FINAL YEAR B.TEXT. (TPE) SEMESTER-I

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
7.1	TPE	ENGINEERING DESIGN OF TEXTILE MACHINES-II	3	---	---	3	100	25	50	---	175
7.2	TPE	THEORY OF TEXTILE MACHINES-II	3	---	---	3	100	25	---	---	125
7.3	**TPE**	*** MAINTENANCE OF TEXTILE MACHINES**	**3**	**---**	**---**	**3**	**100**	**25**	**---**	**50**	**175**
7.4	TT/MMTT/TPE	TEXTILE MILL PLANNING & ORGANISATION	4	---	---	---	100	25	---	---	125
7.5	**TT/MMTT/TPE/TC**	*** INDUSTRIAL ENGINEERING**	**3**	**---**	**---**	**---**	**100**	**---**	**---**	**---**	**100**
7.6	TPE	ELECTIVE -I	3	---	---	---	100	---	---	---	100
7.7	TT/MMTT/TPE/TC	SEMINAR-I	2	---	---	---	---	50	---	---	50
7.8	TT/MMTT/TPE/TC	INPLANT TRAINING-II	---	---	---	---	---	50	---	---	50
			21	---	---	9	600	200	50	50	900

L =LECTURES
T =TUTORIALS
DR=DRAWING
PR=PRACTICALS

TP=THEORY PAPER
TW=TERM WORK
OE=ORAL EXAMINATION
PE=PRACTICAL XAMINATION

LIST OF ELECTIVE-I

1. MECHATRONICS
2. CHEMICAL PROCESSING MACHINERY
3. GARMENT MANUFACTURING TECHNOLOGY
4. ENERGY CONSERVATION IN TEXTILES
5. ECONOMICS

FINAL YEAR B.TEXT. (TPE) SEMESTER-II

SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
8.1	TPE	FLUID FLOW SYSTEMS & CONTROLS	3	---	---	3	100	25	---	50	175
8.2	TPE	INSTRUMENTATION & METROLOGY	3	---	---	3	100	25	---	50	175
8.3	TT/MMTT/TPE/TC	TEXTILE MILL MANAGEMENT	3	---	---	---	100	---	---	---	100
8.4	TPE	MAINTENANCE MANAGEMENT	4	---	---	---	100	---	---	---	100
8.5	TPE	ELECTIVE -II	3	---	---	---	100	---	---	---	100
8.6	TT/MMTT/TPE/TC	SEMINAR - II	2	---	---	---	---	50	---	---	50
8.7	TT/MMTT/TPE/TC	DISSERTATION	---	---	---	6	---	50	100	---	150
			18	---	---	12	500	150	100	100	850

L =LECTURES
T =TUTORIALS
DR=DRAWING
PR=PRACTICALS

TP=THEORY PAPER
TW=TERM WORK
OE=ORAL EXAMINATION
PE=PRACTICAL XAMINATION

LIST OF ELECTIVE-II

1. CONDTION BASED MONITORING TECHNIQUES
2. ENVIRONMENTAL ENGINEERING IN TEXTILES
3. FASHION TECHNOLOGY IN APPARELS & MADE-UPS
4. INDUSTRIAL TEXTILES
5. ORGANIZATIONAL BEHAVIOUR AND HUMANITIES

FINAL YEAR B. TEXT - SEMESTER-I

7.4 TEXTILE MILL PLANNING & ORGANISATION (TT/MMTT/TPE)

Lectures	:	4 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

I) **Project Planning** - Introduction, Capital investment required for project, Phases of Capital Budgeting, Difficulties in Capital expenditure, Phases involved.

II) **Machinery Specification, Selection & Calculation for No. of Machines** - Selection of machines & machinery specifications required for the product in spinning, weaving, knitting etc.

