

DEPARTMENT OF TEXTILE TECHNOLOGY
SGGS INSTITUTE OF ENGINEERING & TECHNOLOGY VISHNUPURI, NANDED
Proposed Scheme for B.Tech. (TEXTILE TECHNOLOGY)
(Introduced in the Year 2008-09)

Semester VII						
SR No	Subject Code	SUBJECT	Total No. of Credits	Theory /Week	Tutorial /week	Practical/ week
1	TT413	Statistical Process Control in Spinning	05	03	01	02
2	TT414	Knitting & Nonwoven Technology	05	03	01	02
3	TT415	Production Management	03	03	--	--
4	TT416	Business Law & Economics	04	04	--	--
5		Elective – II				
	PR485	A) Theory of Machine	04	03	--	02
	PR486	B) CAD/CAM	04	03	--	02
	TT417	C) Merchandising	04	03	01	---
6	TT418	Inplant Training ,Seminar & Personality development	02	--	02	--
7	TT419	Minor Project	03	--	--	06
		Total	26	16	04/05	10/12
Semester VIII						
8	TT421	Process Control in Weaving	04	03	-	02
9	TT422	Technical Textiles	04	03	--	03
10	TT423	Costing & Financial Management	04	04	--	--
11		Elective – III				
	PR487	A) Machine Design	04	03	--	02
	TT424	B) Smart Textiles	04	03	01	
	IT488	C) Information Technology	04	03	--	02
12	TT425	Major Project	08	--	02	12
		Total	24	13	02	19
		Grand Total	50	29	06-08	29/31

Semester-I:

TT413: Statistical Process Control in Spinning (L3-T1-P2): 5 Credits

Collection of data, Representation of data, Frequency distribution, Mean and Standard deviation, Use of standard deviation, Random variable, Normal distribution- fundamental concepts and applications, Central Limit Theorem.

Confidence Level and confidence interval, Interval estimation, Hypothesis testing of mean(s), proportion and variances- both small and large samples, Applications in spinning and textiles, Control charts importance and applications

Concept of process control in spinning, Need of it, Steps to implement process control in spinning, Fibre characteristics, HVI data-applications in spinning, and control of mixing cost and quality-Linear programming method, Control of waste and cleaning in blowroom, carding and comber- technological considerations and norms, AFIS data-applications in spinning, Snap study and end-breakage study in ring spinning.

Control of yarn quality: Causes and control of within and between bobbin variations, Methods of routine checking, Controlling count CV%, Causes and control of yarn strength variation, Causes and control of mass variations and imperfections in yarns, Uster spectrograph and periodic faults and their analysis & Uster diagram-analysis: application in spinning process, Causes and remedies of objectionable Classimat faults.

Yarn realization and control, Productivity and means to improve it, Yarn faults and package defects, Machinery audit, Machine conditions and yarn quality, Instruments for machinery audit.

Practicals:-

1. Prepare a yarn of given count with a given twist multiplier from a given roving hank. Make the necessary arrangements in the ring frame for the required draft and twist.
2. Prepare another yarn sample of same count and twist multiplier but with only one change in process parameter (say different front top roller pressure or spacer) from a given roving hank
3. Test the single yarn strength of the above two samples. Take at least 30 readings for each type of yarns. Find the means and standard deviations of the two sets of readings. Perform the significance testing of the mean yarn strengths. Is there any significant difference between the yarn strengths at 5% significance level?
4. Introduce a periodic fault in any one of the above-mentioned yarns/ Detect a periodic fault from a given yarn. Using Evenness tester, generate the spectrogram of the same yarn and find out the wave length of the fault. Also correlate it from the known source.
5. Test the yarn CV%*s* in Evenness tester for the original yarn as well as the yarn with deliberately introduced periodic fault. Take 5 readings for each type of yarns. Find the means and standard deviations of the two sets of readings. Perform the significance testing of the mean yarn mass variation. Is there any significant mass variation between the two yarns at 5% significance level?
6. Perform the snap study in a ring spinning shed. Find the snap efficiency.
7. Perform the end-breakage study in a ring spinning shed. Find the end breakage rate.
8. Find the within and between bobbin variations of yarn samples taken from a ring frame. Give your comments.

