

DEPARTMENT OF TEXTILE TECHNOLOGY
SGGS INSTITUTE OF ENGINEERING & TECHNOLOGY VISHNUPURI, NANDED
Proposed Scheme for Third Year (TEXTILE TECHNOLOGY)
From 2009-10 FY Admission
(To be introduced in 2011-12)

V Semester					
S. N.	Title of the Course	Credits	Lecture/ Week	Tutorial/ Week	Practical/ Week
TT331	Yarn Manufacture III	04	03	00	02
TT332	Weaving Technology III	05	04	00	02
TT333	Textile Wet Processing II	04	03	00	02
TT334	Manmade Fibers	04	03	00	02
TT335	Textile Testing Lab	01	00	00	02
	Elective I				
TT336	a) Theory of Textile Structures	04	04	00	00
TT337	b) Garment Technology	04	03	00	02
IT385	c) Data Base Management	04	03	00	02
	Sub Total	22	17/16	00	10/12
VI Semester					
TT338	Yarn Manufacture IV	04	03	00	02
TT339	Automatic & Unconventional Weaving	05	04	00	02
TT340	Knitting Technology & Nonwoven	05	04	00	02
TT341	In Plant Training & Seminar	01	00	00	02
IN386	Instrumentation & Control	03	02	00	02
	Elective II				
TT342	a) Merchandising	04	04	00	00
TT343	b) Fibers for Composites	04	04	00	00
IT386	c) Information Technology	04	03	00	02
	Sub Total	22	17/16	00	10/12
	Grand Total	44	34/32	00	20/24

Examination System:

The evaluation of theory courses and practicals will be done as per the Institute rules as given in the prevailing Rules and Regulation book.

Attendance Criteria:

Students have to maintain 85% attendance in all the registered courses in a semester to be eligible for appearing examinations.

Industrial Training: Every student need to take 3 weeks industrial training after First/ Second Semester of Third Year compulsorily. They need to submit bound copy of training report at the end of the Third Year for the evaluation.

Semester-I:

TT331: Yarn Manufacture III (L3-T0-P2): 4 Credit

Combing:

1. Theory of lap preparation and its importance, Pre-comber draft and doubling, Construction and working of Sliver lapper, Ribbon lapper and Super lapper machines
2. The object and principle of combing, Details of working and construction of combing machine, Comber gearing, Draft and production calculation, Different combing actions and their mechanisms, Combing cycle and timing diagram
3. Noil and its measurement, Theory of noil extraction, Forward and backward feeding, Influence of machine settings and other parameters on combing, Settings in comber, Design features of modern combers

Speedframe (Roving):

4. Functions of Speedframe, Principle of winding and twisting- flyer leading and bobbin leading, Design of different flyers, Construction and working of speed frame, Drive in speedframe, Draft and production calculation
5. Fundamentals of differential gearing, Differential motions in speed frame and related calculations, Theory and design of cone-drums, Working of building mechanism-adjustments and related calculations, Roving tension, Coil spacing and layers of roving in bobbin, Design features of modern speed frames
6. Importance and influence of various components/parts and parameters on drafting process, Details of construction and working of different spring-loaded and pneumatic drafting systems in speed frame, Stop motions, Brief Outline of Worsted Spinning:
7. Worsted top making fundamentals, Scouring, Drying, Details of working of roller and clearer card, Gill-box drawing, Combing and top conversion

Reference Books:

1. A Practical Guide to Combing and Drawing, Vol.-3 (The Textile Institute) by W. Klein
2. Man-made Fibres and their Processing, Vol.-6 (The Textile Institute) by W. Klein
3. Fundamentals of Spun Yarn Technology (CRC Press) by Carl A. Lawrence
4. Textile Mathematics, Vol.-2 (The Textile Institute) by J. E. Booth
5. The Drawframe, Comber and Speedframe, Vol.IV, Part-II (The Textile Institute, Manchester) by Frank Charnley
6. Contemporary Textile Engg. by F.Happy

Practicals:

1. Study of gearing diagram of the speed frame. Calculate the spindle speed, top cone drum speed. Also calculate the bottom cone drum speeds at various diameters.
2. Study the building mechanism. Calculate the bobbin rail speeds at various bottom cone drum speeds and corresponding time required to complete one complete traverse.

3. Study the differential mechanism of speed frame and calculate the bobbin speeds at various bottom cone drum speeds.
4. Calculate the layers/inch and coils/inch of a roving bobbin.
5. Study the drafting system of speed frame. Calculate the draft and draft constant of the system.
6. Study of the combing machine and gearing.
7. Calculate the actual draft and mechanical draft of and production a combing machine.
8. Find out the noil percentage of a given comber.