Calculation for no. of machines in spinning /spin plan - Preparation of organization for ring spinning mill and preparatory, departments based on ring spindle capacity and production of ring spun yarn. (Carded, Combed, Blended, Folded) Preparing organization of rotor spinning mill. Calculation regarding efficiency, waste, draft, twist, production rates, amount of raw material required and no. of machinery required at different stages of processing.

Calculation for no. of machines in weaving / weave plan - Preparation of organization for shuttle & shuttleless weaving mill and preparatory departments based on number of weaving machines & production of different cloths. Calculation regarding efficiency, waste, crimp, production rates, raw material and no. of machinery required at different processes.

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

IV) **Site Selection** - Selection of site for textile mills, General location, Actual selection of specific site, Calculation of spatial requirements, factors influencing site selection, Climatic considerations, geo-technical report, bearing pressure etc. General information about textile manufacturing industry centers in India.

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

VI) **Formulation of a Project Report for Spinning, Weaving, Knitting Units** - Assumptions, Machinery Organizations, Requirement of Miscellaneous Fixed Assets & Machinery Stores & Spares, Requirement & Calculations related to Electrical Power, Lighting, Water, Steam, Compressed Air, etc.

VII) **Materials Handling** - Definition and importance of materials handling, functions and principles of materials handling, material handling methods, engineering and economic factors, relationship to plant layout, selection and type of material handling equipments, study of different types of equipments used for materials handling in spinning, weaving, knitting mills.

VIII) **Labour Compliments** - Types of labour required, labour compliment, labour and staff required for spinning and weaving based on workload consideration. Use of mathematics for number of operations in deciding the workload.

IX) **Techno-economic Viability** - Calculations of cost of project – Means of Finance – Estimates of sales & production – cost of production – working capital requirement – Profitability Projection – Break even point – Projected cash flow statements.

Reference Books

1) Textile Project Management by A. Ormerod, The Textile Institute Publication.
2) Goal Directed Project Management by E.S. Andersen, K.V. Grude & Tor Hang, Coopers & Cybranl Publication.
3) Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,
4) Management of Textile Production, A. Ormorod. Newnes – Butter Wortrs Publication.
5) Plant location, Layout & Maintenance by Ruddele Reed.
6) Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma, Khanna Publishers, Delhi.

7) Norms for Process Parameters, Productivity etc. ATIRA, BTRA, SITRA, NITRA, etc.
8) Trade Literature of Different Machinery Manufacturers.
9) A Weavers' View Can We Afford Not to invest by L. Cegielka M.A, The Textile Institute Publisher.

FINAL YEAR B. TEXT - SEMESTER-I

7.5 INDUSTRIAL ENGINEERING (TT/MMTT/TPE/TC)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Introduction –** Concept of Industrial Engineering, definition, history & development, various techniques of Industrial Engineering, Scope in Textiles.

II) **Production Planning & Control (PPC) –**

a) Production – Definition, Types of production, characteristics of each type production.

b) Productivity – Definition, ways to increase productivity, measurement of productivity – Total productivity Index & factor productivity indices.

c) Definition of PPC, Functions of PPC

d) Sales forecasting, various techniques of sales forecasting, problems.

e) Gantt chart, types, use.

III) **Work Study –** Definition, techniques, objectives, use of work study to increase productivity.

a) Method Study – Definition, steps in method study, details of every step, charts used for recording, outline chart, flow process chart & its types, two handed process chart, multiple activity chart, principles of motion economy.

b) Micromtion Study – Contribution of Gilbreth, Therbligs, Prodedure, SIMO Chart.

c) Work Measurement – Definition, Techniques, concept of total time, standard time, allowances, MTM, problems.

IV) **Operation Research –** Definition, various techniques of OR.

a) Basics of linear programming – Formulation of LP, Graphical solution, simplex method, problems.

b) Network Analysis – PERT, CPM, and comparison.

V) **Plant Location –** Importance of site selection, factors affecting, urban, rural & suburban area, selection of site for textile & engineering plant.