Reference Books:

1. Process Control in Spinning by Subramaniam and Garde, Ahmedabad Textile Research Association
2. Practical Statistics for the Textile Industry: Part I by GAV Leaf, The Textile Institute.
3. Practical Statistics for the Textile Industry: Part II by GAV Leaf, The Textile Institute.
4. Statistics for Engineers by Irwin R. Miller, John E. Friend and Richard Johnson Prentice Hall of India Pvt. Ltd.
5. Mathematical Statistics by S.C. Gupta and Kapur, Sultan Chand & Sons
6. Principles of Textile Testing by J.E. Booth, Butterworth Co.

TT414: Knitting & Non-woven Technology **(L3-T1-P2): 5 Credits**

Weft knitting:

1. Introduction, knitted loop structures, a course, a well, stitch density, 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, Rib, Inter-lock and Purl structures and machine.
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.

Basic Warp Knitting Principles:

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

Non-Wovens:

11. Definition of technical textiles, its growth, market etc.
12. Classification of non-wovens, dry methods, raw materials, preparation and mixing, uniformity of feeding to web making m/c. Worker and stripper card, carding action. Methods of web laying, laying angle, number of layers, web mass web overlapping.
13. Aerodynamic method of web production: Systems used to transport the fibres from opening aggregate to perforated cylinder/traveling screen. Aerodynamic web making machines.
14. Spun bonded fabric manufacturing: Choice of polymer, spinning drawing, web laying and bonding techniques, spun bonded fabric made from different polymers and their uses.
15. 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
16. Wet bonding techniques in brief.

Practicals:

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

1. Knitting elements & knitting action
2. Running of knitting m/c. & problems encountered
3. Analysis of cloth samples. (Knitted cloth)
4. Preparation of few knitting samples on the above machines

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. Needle Punching by A.T. Purdy, The Textile Institute, Manchester
7. Non-woven Bonded Fabrics by J. Lunenschloss, Ellis HORWOOD Limited, West Sussex, England, 1985
8. Flat Knitting Technology, Dr. Samuel Rar, Universal Maschinen fabric, Germany, 1983.

TT415: Production Management (L3-T0-P0): 3 Credits

Definitions of Production & Operations Managements, Criteria of Performance, Factions of PPOM, Classification of Decision Areas, New Ways of Looking of the Decision Areas, **PPC** – Functions of PPC

Plant Layout – Features, Basic Principles, Costs, Basic Types of Layout, Their Merits and Demerits, Optimisation in Product & Process Layout, Use of Computers in Plant Level Planning, Layouts & Buildings Used in Textile Industries

Material Handling – The Principles, Cost Involved, Classification of Material Handling Equipments, Automation, Material Handling Equipments used in Ginning, Spinning, Weaving & Processing

Quality Management – Quality as a Corporate Strategy, What is Quality?, New Quality Concepts – Quality Circles, Kaizen, Contributions of Deming, Total Quality Management, Roadmap for TQM, Implementation of TQM, Six Sigma, Five ‘S’

Productivity – Concepts, Measurement, Techniques of Productivity Improvement, Efficiency & Effectiveness, Business Process Re-engineering, Benchmarking

Materials Management– Inventory, Relevant Cost, Economic Order Quantity (EOQ), ABC & Other Classifications of Materials, Supply Chain Management, Outsourcing– Textile (B.P.O.)