TT332: Weaving Technology III (L4-T0-P2): 5 Credit

1. **Dobby Shedding:** Purpose and use of dobbie, Types of dobbie, Different sheds used in dobbie, Positive and negative dobbie, Working of a double lift double jack(Climax) dobbie, Drive to a dobbie & its cylinder, Pattern formation and method of pegging, Settings of Climax dobbie, Heald reversing motion used in Climax dobbie, Timing cycle of double lift dobbie, Pick finding devices for dobbies, Cam dobbie and its working, Dobby with paper pattern, Comparison between wooden lags and paper synthetic cards, Positive dobbie and its working, Working of Staubli dobbie and Rotary dobbie, Cross border dobbie and its working, Working principles of electronic dobbie, machine parameters, design features, drive arrangement, system for pattern data transfer and design development.
2. **Jacquard:** It's necessity and use, Types of Jacquard, Different parts of a jacquard, Size and figuring capacity of a jacquard, Type of sheds, Working of double lift single cylinder and double lift double cylinder jacquard and their comparisons, Timings and settings of double lift double cylinder Jacquard, Harness building, types of harness mounting, Harness ties. Position of the first hook of the jacquard, Card cutting machine in general, Pattern card preparation.
High speed jacquard and its requirements, working of open shed Jacquard, Electronically controlled jacquard, working principle of Staubli, Gross and Bonas Jacquard.
Pattern data transfer management, Production of jacquard design
3. **Multiple Box Motions:** It's importance. Types of drop box motion. Cow burn and Peck box motion, setting of box motion. Pattern card preparation, card saving device.
4. **Textile Designing:** Simple and waded Bedford cords, Definition of backed and waded threads, pique fabrics and their construction. Methods of designing weft backed and warp backed fabrics and their construction details. Double cloth structures and principles of manufacturing of double clothes.
5. Calculations of weight of warp and weft required to weave a cloth, calculations of weight per square meter of cloth.

Practical:

1. To study a Climax dobbie & study the different settings.

2. Select a weave and prepare a design lattice & run the design on a doobby loom.
3. Study in details the Double lift single cylinder jacquard. To observe the shed formation and study the timings & settings.
4. Study any multiple box ----- During your mill visit.
5. Development of a design of jacquard or carpet using different repeating techniques. Card cutting, lacing and running the same on Jacquard machine.
6. Analysis of at least 03 samples of the fabrics mentioned in Textile Design chapter fabric design. Draw their design repeat, drafting and peg plan on graph paper. Give yarn particulars, fabric weight in grams per square meter, crimp percentage.
7. Prepare at least 03 different samples on pilot loom (Handloom) and represent them on graph paper with drafting and peg plan. Eg. Bedford cord, Satin, Broken twill/ zigzag twill, Double cloth, Brighton weave.
8. Working on CAD, create stripes, checks with different coloured yarn, create doobby designs (4 samples) along with their draft, lifting plan on computer.

Reference Books:

1. Weaving Mechanism- N.N.Banerjee.
2. Principles of Weaving- Mark & Robinson.
3. Watson Textile Design & Colour- Grosicki.
4. Grammar of Textile Designing - H. Nisbeth
5. Advanced Textile Designing - William Watson
6. Weaving Mechanism- T.W.Fox.
7. Shuttless Wvg.Machines- OldrichTalavasek and Vladimir Svaty.
8. Weaving machincs, mechanisms management – M.K.Talukdar, P.K.Sriramulu, D.B. Ajgaonkar

TT333: Textile Wet Processing II (L3-T0-P2): 4 Credit

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1. **Dyeing Machines:** Principle and technology of different dyeing machines like - HTHP beam dyeing machine, Jet dyeing machine and their latest developments.
 2. **Dyeing of Man-made Fabrics/Fibres:** Dope dyeing, dyeing of synthetics like viscose rayon, polyester, polyamide, acrylonitrile fabrics with suitable dyes, Dyeing of polyester/viscose, polyester /cotton blended fabric with disperse reactive and disperse vat dyes. Dyeing textured polyester yarn/fabric, micro denier filament fabric.
 3. **Natural dyes:** Introduction to Natural dyes; It's sources and classifications. Problems and prospects of natural dyes
 4. **Printing:** Styles of printing. Printing of cellulosics with reactive and vat. Printing with disperse, acid and cataionic dyes. Printing with pigments. Working of flat bed and rotary screen printing, Transfer printing, ageing and steaming in printing, Features of different latest printing machinery, Problems in printing
 5. **Finishing:** Introduction to finishing of textiles, Temporary & Permanent, Heat setting & Calendaring. Introduction to coating of textiles

Practicals:

01. Chemical Methods of identification of textile fibres
02. Determination of blends by chemical methods
03. Dyeing of Rayon with different dyes
04. Dyeing of nylon with acid dyes
05. Dyeing polyester with different methods
06. Dyeing of polyester/cotton blends
07. Dyeing of acrylic fibres
08. Printing of fabrics with screen, batic, Tie & Dye and transfer printing methods
09. Identification of dyes
10. Simple experiments to apply various finishes on cotton fabrics