VI) **Plant Layout –** Factors affecting plant layout, Types of plant layouts, Layout procedure, Use of computer in plant layout.

VII) **Value Engineering –** Value, concept of value analysis, concept of value engineering, Reasons of unnecessary cost, value analysis procedure.

VIII) **Job Evaluation & Merit Rating –** Objectives & methods.

IX) **Inventory Control –** Concept, Types, ABC Analysis, EOQ, EBQ.

X) **Machine Interference –** Introduction, Ideal automatic machines, semi automatic with cycle servicing – semi automatic with random servicing.

Reference Books

1) Work Study – ILO
2) Work Study in Textiles – ILO
3) Elements of Production Planning & Control – Samual Eilon.
4) Industrial Engineering & Management – Banga Sharma.
5) Industrial Engineering & Management – O. P. Khanna.
6) Industrial Engineering Manual of Textile Industry – Nobert Lioyd Enrick.
7) Industrial & production engineering – Sanjay S. Patil, & Nandkumar Hukeri.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 GARMENT MANUFACTURING TECHNOLOGY (TT/MMTT/TPE/TC) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

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

II) **Manufacturing Technology**:

- Types of Fabric Packages – Types of Fabrics – One Way – Two Way Fabrics –Their effect on spreading –Methods of Fabric spreading – Spreading equipments – Computerized spreaders – Marker making –Marker efficiency – Factors affecting marker efficiency – Marker duplicating methods – Computer aided marker making.
- Introduction to cutting machines – Types and functions of cutting machines – straight knife, round knife,band knife, cutting machines – Notches, drills, die cutting machines – Computerized cutting machines –maintenance of cutting machines – common defects in cutting & their remedies.
- Types of needles – Parts of needles and their function – Needle size - sewing thread – properties of sewing threads – ticket number – fabric sewability. Seam quality – effect of stitch type on seam quality. Selection of seam and stitch.
- Federal classification of seam and stitches – Basic parts of sewing machine – Needle – Bobbin case /Bobbin hook, Loopers – Loop spreader – Threading fingers – Throat plate – Tongue chaining plates – Takeup devices – Tensioners – Feed dog – Pressure foot for sewing.
- Sewing Technology : feed systems, , machinery and equipment, basic sewing machines, like general sewing, over locking, safety stitching, blind stitching, button holes, bartacking, & button sewing, special sewing machines like three thread overlock with a microprocessor, Sewing

problems, slipped stitches, stay gered stitches, unsalaneed stitching pocker etc.

a) Fusing Technology: Construction of Fusibles, Fusing process, Fusing machinery, quality control.

b) Application of various components such as buttons, zips, underlining, Hooks and ornamental materials, - fly, kissing, lap; Button and buttonholes, hooks and eye snaps, Velcro and other accessories.

c) Pressing Technology: Classification, components of Pressing, machinery and equipments viz. Hand irons, dry iron, electric steam iron, under pressing, top pressing, scissors press, assept or drower, Carousel machines, Steam dolly, tunnel finishing, controls, handling systems, boiler room.

d) Garment Finishing and Inspection:Attaching buttons, marking, sewing labels, cleaning, final touch, fitting quality, live models, measurements, viewing the garments, quality standards.

III) **Production Technology**: Manual systems, making through, section system, progressive bundle system, straight line system, mechanical transport systems, selective conveyor belt system, unit production system, quick response sewing system.

- Ware Housing: Handling equipment, storage equipment, packing equipment.
- .Basic Pattern Making: Measurement Taking – Size chart and Measuring of Sizes. Definition of various garments parts & positions. Methods: Bespoke method & Industrial method (Using Blocks) – Basic block construction – Block preparation & correction. Figure analysis: Body ideals, body proportion, height, weight distribution, body parts, individual figure analysis, study of body measurement of all age groups. Preparation of basic blocks, muslin pattern, commercial pattern, sizes and its understanding, fabric preparation for garment construction.
- CAD/CAM in Garment Manufacturing.