Production Planning in Spinning and Weaving - Spin Plans for various Counts and Yarns, Production Rates, Waste, Efficiency level of Spinning Machines, Estimation of number of machines for the given production of yarn, Balancing of Machines, Production Rates, Efficiency etc. of Preparatory and Weaving Shed, Estimation of number of machines in Preparatory and Weaving. Preparation of Weaving Plan

Machinery Maintenance- Preventive and Breakdown Maintenance of Machinery, Air Conditioning, Humidification and Ventilation for a Textile Mill, Different Systems of Humidification and their efficiency, Temperature, Relative Humidity and Ventilation

requirement for different Sections of a Textile Mill. Dust extraction in Textile Mills, Methods and equipments used in dust extraction, Lighting requirements and fittings, Spacing of light fitting, illumination standards and measurements

Reference Books:

1. Modern Textile Management - J.B. Rattan, Abhishek Publications, Chandigarh
2. Textile Manufacturing – Mr. M.G. Kulkarni
3. Krajewski, Lee J., Ritzman, Larry P., Operations Management: Strategy and Analysis – Vth Edition, Addison – Wesley Publishing Co, Inc.
4. Chary, S.N., Production and Operations Management – IInd Edition, Tata McGraw Hill, New Delhi.
5. Nair, N.G., Production and Operation Management, Tata McGraw Hill, New Delhi.
6. Chase, Aquilano and Jacobs, Production and Operation Management: Manufacturing and Services – VIIIth Edition, Irwin McGraw Hill.
7. Dr. V.D. Dudeja, Management of Textile Industry, 1981.
8. S. P. Patel, Humidification in Textile Mills, Textile Engineering Tablet II' ATIRA.

TT416: Business Law and & Economics **(L4-T0-P0): 4 Credits**

Definitions & Objectives of Industrial Relation, Labour Welfare, Welfare Programs in the Textile Industry, Social Security, Functions and Trade Unions in India

Industrial Discipline– Charge Procedure, Punishment & Appeal, Collective Bargaining, Employee Grievances - Nature, Grievance Handling Procedure, Workers Participations in Management. Industrial Disputes, Case Studies on above Topics

Nature & Concepts of Labour Law- Industrial Disputes Act 1947, The Factories Act 1948, The Wages Act 1956, The Minimum Wages Act 1948, Workmen's Compensation Act 19 23, The Of Gratuity Act 1972

Basic concepts of Micro and Macro Economics, Supply and Demand, Demand Schedule and Demand Curve, Demand function, Supply Schedule and Supply Curve, Production Function, Factors of Production, Return to scale. Economies of scale

Introduction to Macro-Economics- Meaning, Definition and Features of Macroeconomics, comparison, National Income, Determinants of Aggregates, Consumption and Saving Function, Money, Commercial Banking, Central Banking

Entrepreneurship Development – Introduction, Entrepreneur, Modern Concepts, and Qualities Required, Classification of Entrepreneur, Factors Conductive for Promoting Entrepreneurship, EDC/EDP–Training, Development of Women Entrepreneur, Case Studies of Successful Entrepreneurs

Management of Small Scale Industries–Definition, Characteristics & Classification Procedure to start Small Scale Industries, Institutions offering Assistance to SSI–DIC, MSFC, IDBI, SIDBI, IDFC, ISLFC, Etc., Central and State Govt. Policies and Incentives offered

Structure of Indian Textile Industry- Capacity production, Exports, Foreign Exchange Earnings, Strength, Weakness, Opportunities and threat (**SWOT**) analysis of Indian Textile Industry, Problems of Indian Cotton Textile Industry

Globalization and effect of World Trade Organization (**WTO**) on Indian Textile Industry, Union Budget, Government Textile Policies

Reference Books:

1. www - Ministry of Textiles.
2. Labour & Industrial Law – S.K. Mishra.
3. Industrial & Business Management Martand T. Telsang.
4. Compendium of Textile Industry - Textile Commissioner
5. Principles of Economics - Marshal
6. Principles of Economics- H.S. Agrawal, Konark Publisher

