experimental Set-up Work
- c) Production/Fabrication / Research Trials

(II) Testing and Result Analysis: - Students will perform various scientific tests as required by their project. In order

to perform testing, student will use testing facilities at their parent institute or related industries or research institutions or other institutes or universities. After completion of testing work, the test data will be analyzed by using suitable analytical/computational tools.

(III) Thesis Writing: - After the completion of experimentation and result analysis work, students will start writing of their project thesis as per the standard format prescribed by their parent institute.

(IV) Internal Evaluation Prior to Thesis Submission: - Students will have to give detailed presentation before the departmental research recognition panel (DRRP) for final approval of their project.

(V) Thesis Submission in Hard Copies: - After the satisfactory remarks and approval from DRRP, students will submit project work in hard copies to the institute.

8TX06NON-WOVENTECHNOLOGY-LAB

Students will perform 8to10 practical's based on the syllabus given for subject 8TX01Non-WovenTechnology.

8TX07APPARELMERCHANDIZING-CASESTUDIES

Students will have to undertake 1 to 2 case studies based on subject 8TX02 Apparel Merchandizing. Students will submit the case study report in hard copies during internal evaluation process. Further they will have to deliver the case study during internal and external evaluation process using suitable ICT tools.