Reference Books

1) Garment Technology for fashion designers by Gerry Cooklin
2) Introduction to clothing Manufacturing by Gerry Cooklin
3) Clothing construction and wardrobe planning by Dora S. Lewin, Mabel Goode Bowers, Manetta Knttunen — The Macmillan co New York
4) Garment Technology by Dr. V.Subramaniam — Winter School booklets 1990
5) BIS publications 1989.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 ECONOMICS (TT/MMTT/TPE/TC)

(ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Definition of Economics** – Nature and scope – Economy – Types – Problems and functioning – Basic terms and concepts

II) **Human Wants** – Consumption and standard of living – Demand Analysis – Consumer's surplus – Demand and law of demand – Elasticity of demand.

III) **Scale of Production** – Laws of returns – Costs and cost curves – Supply and supply curves – Markets and market forms – Equilibrium of the firm and industry.

IV) **Price Determination under perfect competition** - A preliminary Idea – Price determination under perfect competition – market price and normal price – price determination under imperfect competition

V) **National Income** – Concept and importance – Nature and functions of money – Monetary standards – Theory of money and prices.

VI) **Credit and Credit Instruments** - Banking – Central Banking.

VII) **International Trade** - Balance of payments – Foreign exchange rate determination.

VIII) **Public Expenditure** – Public revenue – Taxation – Public Finance – Public Debt.

IX) **Economics Systems** - Capitalism – Socialism – Mixed Economy

Reference Books

1. Elementary Economics Theory by K. K. Dewett and J. D. Varma
2. Basic Economics by James A. Dgal, Nicholas Karatjas
3. Applied Economics by Derek T. Lobley.
4. Micro Economic Theory by M. C. Vaish.
5. Principles of Economics by D. N. Dwived.
6. Economics Analysis, Decision Making & Policy by George Leland Bach.
7. Contemporary Economics by Milton H.
8. Engineering Management by Frgidon Mazda – Addison Weley Longman Pearson Education.
9. Economics Environment of Business by V. K. Garg Sultan Chand & Sons Educational Publishers.
10. Management for Business and Industry by Cloute S. George.
11. Essentials of Management by Koontz Odonell.

FINAL YEAR B. TEXT - SEMESTER-I

7.7 SEMINAR-I (TT/MMTT/TPE/TC)

Lectures	:	2 Hrs / Week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Topic -

In the beginning of the semester, every student individually will be assigned a seminar topic in the emerging / perspective field in the area of textiles such as Spinning, Weaving, Fibres, Testing, Chemical processing and alike.

Seminar Preparation and Presentation -

Students will collect the information on the above subjects and submit the report both soft and hard copy on the dates specified by the concerned faculty. The seminar report will be of minimum 15 pages. The spacing between the lines will be 1.5. The font size will be 12 point with New Times Roman. The list of reference must be given at the end of seminar report. The list of reference should be written as per the Textile Research Journal format.

Term Work Marks –

Seminar Report	-	25 Marks
Presentation	-	25 Marks

FINAL YEAR B. TEXT - SEMESTER-I

7.8 INPLANT TRAINING-II (TT/MMTT/TPE/TC)

Term Work : 50 Marks
Subject Total : 50 Marks

Objective:

To provide an opportunity to observe industrial activities and gather related technical and non-technical information about industry working.

Training Period:

One Month after completion of second semester of Third Year B.Text.

Industry:

Spinning, Weaving, Garment, Processing, Synthetics, Textile Chemicals & Auxiliaries, R&D, Machinery Manufacturing, Marketing etc. (Any One).

Observations:

Observe working of industry and collect data as per guidelines in the manual, study machineries / systems / practices.