*Elective-II:***PR485: A) Theory of Machines
(L3-T0-P2): 4 Credits**

-
1. **Mechanisms & Inversions:** Mechanisms, machines, kinematics pairs, kinematics chains, kinematics inversions
 2. **Velocity & Acceleration:** Instantaneous centre, Kennedy's three centre theorem, Instantaneous centres method and relative velocity method for velocity diagrams, acceleration diagram. Short cut methods for velocity and acceleration diagrams for single slider crank mechanism. Dynamic force analysis for slider crank mechanism.
 3. **Balancing: Need for balancing,** Balancing of one/ several masses rotating in one/different planes, the effect of inertia force of a reciprocating mass on the engine frame, partial primary balance.
 4. **Turning Moment and Flywheels:** Turning moment diagram for an IC engine, fluctuation of energy and speed, flywheel
 5. **Governors:** Introduction, types of governors, centrifugal governors, watt governor, porter governor, propel governor, spring loaded governors, Hartnell governor, sensitiveness, stability, Isochronism, Hunting, governor effort and power, controlling force.
 6. **Cam:** Definition, Applications, types of cams, types of followers, Displacement, velocity and acceleration time curves, generation of cam profile, cams with specified contours, circular are cam with flat faced reciprocating follower.
 7. **Gyroscope:** Introduction, gyroscopic couple, gyroscopic stabilisation of automobiles ships and aeroplanes
 8. **Gears:** Friction wheel, types of gears, selection of gears, law of gearing, Gear Terminology, gear profiles, Interference and undercutting, methods of eliminating/ reducing interference
 9. **Introduction to Vibrations:** Introduction, Spring mass system, natural frequency computations, (spring mass and compound pen)

Practicals:

1. Study of at least four inversions of each single slider and double slider crank mechanisms.
2. Drawing of kinematics link diagram for a given mechanism.
3. At least 04 typical problems of velocity and acceleration analysis to be solved on quarter imperial size drawing sheet. (04 Hrs)
4. Practical analysis on spring mass system and compound pendulum.
5. Gyroscope.
6. Static and dynamic balancing.
7. Generation of involute tooth profile.
8. 04 problems on cam profile generation.

Text Books:

1. Theory of Machine and Mechanisms- Amitaba Ghosh & Mallik
2. Theory of Machines- P.L. Ballaney

Reference Books:

1. Theory of Machines- Thomas Bewan
2. Theory of Machine and Mechanisms- Shigley
3. Theory of Machines- Ratan

**PR486: B) CAD/CAM
(L3-T0-P2): 4 Credits**

1. **Fundamentals of CAD:** Introduction to CAD, Definition of CAD/CAM, product cycle & CAD/CAM, automation & CAD/CAM, Basic design methodology and engineering considerations, computerisation of design procedures, CAD benefits and limitations
2. **Hardware in CAD:** CAD workstation, graphic terminal, input and output devices.
3. **Computer Graphics Software & Database:** Software configuration of a graphics systems functions of a graphics packages, Constructing the geometry, 2-D and 3-D transformations, Database structure & content, wire frame modelling and solid modelling
4. **Computer Aided Drafting:** AUTO CAD, AUTO LISP
5. **Computer Aided Production Management System:** Production Planning and control, inventory management & management & material requirement planning. Shop floor control and computer process monitoring
6. **Optimization Techniques FEM:** Finite element method and their application to design problems

Practicals:

1. Auto CAD exercises for drafting of textile machinery parts like CAM GEAR etc.
2. Representation of simple fabric structure using a graphics package or a programming language like C/BASIC OR PASCAL
3. Exercises of Advanced Basic Graphics
4. CAD application for m/c. part design
5. CAD application in mechanism designing

Reference Books:

1. CAD/CAM - By Grover and Zimmers
2. Production Planning & Control - By Riggs
3. Auto CAD Manual
4. Mathematical & Procedural Elements of Computer Graphics- Rogers

TT417: C) Merchandising (L3-T1-PO): 4 Credits

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".
- 2) Sidney Packard "Principles of Fashion Merchandising"