Reference Books:

1. Technology of textile processing, vol-VI " Technology of dyeing " by Dr.V.A.Shenai.
2. Dyeing and Chemical Technology of Textile Fibres by - E.R.Trotman.
3. Dyeing of Wool Silk & Manmade Fibres, By- R.S Prayag.
4. Technology of Textile Printing; By- R.S.Prayag.
5. Technology of Textile Processing – vol-IV "Technology of Printing" by Dr.V.A.Shenai.
6. Book of papers on "convention on natural dyes" Dept. of Text. Tech.,IIT,Delhi, 1999
7. Technology of Textile Processing - vol. II, "Chemistry of dyes and principles of dyeing" by Dr. V.A.Shenai.
8. Polyester Textiles, Paper of 37th All India Textile Conference Oct.1980, by M.L.Gulrajani, published by Textile Association of India, 1980
9. Technology of Textile Finishing - vol.X, by Dr. V.A.Shenai.
10. Textile Finishing; By- R.S.Prayag.
11. Book of paper of NCUTE "Pilot programme for resource persons on "Finishing of garments and knits" Sept.2001. Edited by G.W.J

TT334: Man-made Fibres (L3-T0-P2): 4 Credit

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1. **Spinning Fundamentals**:- Idea of dry, wet & melt spg., Brief outline of method of staple fibre and continuous filament yarn production, Mechanics of melt spinning, Spin line forces and spinning tension.
 2. **Viscose Filament Formation**:- Chemical analysis of viscose formation, function & controls at spg. bath, ingredients and process parameters on filament quality, physical and chemical properties of rayon fibres, Brief idea of its modern derivatives.

3. **Synthesis of Polyester:-** Synthesis of DMT and TPA, chemistry and method of transesterification and polycondensation, Manufacturing method, physical and chemical properties of PET
4. **Nylon Synthesis:-** Manufacturing method, physical and chemical properties of Nylon 6, Nylon 66
5. **Poly-acrylonitrile:-** Manufacturing method, physical and chemical properties of polyacrylonitrile
6. **Polyethylene & Polypropylene:-** Manufacturing method, physical and chemical properties of polypropylene and polyethylene fibre.
7. **High Performance Fibres:-** Brief idea of manufacture of high performance fibres Viz Carbon, Glass and Kevlar, their properties and applications
8. **Spin Finishes :-** Spin Finish, its chemistry and methods of application
9. **Characterization & Structural Aspects:-** Glass transition temperature, Melting temperature, Factors affecting Tg and Tm. Concept of crystal, crystallinity, amorphous phase, Influence of fine structure on physical, mechanical and thermal properties

Practicals:

1. Synthesis of an Homo-polymer
2. Synthesis of an copolymer
3. Synthesis of an thermo-sett Resin
4. Determination of, viscosity average molecular weight of any polymer
5. Determination of molecular weight by end group analysis, and find degree of polymerisation
6. To measure birefringence of fibres
7. To determine density of a given fibre/polymer
9. To determine spin finish of a filament.
10. Spin Filament from a given polymer.

Reference Books:

- 01 Winter School on Manmade Fibres Vol-1; Edited By Gupta & Kothari; 1988, IITD
- 02 Winter School on Manmade Fibres Vol-II; Edited By Gupta & Kothari; 1988, IITD Man-made fibres - Moncrieff.
- 03 Introduction to Polymers ;by Young & Lovel; Published by Chapman & Hall
- 04 Production at Synthetic fibres - A.A.Vaidya.
- 05 Textile Fibres - Shenai.
06. Trends in Textile Machinery - S.M.Istiaque.
- 07 High Speed fibre Spg- Ziabicki

TT335: Textile Testing Lab (L0-T0-P2): 1 Credit

Practicals:

01. To determine thickness, wt/unit area of given cloth and count of warp and weft.
02. To measure fabric strength & elongation by prolific tensile strength tester.
03. To measure fabric tensile properties by Instron
04. To measure fabric bursting strength
05. To measure fabric strength by ballistic tester & Calculate work of rupture
06. To measure fabric air permeability.
07. To measure fabric water repellence.
08. To measure fabric water permeability.
09. To measure fabric stiffness.
10. To measure fabric crease recovery.
11. To measure fabric Abrasion resistance.
12. To determine the drape quality of fabrics.
13. To study the pilling properties of fabric

Elective I: Any one is to be opted out of a/b/c depending on availability

a) TT336: Theory of Textile Structures (L4-T0-P0): 4 Credit

Yarn Geometry:

1. Geometry of twisted yarns, Idealized helical yarn geometry, Yarn diameter and twist, Count and twist factor, Twist contraction: Theoretical calculations and related numerical.
2. Limits of Twist, Average fibre length in twisted yarns and derivations, Packing of fibres in yarns, Packing coefficient, Open and close packing & numerical.
3. Small and large extension behaviour of continuous filament yarns-related numerical, Extension and breakage behaviour of spun yarns
4. Migration of fibres in yarns- Ideal and real, Characterization of migration behaviour, Tracer measurements, Morton and his associates work and view on migration

Fabric Geometry

5. Float and weave value, warp & weft crimp, density of cloth, cover factor, elements of fabric geometry, cloth setting theories, plain and matt weaves
6. Peirce's equations-Flexible thread model, plain woven fabrics assumptions, jamming condition, crimp-inter change equation, Race track model, Jamming conditions, Rigid thread model and crimp balance equation.
7. Plain Jersey knitted fabric geometry: Cover factor, loop-length, wrap angle.

Reference Books:

1. Textile Yarn Structure & Application - Martindal & Goswami.

2. Structural Mechanics of Yarns, Fibre and Fabrics - Grosberg, Hearle and Backer
3. Cloth Geometry - Pierce

b) TT337: Garment Technology (L3-T0-P2): 4 Credit

1. a) A brief history of Indian readymade garment industries, Scope of readymade garment in export from India
b) Basic elements and principles of fashion designing
c) Various terms used: Fashion cycle, fad, classic styles etc.
2. Overview of pattern making grading, size, charts, Types as spread, spreading quality specifications, Spreading equipment and tools, Cutting Quality specifications, Cutting Equipment and tool analysis, Different cutting tools
3. Sewing production equipment, Difference between stitch, Stitching and seams and their classifications. Stitch class like 300, 400, 500 600, 200 & 100, Details of seam types and their uses
Stitching machines and different parts, Brief idea about overlock, Button hole, button fixing machine, embroidery machines, zig zag and fashion maker, disc machines. Some attachment to sewing machines
Stitching quality measurement, Gathering, Fabric sewability, principles of selecting proper stitch and seam types, Effect of stitch type on elasticity and strength, Effect of stitch type on seam slippage, Classification of Sewing machine bed types
4. Garment manufacturing techniques such as fashioning, neck finishes, Darts, Plates, Tucks and Gathering. Sleeve insertion, hemlines, waist lines, contours of garments, Computer application in garment manufacturing, Quality control in garment manufacturing. Cost structure in garment manufacturing
5. Buttons, Characteristics of buttons, button size, and button applications, Snaps

Practicals:

1. Practice different types of stitches by hand like tacking or kachha tacking diagonal stitch, permanent stitch, back stitch, hem stitch, - blind hem, round hem, fine stitch, button hole stitch, jerking stitch.
2. Practice different type of stitches by machine.
3. Practice different types of items by machine
4. Drafting
5. Grading
6. Preparation of plain blouse.
7. Preparation of cholicut blouse.
8. Preparation of kurta.
9. Preparation of salwar
10. Preparation of gents' open shirt
11. Preparation of gents' full pant

Reference Books:

01. Cover & Latham "The Technology of clothing manufacture" Blackwell Science Hd. 1994
02. Cooklin "Introduction to clothing manufacturing "Blackwell Science Ltd., 1998
03. Carr "Fashion Design and product" Blackwell Science, London 1992
04. Ila Kantilal "The apparel industry in India"
05. Grey and Stephens "CAD/CAM in clothing & Textiles "Gower Publishing, Hampshire, 1998.

c) IT385: Data Base Management (L3-T0-P2): 4 Credit

1. **Introduction** : Purpose of database systems, view of data, data models, database languages, transaction management, storage management, database administrator, database users, overall system structure.
2. **Entry-Relationship Model** : Basic concepts, design issue, mapping constraints, keys, E-R diagram, weak entity sets, extended E-R database schema, reduction of an E-R schema to tables.
3. **Relational Model** : Structure of relational database, the relational algebra, the tuple relational calculus, the domain relational calculus, extended relational algebra operations, modifications of the database, views, Study of SQL, embedded SQL and other SQL features.
4. **Relational Database Design** : Integrity Constraints, Domain constraints, referential integrity, assertions, triggers, functional dependencies. Pitfalls in relational database design, decomposition, normalization using functional dependencies, multi valued dependencies, join dependencies, domain key normal form, alternative approaches to database design.
5. **Storage and File Structure** : Magnetic disks, RAID, Tertiary storage, File organization, organization of records in files, data dictionary storage, storage structures for object oriented databases.
6. **Indexing and Hashing** : Basic concepts, ordered indices, B tree index files, static hashing.
7. **Transaction and Concurrency Control** : Transaction concept, transaction state, atomicity and durability, concurrent executions, serializability, recoverability.

Practicals:

Term work shall consist of at least 10 Programs based on the above syllabus and complete study and sample application development using VB or VC++ or JAVA or PHP as front-end processor and ORACLE or Microsoft Access or SQL server or Ms Sql as Back end server.