Training Report:

* Report should have Title on Cover of Report as per Format.
* Report should be prepared as per following sequence -

I Page Certificate from Institute as per Format.
II Page Acknowledgement
III Page Programme of Training
IV Page Introduction of Industry
V Page Index with Page Numbers
VI Page Plant/Dept. Layout
VII Page Organization Structure.
VIII Page Department wise / Product wise Report: Report should (Onwards) be based on Own Observations made, data colleted during Inplant Training (i.e. Study of Machinery, Actual Production and Efficiency, Production Control, Modern Developments in Machines/Process, Flow Chart of Processes, Speed of Important Parts, Labour Allocation, Maintenance Practices, Process Control & Quality Control Activities etc.) roles and responsibilities of various Workers/Technical Staffs.

Special Study: Mini Project Undertaken, Costing, Production Planning & Control, Target Achievement, Information regarding humidification plant, Utility, Electrical Supply, Store, Purchase, Marketing, Sales, Samples, Lay-out of Mill etc.

Assessment:

Viva-voce to be conducted in first semester of Final Year B.Text. Term Work Marks are assigned on the basis of student's performance in viva-voce, conducted by internal and external examiners from related field.

FINAL YEAR B. TEXT - SEMESTER-I

7.1 ENGINEERING DESIGN OF TEXTILE MACHINES-II (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Oral Exam	:	50 Marks
Subject Total	:	175 Marks

I) **Design for fatigue strength** – Stress concentration, fluctuating stresses, fatigue failure, endurance limit, Notch sensitivity, Reversed stresses, Design for finite and infinite life, Cumulative damage in fatigue, Soderberg & Goodman diagrams, Modified Goodman diagrams.

II) **Design of sliding & Antifriction Bearing** – Hydrodynamic and Hydrostatic lubrication, Viscosity, Hydrostatic step bearing & its energy losses. **Reynold's equation** & Sommerfeld no. for one dimensional flow, temperature rise, **bearing design** – selection of parameters, constructional details & materials etc.

Construction, classification & selection of rolling contact bearing, mounting & dismounting of rolling bearing, static & dynamic capacity, selection of bearing from catalogue.

III) Cost consideration in design, Ergonomics, standardization.

IV) **Design consideration of machine frames** – Design consideration of machine frames, bed, covers and bodies, design consideration for casting, forging & fabricated parts.

V) **Design of pressure vessel** – Classification, design of thick & thin cylinders, Autofrettage, Compound cylinder, end closures.

VI) **Design of Spur & Helical gears** – Force analysis in spur gears, Gear tooth failures, material selection, Beam strength & wear strength of gear tooth, Gear design for maximum power transmitting capacity.

Terminology of Helical gears, virtual number of teeth, force analysis, beam strength & wear strength of helical gears.

VII) **Design considerations of Bevel gear & worm and worm wheel** – Terminology of bevel gears, force analysis, beam strength & wear strength of bevel gears.

Terminology of worm gears, proportions of worm gears, force analysis, friction in worm gears, material selection, strength rating & wear rating of worm gears, Thermal considerations.

VIII) Introduction to CAD & analysis – Introduction to solid modeling package & analysis package, concept of optimum design.

List of Experiments

1) Design projects and drawings sheets based on above topics (Minimum 6 problems)
2) Assignments based on CAD and analysis.

Reference Books

1) Design of Machine Elements - V.B. Bhandari.
2) Mech. Engg. Design - Shigley
3) Design of Machine Elements - Spotts
4) Fundamentals of M/c. Design - Orlov
5) Machine Design - Pandya & Shaha
6) Optimum Design - Dieter
7) Working Manuals of Solid Modelling & analysis package.
8) Mechanics of Spinning Machines – R. Rengaswamy.

FINAL YEAR B. TEXT - SEMESTER-I

7.2 THEORY OF TEXTILE MACHINES-II (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

I) **Balancing** - Static and Dynamic Balancing of rotary masses. Balancing machines. Balancing of textile machine components – carding cylinder, spindles of Ring frame.