TT418: INPLANT TRAINING, SEMINAR & PERSONALITY DEVELOPMENT (LO-T2-PO): 2 Credits

There are *three* components under this head. The weightages of marks for in-plant training
is 25%, for seminar 25% and for personality development, it is 50%. Every student has to
submit a report (bound copy) containing the technical training that he/she has undergone in
the *in-plant training* during his/ her study at TY (Textile). Also, he/ she has to present the
same individually or in a group in front of the coordinator/ teacher. The evaluation will be
done on the basis of report, presentation and viva-voce performance. Similarly, under the
head *seminar*, each student has to deliver lecture(s) /speech(s) on pre-decided topic(s) as
decided by the coordinator/ teacher. Also, he/ she has to submit a bound copy of the same.
The evaluation will be done on the basis of report, presentation and viva-voce performance.
A series of *personality development* activities will be conducted by the coordinator/ teacher
and everybody has to participate in those activities as directed by him/ her. The evaluation
of the student will be done on the basis of performances in these activities.

TT419: Minor Project (LO-T0-P6): 3 Credits

Every student will be allotted a project work (in a group) under a supervisor(s) at the beginning of 1st term of Final Year B. Tech. Every group is supposed to finalize the title of the project in consultation with the project supervisor(s). They have to complete the review of literature, plan of experiment and at least should start the actual project work in this semester. At the end of the semester, each student (in the group) is supposed to present his/her work before the panel of examiners as a part of internal examination. The weightages of marks for this examination will be 60% for the supervisor and 40% for the other examiners. The evaluation will be done on the basis of completion of the above-mentioned activities, presentation and viva-voce performance.

Semester-II:

TT421: Process Control in Weaving (L3-T0-P2): 4 Credits

General: Scopes of process control, approach to process control, setting norms and schedule of checks, machinery audit.

Winding: Scopes, approach, conditions of uniform build of a package, yarn faults and their analysis, winding parameters & their effect on yarn quality, ring package characteristics and their effects on yarn unwinding. Tension variations causes & remedies. Classification of yarn clearer & their settings, Condition of slub catchers, Calibration of slub catcher, Clearing efficiency, optimum clearing, quality of knots, splicing, packing faults & causes. Recording of yarn breaks in winding. Cause wise yarn breaking rate, approach to control of productivity, optimum allocation and expected productivity on non-automatic winding machine. Expected efficiency for autoconer, product records, productivity & its control, hard waste in winding & its resources.

Warping: Approach to process control, minimise end breaks in winding, uniformity of yarn tension across the warp sheet. Norms for end breaks, quality of warping beam, control of productivity, control of hard waste.

Sizing: Scope of process control, approach to process control. Preparation of standard recipe, control of pickup, broken end, missing end, cross ends & sticky ends & their control, Control of yarn stretch. Control of moisture in sized beam, quality of sized beam, improved fibre laying, control of productivity, dead- loss and their calculations. Control of waste in sizing.

Weft Winding: Minimising end breaks, productivity, hard waste.

Loom Shed: Control of productivity: Scopes, control of loom speed, control of loom efficiency, stops due to end breaks & warp faults & their control. Stops due to weft breaks, optimum loom allocation to minimize the cost of productivity, control of waste in weaving

Control of Quality: Scope, approach.

Some Special Weaving Processes: Introduction, properties of PC yarn, control of PC blend yarn starting from winding to weaving, conditioning of yarn

Fabric defects: Grading of fabrics, value loss. Various fabric defects & their causes and control

Some important loom accessories & their care: Care of shuttle & its inspection. Picker and its care, Twin and flat steel healds and their care, Reed and its care, gauge no.

Practicals:

Breakage study of yarn with different slub catcher setting on high speed winding.

1. Measurement of winding tension on different winding m/c.
2. Calculation of the m/c. efficiency and operative efficiency of a given winding machine.
3. Warp breakage study on warping machine.
4. Calculation of machine efficiency and operative efficiency on warping machine.
5. Effect of change of traverse length on physical configuration of a pirn and its effect on breakage rate on weaving.
6. Effect of change of run of chase on physical configuration of a pirn and its effect on breakage rate on weaving.
7. Effect of back rest height setting on cloth cover.
8. Study the bumping condition by changing cloth settings.
9. Snap study for determination of loom efficiency.