Reference Books:

1. Silberschatz, Korth and Sudarshan, "Database system Concepts", McGraw Hill.
2. Aho Ullman, "Principles of Database Management"

Semester-II:

TT338: Yarn Manufacture IV (L3-T0-P2): 4 Credit

Ring Spinning:

1. Ring spinning fundamentals, Principle of twisting and winding, Traveller lag and related calculation, Construction and working of ring spinning frame- gearing and drive, Various parts and their functions, Creel design, Structure and construction of spindle and types of spindle drives, Types of bobbin builds, Working of building mechanism
2. Concept of yarn balloon, Importance and details of lappet guide, balloon separator, balloon control rings, Forces acting on yarn element in the balloon during spinning, Causes of yarn tension variation in ring spinning, Forces acting on the traveller, Twist flow in ring spinning
3. Limitations of ring frame productivity, Design and shapes of ring/traveller combinations- relative merits and demerits, Specification of ring and travellers, Doffing and auto doffing mechanism
4. Spinning geometry, Spring-loaded and pneumatic drafting systems in ringframe- design concepts, settings, roller pressure, aprons, cots, condensers, spacers, cleaners etc., Roller lapping- causes and remedies, Modern developments in ring spinning, Monitoring devices in ring spinning- ring data system

Modern Spinning:

5. Fundamentals of open-end/ break spinning, Construction and working of rotor spinning system, Mechanism of yarn twisting, Concepts of fibre flux and draft, production and twist calculation
6. Raw material requirements and preparation, Opening/Combing roller details, Fibre deposition and gap formation on rotor collecting surface, Factors influencing rotor spinning and yarn quality, Structure and properties of rotor yarns and comparison with ring yarns
7. Principle of Friction spinning, Mechanism of yarn twisting, Construction and working of OE-friction spinning, Dref-II, Dref-III machines, Structure and properties of friction yarns, Principle of Air-jet spinning. Concepts of edge fibres and geometry of edge fibre twisting, Structure and properties of air-jet yarns, Comparison with ring yarns
8. Principles of Self-twist spinning, Twist-less spinning, Compact spinning-details comparison with ring spinning, Core yarn spinning, Bobtex spinning etc. Siro yarn, Principles and manufacturing methods of various fancy yarns- slub yarn, snarl yarn, loop yarn, knop yarn, marl yarn, corkscrew yarn

Practicals:

1. Study the path of the material through ring spinning machine. Also study and sketch the spinning geometry of the system with all major dimensions, angles etc.
2. Calculate the draft and draft constant of a given ring frame drafting system. Also calculate the break draft and break draft constant.
3. Calculate the spindle speed and yarn delivery speed of a ring frame. Also calculate the twist and twist constant of the ring frame.
4. Find out the angle of yarn pull at empty and full bobbin stages. Also calculate the

- winding revolutions and linear speed of traveller at empty and full bobbin stages in the given ring frame.
5. Study the bobbin building mechanism of the ring frame. From this mechanism and geometry calculate the approximate theoretical chase length.
 6. Study the various setting and gauges required in ring frame.
 7. Study the path of material through rotor spinning machine. Sketch the various parts involved.
 8. Study the path of material through friction/air-jet spinning machine. Sketch the various parts involved.

Reference Books:

1. A Practical Guide to Ring Spinning, Vol.-4 (The Textile Institute) by W. Klein
2. New Spinning Systems, Vol.-5 (The Textile Institute) by W. Klein
3. Man-made Fibres and their Processing, Vol.-6 (The Textile Institute) by W. Klein
4. The Technology of Short Staple Spinning Vol.-1 (The Textile Institute) by W. Klein
5. Fundamentals of Spun Yarn Technology (CRC Press) by Carl A. Lawrence
6. The Principles and Theory of Ring Spinning, Vol.-V (The Textile Institute) by A. E. De Barr and H. Catling
7. Textile Mathematics, Vol.-2 (The Textile Institute) by J. E. Booth
8. Open-end Spinning (Elsevier Science) by V. Rohlena
9. Rotor Spinning- Technical and Economic Aspects (Textile Trade Press, The Textile Institute) by E. Dyson
10. Rotor Spinning (The Textile Institute, Manchester) by C. A. Lawrence and K. Z. Chen
11. Textile yarns- Structure, Technology and Applications by B. C. Goswami, J. G. Martindale and F. L. Scardino
12. Fancy Yarns- Their manufacture and application (The Textile Institute, CRC Press and Woodhead Publishing Limited) by R. H. Gong and R. M. Wright