II) **Toothed Gearing** - Gear tooth terminology and geometry, Condition for constant velocity ratio, velocity of sliding of teeth, form of teeth. Effect of change in central distance on velocity ratio. Length of path of contact, arc of contact for involute teeth. Interference, minimum number of teeth on pinion for involute rack to avoid interference. Minimum number of teeth on gear to avoid interference.

III) **Epicyclic gearing** - Gear trains, determination of velocity ratio and torque in epicyclic gear trains. Study of epicyclic gear trains used in speed frame, carding and comber.

IV) **Brakes and Clutches** - Simple band brake, Band & block brake, shoe brake. Different types of clutches – plate & cone clutches. Application to textile machines.

V) **Vibrations** - Longitudinal, torsional vibrations, free and forced vibrations, natural frequency. Whirling of shaft, critical speed.

VI) **Antifriction and sliding bearings** - Construction, classification, mounting, maintenance & application to textile machines.

VII) Different types of drives used in spinning. PIV, VPS, frequency controlled drive and applications.

VIII) Power required for textile machines. Ring frame, speedframe, carding and looms.

List of Experiments

Any 8 Experiments based on following topics.

1) Static balancing of rotary masses.
2) Dynamic balancing of rotary masses.
3) Generation of Involute gear tooth profile.
4) Study of Epicyclic gearing on speed frame / carding / comber / Rapier machine.

5) Study of Brakes.
6) Study of clutches.
7) Calculation of natural frequency of single degree of freedom vibration.
8) Study of forced vibration characteristics.
9) Study of whirling of shaft.
10) Assembly & Dismantling of bearing of spinning / weaving machine.
11) Study of PIV & VPS, frequency control drive.
12) Study of power consumption of a loom or any spinning machine.

Reference Books

1) Theory of Machines - Ballani & Khurmi.
2) Theory of Machines - S.S. Rattan.
3) Mechanics of Textile M/c. Part-I & II - Huntan & Slatter
4) Textile Mathematics Part –I, II, III - Booth.
5) Mechanics of Spinning Machines – R. Rengaswamy.

FINAL YEAR B. TEXT - SEMESTER-I

7.3 MAINTENANCE OF TEXTILE MACHINES (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Practical Exam	:	50 Marks
Subject Total	:	175 Marks

I) **Maintenance** – concept, importance, objectives of maintenance, Breakdown & planned maintenance subclassification of planned maintenance, Procedure for planning, schedules for preventive maintenance.

II) **Maintenance of spinning preparatory machines** - schedules, staff, precautions & methods to be followed during maintenance activities, tools & gauges used for maintenance.

III) **Maintenance of Ringframe & Compact Spinning Mechanisms** - schedules, staff, precautions & methods to be followed, Tools & gauges used, Maintenance of Rotor Spinning Machines – Schedules, Precautions, Methods etc.

IV) **Study of aprons & cots** used in spinning & their maintenance.

V) **Machine audit** – concept and auditing of spinning machines. Energy conservation in spinning

VI) **SQC synchronization with maintenance** – SQC activities useful for maintenance in various departments of spinning.

VII) Basic concept of lubrication, types of lubricants used for textile machines, Lubricant storage handling, precautions.

VIII) Maintenance of weaving preparatory machines, schedules, critical points of maintenance, precautions to be taken during maintenance operations.

IX) **Maintenance of plain & auto loom** - Schedules, critical points, precautions, auditing of plain & auto loom.

X) **Maintenance of shuttleless weaving machines** - Approach towards maintenance of latest weaving machines, Critical maintenance points of various shuttleless weaving machines.

XI) Recording of maintenance activities & its importance.