Reference Books:

1. Process Control in Weaving - ATIRA.
2. BTRA Monograph series in Warping Winding & Sizing, Bombay Textile Research Association, Edited by S.M.Betraded, 1986.

TT422: Technical Textiles (L3-T0-P3): 4 Credits

1. High- performance and high- functional fibres and textiles: Introduction, high performance fibres and their properties, high – functional fibres and textiles. Future trends-such as fibre development(nanotechnology, nanofillers).
2. Belts: Conveyer belts: Physical and mechanical properties- construction of belts, power transmission belts.
3. Hoses: Construction, manufacturing of different hoses and their uses.
4. Filter fabrics: Mechanics of filtration. Different filtration processes and textiles used therein.
5. Fire protection, general considerations, LOI, Flame resistance fibres and fabrics, fire fighter's protective clothing, thermal and electrical insulation, chemical protective clothing, mechanical protective clothing, protective clothing for space, bullet proof fabrics- it's mechanics, building, clean room fabric, radiation protection, thermal insulation, high visibility textiles.
6. Film yarn, their uses in fabrics, twines and ropes. Artificial turf, swing thread.
7. Coated fabrics: introduction, different coating materials, different coating methods such as calendaring, flexible film laminating, knife coating, roller coating, nip coating, dip coating, cast coating, extrusion coating, spray coating, foam coating, U-V Cured coating, powder coating, developments in coating(nanotechnology, nanofillers) uses of coated fabric in civil-engg., including geotextiles, in agriculture, tarpauline and covers, transport, foot wear and protective clothing.
8. Geotextiles: Functions, raw material, application of geotextiles for drainage, stabilization, filtration, erosion control and reinforcement.

9. Automotive Textiles: Major fibres, fabric types, formation and properties, building of seat, seat belt, carpet, important properties required, headlining(roofing), moulded door panels, use of Flocking on Pre-formed parts.
10. Tyre cords and fabrics: Requirements of tyre cords, Textile components in a tyre, Tyre structure and design, cord processing and tyre formation, good cord properties vs tyre performance, physical and mechanical property requirements for tyre. Airbags-back ground and functions, fabric types, formation and properties, air filters—materials and functions, fuel and oil filters—materials and functions.
11. Medical textiles: Surgical textiles, suture threads, dialyses textiles, cardio vascular textiles, disposable drapes, sanitary applications, bandages.
12. Textiles in sports: Current sportswear market, key trends in sportswear design, the design development process, the application of technical textiles in performance sportswear, emerging trends, smart clothes and wearable technology.
13. Sports footwear: Functional design of sports wear, functional fit of sport footwear, biomechanics of the foot, functional materials and components in sport footwear.

Practicals:

Testing of Non-wovens and Technical Textiles

1. Tensile strength including grab test and strip test
2. Air-permeability test
3. Porosity test of non woven/woven fabrics
4. Water permeability test
5. Thickness test.
6. Puncture Resistance
7. Shear Test of soil and with geotextile
8. Transmissivity of geotextile
9. Permeability of geotextiles
10. Grain size analysis of soil

Reference Books:

1. The design of Textile for Industrial Application - Textile Institute
2. Weaving Machine Mechanisms & Management – Talukdar M.K, D.B.Ajgaonkar,P.K. Sriramulu,Mahajan Publishing Pvt.Ltd., Ahmedabad,1998
3. Geotextiles Handbook - T.S.Ingold & Miller K.S.
4. Wellington Sears Handbook of Industrial Textiles - By Sabit Adanur,Technomic Publishing Co. INC, Lancaster, Basel,1995
5. Industrial Applications of Textile- By R.S.Goy & J.A.Jenkins Textile progress-1970, March Vol. II No.1
6. Industrial Applications of Textiles- By K.L.Floyd & H.M.Taylor Textile progress - 1970, Vol.VI, No.2
7. High performance fibres, Bajaj P. and Sengupta, A.K., The Textile Institute, Manchester
8. Industrial Applications of Textiles: Textiles for Filtration and Coated Fabrics, Pushpa Bajaj and A.K.Sengupta, The Textile Institute, Textile Progress, Vol 14, No.1
9. Automotive Textiles, S. K. Mukhopadhyay and J. F. Partridge, The Textile Institute, Textile Progress, Vol 29, No.1/2
10. Textles in sports, R.Shishoo, Woodhead Publication, The Textile Institute
11. Paper of International Conference on Non Wovens Textile Institute North India, Section, India 1992, by Prof. M.L. Gulrajani, Dept. of Text. Tech., IIT Dehli

TT423: Costing & Financial Management **(L4-TO-PO): 4 Credits**

Nature of Financial Management: Basic Definition, Some of Finance Functions, Job of the Finance Manager. Financial Goal: Profit Vs Wealth

Sources of Finance Shares, Debentures and Term Loans, Convertible Securities and Warrants, Lease Financing, Venture Capital Financing. Management of working capital
Statements of Financial Information: Financial Statements, Balance Sheet, Assets, Liabilities, Equity, Relationship between Assets, Liabilities & owners Equity, Forms of the Balance Sheet, Profit & Loss Account

Cost Classification and Allocation, Nature of Cost, Cost Classification in a Manufacturing Firm, Cost Concepts for Planning & Control Cost Allocation.

Distinction between Fixed and Variable Costs, Opportunity Costs and their use, Sunk Costs, Direct & Indirect Costs, Overheads, Controllable & Non controllable Costs

Standard Costing – Limitations of Historical Costs, General Principles of Standard Costing, Standard Costing & Budgetary Control: Standard Cost & Estimated Costs, Advantages of Standard Costing, Limitations of Standard Costing. Types of Standard Costs – Standard Cost for Direct Material, Direct Labour and Overheads, Computation & Analysis of Variances of Same

Costing: Its application to Textiles, Determination of cotton Cost per KG., Conditioned Moisture Content on Relation to Cost, Pre-determining weaving Cost, Cost Calculations of Standard Fabrics. Finishing Department Cost Problems, Activity Levels, Use of Cost Accounting in Administering a Business.

Depreciation, Pay back period, Preparation of New Project Report

Reference Books:

1. Cost Accounting– ATIRA, Ahemedabad.
2. Cost Control & Costing in Spinning Mills – SITRA, T.V. Ratnam,
3. Modern Management Accounting- S.P. Deshpande,
4. Cost Accounting - Arora.
5. Financial Management – I M Pandey, Vikas Publishing House Pvt. Ltd., New Delhi
6. Principles & Practices of Cost Accounting– N K Prasad & A K Prasad
7. Production & Operations Management – N. Chary

Elective-III:

PR487: A) Machine Design **(L3-TO-P2): 4 Credits**

1. **INTRODUCTION:** Mechanical Engineering design, Traditional design methods, Design synthesis, Aesthetic considerations in design Ergonomic considerations in design, Use of standard in design, Selection of preferred sizes, value analysis, Engineering materials, Selection of materials, statistical considerations in design.
2. **DESIGN OF MACHINE PART SUBJECTED TO STATIC LOAD:** Modes of failure, F.O.S. Stress due to B.M., stress due to torsional moment, Eccentric axial loading, Combined stress: Direct and bending e.g.c-clamp, frame, screw press, frame.
3. **DESIGN OF MACHINE PARTS SUBJECTED TO FLUCTUATING LOAD:** Stress concentration, stress concentration factors, reduction of concentration effects,

fluctuating stresses, fatigue failure, notch sensitivity, Endurance limit, Rotating beam test. Fatigue strength, factor affecting fatigue strength, Soderberg, and Man diagram S.N. diagram, cumulative damage in fatigue:-Miner's equations.