TT339: Automatic and Unconventional Weaving (L4-T0-P2): 5 Credit

01. Automatic Weaving: Its requirement, Classification, Pirm changing mechanism of Cimmco loom, Semi positive let-off motion, basic requirements, Effect of beam diameter & effect of angle of wrap on warp tension of freely rotating back rest and for fixed back rest, Roper let-off motion. Calculations related to let-off. Shuttle checking on automatic loom, General considerations- such as ideal shuttle checking, movement of shuttle during checking, Alacrity & its importance.
02. Unconventional Weaving: Its necessity, warp and weft requirements, building floor, humidification, control of dust, fibre fly and humidity, machinery maintenance and training, Selvage formation on unconventional looms, Weft accumulator, its importance- different types, Weft measuring systems, Comparison of various weft insertion systems

03. **Rapier Looms:** Classification of rapier looms, different systems of weft insertion, Positioning of weft insertion mechanism, Rapier driving, Weft changing mechanism, Density & quality of fabric, different electronic controls on machine.
- 04 **Air-Jet Looms:** Different systems of air-jet weaving, Different phases of insertion, and Traverse aids for maintaining of air flow (STRESS ON CONFUSER DESIGN), Relay jets, Methods of air-jet control. Air requirements, factors affecting pneumatic weft propulsion, Motion of weft, Nozzle design, Weft flight through the shed, automatic weft repair, nozzle design and different factors involved in it, factors affecting pneumatic weft propulsion, Fabric defects, quality produced, electronic controls on machine.
- 05 **Water Jet Looms:** Principles of water jet picking, Working of pump, pump details, The nozzle details. Quality of water and related aspects, Necessity of protection of machine parts, Water consumption, Cloth drying mechanisms, Timing diagram New developments, Quality of woven fabrics & fabric faults, Equation of motion of weft, Cloth set and quality
- 06 **Gripper Projectile Loom:** Classification of projectile loom, Main features, advantages, transfer of weft from feeder to the projectile, Different phases of weft insertion, picking mechanism, beat-up mechanism, Power of picking, Projectile monitoring, Energy utilisation. Mechanism for multicolour weft insertion, Features of different type of Sulzer looms, Guide line of weaving filament yarns. Material handling: transportation of weaver's beam, grey fabric.
- 07 **Multiphase Weaving Machines:** Introduction, Advantages and disadvantages of multiphase weaving, Classification, warp way multiphase weaving machine, weft way phase difference weaving machines, shedding, picking and beat-up mechanisms. Principles of working Sulzer Ruti M8300 multiphase weaving machine
- 08 **Techno -Economics of Shuttle less Weaving:** Introduction, Scenario, value rating of different technologies, economic aspect, conclusion
- 09 Fabric faults generally observed on shuttle less looms and their causes
- 10 Textile Design: Varieties of fustian fabrics, velveteen, Corduroy fabrics and their constructions, Different methods of formation of terry pile fabrics. Terry pile structures and their requirements. Gauze and leno fabrics. Use of computer in fabric design: CAD for dobby & jacquard, design algorithm.
- 11 Calculations: Shuttle movements, calculations of shuttle less weaving machines such as loom speed, projectile velocity, cloth setting rules,

Practicals:

1. Setting of Automatic cop changing mechanism of CIMMCO Loom
2. Weft feeler mechanism of CIMMCO Loom
3. Let-off motion on CIMMCO Loom
4. Setting of (a) Shuttle Box, (b) Weft cutter, (c) Dagger on CIMMCO Loom
5. Study of Rapier loom for its
 - a. Shedding
 - b. Weft Accumulator
 - c. Rapier Centering
 - d. Let-off
 - e. Selvage formation mechanism
6. Working on CAD, create dobby /jacquard designs (01 samples) along with their draft, lifting plan on computer.

Reference Books:

1. Shuttleless Wvg.Machines - Oldrich Talavasek and Vladimir Svaty.
2. Principles of Weaving - by Mark & Robinson.
3. Weaving Mechanism - Banerjee N.N.
4. Technology of H.S.Wvg.Machines & their design - ISTE Winter School Programme 3rd - 15th Dec. 90 PSG College of Technology, Coimbatore.
5. Automatic Weaving - By Tairo.
6. Modern weaving preparation - By Ormerod
7. Weaving machines, mechanisms, management – M.K. Talukdar, P.K.Sriramulu, D.B.Ajgaonkar.
8. NCUTE - Pilot Programme - Weaving-II, Shuttleless Loom. October. , 7-9, 1999 IIT, Delhi.

TT340: Knitting Technology & Nonwovens (L4-T0-P2): 5 Credit

Weft knitting:

1. Introduction, knitted loop structures, Difference between weaving and knitting, Different types of needles, Knitted loops and their representations.
2. Four primary base structures of weft knitting and their derivatives
3. Circular sinker bed knitting machine, Knitting head, the cam systems, sinker timing, cloth take down, double jersey knitting machines.
4. Jacquard: Jacquard knitting, Rib jacquard, pattern wheel, pattern drum, multi-step pattern drum, electronic devices for selecting the needles.
5. Flat knitting machines. The cam system, needles, the carriage, carrier and fabric take down, loop transfer, racking---Brief.
6. Calculations related to above.