List of Experiments

1) Auditing of carding machine and study of card room maintenance machines.
2) Auditing of draw frame, classimat analysis and roller setting.
3) Auditing of speed frame and spectrogram analysis.
4) Auditing of Ring frame and its settings.
5) Auditing of comber and its settings.
6) Study of basic pneumatic circuits.
7) Study of air circuits used on ring frame G5/1, speed frame LF 1400 and Airjet weaving machine.
8) Study of cots maintenance equipments.
9) Auditing and setting of shedding and picking mechanisms of plain loom.
10) Auditing and setting of pirn changing mechanism of autoloom.
11) Auditing and setting of sulzer picking mechanism.
12) Auditing and setting of sulzer shedding mechanism.
13) Mill visit – Spinning Maintenance.
14) Mill visit – Weaving Maintenance.

Reference Books

1) Maintenance manuals by BTRA for various spinning & weaving machines.
2) BTRA monograph series.
3) Spinning machinery maintenance by SITRA
4) Maintenance manuals of different machinery manufacturers of spinning & weaving machines.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 MECHATRONICS (TPE) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Introduction** – Multidisciplinary approach, scope, elements in mechatronics design, applications, review of microprocessor & microcontroller based controllers, PC based controllers, proportional, integral, differential controller, digital controller, adaptive controller.

II) **Drives in mechatronics** – Electrical motors, stepper motors, sevo principle, Hydraulic and pneumatic actuators, variable frequency drives, relays and solenoids, selection criterion for drives.

III) **Review of sensors of transducers –** Principles & types of transducers and sensors.

IV) **PLC controller & ladder diagram fundamentals –** Basic concept, fundamentals, PLC configuration, block diagram, PLC logic, ladder diagram construction, interfacing of sensors & actuators.

V) **Fundamentals of PLC program –** Programming & physical components, basic PLC programming procedure.

VI) **MEMS Micro electro mechanical systems –** Materials, sensors, actuators, fabrication methods, application of MEMS examples, Accelerometer, humidity micro sensor.

VII) **Design of Mechatronic System –** Design process, comparison of traditional and mechatronic design, some case studies piece counting, robotic walking machine. Autofeed and auto doffing, weft selector, yarn clearer, systems in textile machines.

VIII) **Robotics –** Scope, anatomy, configuration, drives, types of robots, transmission systems, end effectors, applications.

IX) **Robot Programming –** Methods of programming, limitations, capabilities, various commands in programming.

X) **Material Handling Applications –** General consideration, task planning, pick & place, loading unloading, inspection and assembly etc.

Reference Books

1. “Mechatronics” by N. P. Mahalik, Tata McGraw Hill.
2. Mechatronics by M. D. Singh & J. G. Joshi, Prentice Hall Publication.
3. “Introduction to Mechatronics” by David G. Aleiatore & Michael B. Histand, Tata McGraw Hill.
4. “Programmable Logic Controllers” by John W. Webb & Ronald A Reis, Prentice Hall India.
5. “Robotics” by K. S. Fu, R. C. Gonzalez, C. S. G. Lee, McGraw Hill.
6. “Robotics Technology & Flexible Automation” Satyarajan Deb, Tara McGraw Hill.
7. “Industrial Robotics” Mikell P Grover, Mitchell Weiss, Roger N. Nagel, Nicols G. Odrey, McGraw Hill.
8. “Textile Robotics & Automation” by M. G. Mahadevan, Abhishek Publication, Chandigad
9. “Electronic Controls in Textile Machines” NCUTE Training Programme January 2000.

FINAL YEAR B. TEXT - SEMESTER-I

7.6 CHEMICAL PROCESSING MACHINERY (TPE) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Introduction to Textile wet processing machinery** - Machinery for pretreatments, dyeing, printing preparatory, printing, drying and finishing. Machinery for fabric folding, yarn processing equipments, garments processing and machinery for special effects.

II) **Shearing and Cropping machine** - Various types of shearing machines for woven fabric, surface shearing for terry towels, carpets, etc. Working and maintenance of shearing and cropping machine.

III) **Singeing Machine** - Construction, working and maintenance of singeing machines. Various types of gas singeing machines for woven and knit goods.