4. **POWER SCREWS:** Forms of threads, force analysis of square threads and trapezoidal threads, self locking in power screws, collar friction, stress in screw, Differential and compound screws, Recirculating type ball screws
5. **SHAFTS, KEYS AND COUPLINGS:** Transmission shafting, Design against static load and torsional rigidity, keys: Design of various types of keys, couplings: design of rigidity and flexible couplings
6. **FRICTION CLUTCHES:** Torque transmitting capacity, single disc and multiple-disc clutches, friction materials, cone clutches, centrifugal clutches.
7. **GEARS:** Types of gears, V.R. for each type, selection of types of gear, modes of failure, gear design for maximum power transmitting capacity, Design of spur and helical gear, Lewis equation, Buckingham's Equation, Wear Strength of spur & helical gears, gear lubrication
8. **BELT DRIVES:** Flat and V- belts, belt conformations, geometrical relationships, ratio of belt tension, stress in belt, selection of V. belt and flat belts, condition for maximum power transmission
9. **BEARINGS:** Classification, types, applications, selection and mounting of rolling contact bearing

Practicals:

It shall consist of one imperial size sheet on design of clutch/power screw: It shall also consist, of CAD and drafting of gear & belt drive

Reference Books:

1. Design of machine element – V.B. Bhandari Tata McGraw-Hill Co. Ltd.
2. Design of machine element – M.F. Spotts Prantice Hall India Ltd.
3. Mechanical Engineering Design. – J.E. Shingley, McGraw-Hill Int. Ltd.
4. Machine Design– Pandey and Shah, Charotar Publisher Co.
5. Machine Design– Shaums series, McGraw-Hill Co-Ltd.

TT424: B) Smart Textiles (L3-T1-PO): 4 Credits

1. Introduction
2. Electrically active polymers:- Polymer gel, Applications, Non ionic polymer gel, Electroactive elastomer
3. Thermally sensitive textiles:- Basics of heat storage, Manufacture of thermally sensitive textiles, Properties
4. Polymeric membranes:- PVA and PAAc network, Polymers prepared by plasma and radiation grafting, Polymers for gas separation
5. Fiber Bragg gratings:- Fabrication of grating, Mechanical properties of FBG, Optical response under various deformations, Applications
6. Embroidery and its applications
7. Wearable motherboard:- Manufacture, Properties and Applications
8. Snow clothing
9. Bioprocessing:- Wool, Cotton and synthetic fibers

10. Polymers for biomedical applications
11. Tissue engineering

Reference Books:

1. Smart fibres, fabrics and clothing, Edited by Xiaomiag Tao, The Textile Institute

IT488: C) Information Technology (L3-T0-P2): 4 Credits

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

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 modelling, 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. Copright: Course Technology, A division of Thompson Learning INC
2. Data Network and Communications, By – Michalel A. Miller, Vikash Publishing House.
3. Electronic Commerce, By- Gary P. Schneider & James T. Perry.

4. Data and Computer Communications BY-William Stallings, Prentice Hall, India, 2000.

TT425: Major Project (LO-T2-P12): 8 Credits

Major project is the continuation of the minor project. The project which was undertaken by a group of students should be completed within this semester. Every student (in a group) is supposed to present the work before the panel of examiners once internally as mid-term examination and next during the end-term examination before the panel of examiners (one should be external examiner). The weightages of marks for the internal and external examinations will be 50% and 50%. Internal assessment will be done jointly by the project supervisor(s) and other examiners and the weightage of marks to be allotted will be in the ratio of 1:1. External assessment will be done jointly by the project supervisor(s) and external examiner and the weightages of marks to be allotted will be in the ratio of 1:1. [*Ex-Out of 100 marks: Internal: Supervisor-25, Other examiners-25, External: Supervisor-25, External examiner-25*]. The evaluation of both internal and external examinations will be based on the presentation, viva-voice and actual work done by the student as an individual as well as a group.