Basic Warp Knitting Principles:

7. Construction of warp knitted fabrics, warp beams, the guide bar.
8. The pattern mechanism, chain links, development of lapping diagram and chain notation, single or double needle overlaps, five basic overlap/ underlap variations.
9. Two bar fabrics, such as Tricot, Sharkskin, Satin, Queen's cord, Double Atlas and Locknit. Knitting cycle of the Tricot machine and knitting action of the single bar Raschel m/c., WIwK Machines.
10. Calculations related to above
11. Some basic knitted geometry, tightness factor, robbing back, fabric defects.

Non-Wovens:

12. Definition of Non-wovens, its growth, market etc.
13. Classification of non-wovens, dry methods, raw materials, mixing and blending, uniformity of feeding to web making m/c. Worker and stripper card, carding action. Card clothing, Methods of web laying, laying angle, number of layers, web mass overlapping. Calculations.

14. Aerodynamic method of web production: Raw materials and fibre preparation. Super absorbents. Airlaying Technology, Aerodynamic web making machines. Bonding and web consolidation. Physical properties and applications of air-laid webs.
15. Spun bonded fabric manufacturing: Choice of polymer, spinning drawing, web laying and bonding techniques, spun bonded fabric made from different polymers and their uses. Structure & properties of spun bonded fabrics. Meltblown fabric production. Characteristics and properties of meltblown fabrics and its applications. Electro spinning system.
16. Needle-Punching process: Needle loom, operation, needling parameters, needle boards, needle size and shape & their effect, factors affecting fabrics properties. Major application of needled fabrics
17. Stitch bonding techniques, Wet bonding techniques & principles of hydro entanglement in brief.

Practicals:

Study of different knitting machines like Circular Sinker Bed, Flat Bed hand knitting, V-Bed knitting, Interlock knitting & jacquard knitting machine:

1. Study of knitting elements, stop motions, Knitting m/c speed, stitch length setting & fabric take-up.
2. Running of knitting m/c. & problems encountered
3. Preparation of few knitting samples on the above machines
4. Study of socks knitting machine and sample preparation
5. Analysis of few knitted samples and reproduction of samples on the respective machine.

Reference Books:

1. Knitting Technology by David J. Spencer – Pergarman Press, Oxford 1993
2. Knitting - Harry Wignall
3. Warp Knitting Technology - D.F. Pailing.
4. Flat Knitting - By Samuel Raz- Universal Maschinenfabric, Germany, 1993
5. Knitting Technology by D.B. Ajgoankar, Universal Publishing Corporation, Mumbai.
6. Flat Knitting Technology, Dr. Samuel Rar, Universal Maschinen fabric, Germany, 1983.
7. Needle Punching by A.T. Purdy, The Textile Institute, Manchester
8. Non-woven Bonded Fabrics by J. Lunenschloss, Ellis HORWOOD Limited, West Sussex, England, 1985
9. Handbook of non-wovens by S.J.Russel, The Textle Institute, Woodhead Publishing Ltd, 2007.

TT341: In Plant Training and Seminar (LO-TO-P2): 1 Credit

Every student has to take an in plant training for **two/ three weeks** at the end of **fifth semester** and has to submit a hard bound report to the department. **Viva-voce** based on this training report will be conducted in the **sixth semester**.

IN386: Instrumentation and Control (L2-T0-P2): 3 Credit

1. General configuration & functional description of measuring instruments, Classification and characteristic of transducers
2. Temperature Transducers: Std. & calibration, Gas & fluid filled system, Thermocouple, RTD, Thermistors bimetal strip and their working principle and application in textile industries.
3. Pressure & Flow Transducers: Diaphragms Bellows, Bourdon tube & calibration with dead weight tension and manometers, orifices, Nozzles, Ventury meter, magnetic flow meter and turbine flow meter & their working principle and application in textile field.
4. Physical Measurements: Measurement of conductivity, density, viscosity, mass, Humidity & moisture content fluid level, pH, measurement of force & tension of textile materials during their working in machines and instruments
5. Introduction to Controllers: Types of automatic control systems, Types of controllers and their principles, Introduction to P, PI, PID Electronic controllers
6. Alarm: Level alarm, temperature alarm, pH alarm, Pressure alarm their use in textile industry.
7. Mipi/PC based Control System: 8085 block diagram, Instruction set related to data acquisition & control, 8255, interfacing of A/D & D/A converter with 8085, Autoleveler using 8085 system, Interfacing of ADC cards (PCL207) with PC

Practicals:

Seven experiments related to above syllabus.

Reference Books:

1. Principles of Process Control- by C.D. Jonshon
2. A Course in electrical & electronic measurements and instrumentation - A.K. Sawhney
3. Sizing Materials, Methods, Machines- **Ajgaonkar, Talukdar and Wadekar.**
4. Instrumentation Measurement and Analysis - B C Nakra & K K Chaudhary
2nd Edition Tata McGraw Hill

Elective II: Any one is to be opted out of a/b/c depending on availability

a) TT342: Merchandising (L4-T0-P0): 4 Credit

1. Definition of Merchandising and role of Merchandiser:

Definition and role of merchandiser, Buying indication, Market structure in export markets Design buying influences.

2. Merchandising Plan:

Market planning process, merchandising plan, merchandising calendar plan (ladder), Elements in a merchandise line and the planning process, Product Development, CAD for apparel

3. Merchandising and Range Development:

Fashion forecast for Europe and USA, elements of design, Interpretation of forecast for brands in color, silhouette and fabrics. General range development and specific buyer range developments

4. Colors:

International interpretation of colors

5. Apparel Fabrics:

International textile and apparel trade, Global scenario. Technical and design specification to buy fabrics, fabric scouring for export markets, Trims and embellishment scouring

6. Market Research:

Buyer behaviour, apparel brand management, advertising & promotion, Retail management

7. Pricing, Approaches for global markets:

Effect on Global Economy Analysis of effect of international production and distribution of textiles and apparel goods on the global economy, Cost-plus and backward pricing, Elements of cost plus approach & cost sheet, Merchandise line pricing

Reference Books:

- 1) Elain Stone "Fashion Buying".
Sidney Packard "Principles of Fashion Merchandising

**b) TT343: Fibers for Composites
(L4-T0-PO): 4 Credit**

1. Introduction: Definition, Objectives and Applications
2. Fibers: Glass, Carbon, Ceramics, Boron, Polyamides, Kevlar, Alumina, Silicon derivatives
3. Matrix Materials: Polymers used, Properties of polymers, Thermoset and thermoplastic resins, Nonpolymeric materials
4. Fabrication: Hand lay, Bag molding, Pultrusion, Blow molding, Preformed molding compounds
5. Different fibre architectures used for composites, Composites for structural engineering, electrical, civil, aerospace, defense, automobile, sports, medicine and others
6. Unidirectional Composites, Planer, 3D and net-shaped performing
7. Mechanical properties, Failure mechanism, Analysis for Stress and Strain, fracture
8. Surface treatment, Laminated composites, Flamability and fire resistance of composites

Reference Books:

1. Analysis and Performance of Fiber Composites- Bhagwan D. Agarwal, Lawrence J. Broutman, and K. Chandrashekhara
2. Composite Materials: Design and Applications- Daniel Gay, Suong V. Hoa & Stephen W. Tsai
3. Design and Manufacture of Textile Composites- Long C. A.
4. Composite Material Science & Engineering- Spring Verlag

c) IT386: Information Technology (L3-T0-P2): 4 Credit

Introduction to IT System: Information concepts, System and modeling concept, What is an information system? Business information system, System developments, Why study information systems?

Information system in organisations : Organisation and information system. Competitive advantage, Performance based information system Errors in information system.

Hardware Input Processing and Output Devices : Computer systems, Integrating the power of tech., Processing and memory devices, Power speed and capacity, Secondary storage, Input output devices, The gate way to computer system, Computer system types, Standards, selecting and upgrading.

System Software and Application Software: An overview of software, System software, Application software. Programming languages, Software issues and trends.

Organising Data and Informations : Data management, Data modeling and data base, models. Database management systems, database development.

Telecommunications and Networks : An overview of communication system. Telecommunication, Network and distribution processing. Telecommunication applications.

The Internet Intranet and Extra net : Use and functioning of internet. Internet services, The world wide web, Intranet and extranet, Net issues.

Electronic Commerce : An introduction to electronic commerce, E commerce applications, Technology infrastructure, Electronic payment systems, Threats to E commerce, Strategies to successful e-commerce.

Artificial Intelligence Expert System and Visual Reality : An overview of artificial intelligence, An overview of expert system, Virtual reality.

Practicals :

1. Study of window operating system.
2. Study of MS WORD
3. Study of MS EXCELL
4. Study of POWER POINT
5. Study of OUTLOOK EXPRESS
6. Study of INTERNET EXPLORER
7. Study of Networking concept
8. Web page designing

Reference Books :

1. Principles of Information systems (Fifth ed.)- By Ralph M. Stair, George W. Reynolds. Copyright : Course Technology, A division of Thompson Learning INC.
2. Data Network and Communications By – Michalel A. Miller, Vikas Publishing House.
3. Electronic Commerce, By – Gray P. Schneider & James T. Perry.
4. Data and Computer Communications By – William Stallings, Prentice Hall, India, 2000