IV) **Scouring Machine** - Various types of kiers with different methods of heating system, Vapor lock machine, Tumbler solvent scouring machine and continuous solvent scouring machinery. J-box for continuous scouring, pad-roll system of scouring.

V) **Bleaching Machine** - Equipments for conventional bleaching. Bleaching on super jumbo jiggers, Hydraulic jigger and continuous bleaching range.

VI) **Washing and Relaxing Machines** - Open width and Rope form washing machines. Water extraction equipments of different mechanism like centrifuging, mangling, suction.

VII) **Mercerizing Machine** - Yarn mercerization machines, fabric mercerization machines like pad chain, pad chainless and padless – chainless. Caustic recovery plant.

VIII) **Machinery for knit goods** - Reversing machine, hose cutting, singeing machine, mercerising machine, continuous bleaching range. Relax Dryer, Compactor, Stenter, Tumble dryer.

IX) **Dyeing machinery** - Batch and continuous fibre dyeing machine, Hank dyeing m/c., Package dyeing machine, different types of packages.

Jigger, different types of Jiggers, winch dyeing machine, Horizontal beam dyeing machine.

Pad batch and continuous open width fabric dyeing range. Different types of padding mangles. Different types of Jet dyeing machines, Soft flow, over flow & air flow dyeing machine.

X) **Printing Machinery -** General aspects of Textile Printing machinery. Study of roller printing machine. Study of construction & working of rotary printing m/c. & flat bed printing machine. Method of preparation of screen for flat bed and rotary screen printing machine. Continuous & cut panel thermo transfer printing. Developments in printing machines. Inkjet printing machines. Study of agers, steamers & polymeriser.

XI) **Finishing machinery -** General out line of finishing processes. Drying equipments like V.D.R., Float dryer, stenter for drying & finishing. Study of thermic fluid heater. Other finishing machines like friction calender, schriener calender, felt calender, sanforising machine, decatising, raising machine, Peach finish machine. Aero finish machine, heat recovery system.

XII) **Garment Processing machine -** All types of paddle dyeing machine, Tumble dyeing m/c. High temperature garment dyeing machine. Machinery used for printing of garments & finishing of garments.

Reference Books

1) Handbook of Textile processing machinery by R.S. Bhagwat
2) Dyeing of polyester & its blends by Prof. M. L. Gulrajani
3) Engineering in Textile coloration by C. Duckworth
4) Norms for Textile Machinery – N.T.C.
5) Technology of Printing by Dr. V.A. Shenai
6) Technology of finishing by J.T. Marsh

FINAL YEAR B. TEXT - SEMESTER-I

7.6 ENERGY CONSERVATION IN TEXTILES (TPE) (ELECTIVE-I)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Energy** - Basic types of energy, Basic energy, Fuels. Calculations related to measurement of electrical & thermal energy. Concept of energy management.

II) **Various Energy Sources Used in Textile Process** - Compressed air, steam, fuel, electricity applications in textile processes. Methods of estimation methods of generation of compressed air & steam. Quality requirements of steam & compressed air.

III) **Electrical Energy** - Methods of electricity generation, quality of electric supply, leakages, voltage fluctuations, (economic aspects, limitations) power transmission, cables etc.

IV) **Energy Generation From Fuels** - Need of thermal energy in textiles, methods, quality & efficiency of fuels, economics of co-generation, efficient steam generation & utilization.

V) **Energy Audit** - Need of energy audit, method & types of energy audits, energy audit performance, instruments required. Energy consumption of various textile machines.

VI) **Conservation of Electrical Energy in Spinning** - Methods of energy conservation in various departments of spinning.

VII) Conservation of electrical energy in weaving and humidification plants.

VIII) Non conventional energy sources and their application areas in textile wind, biogas, solar energy etc.

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

Reference Books

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

FINAL YEAR B. TEXT - SEMESTER-II

8.3 TEXTILE MILL MANAGEMENT (TT/MMTT/TPE/TC)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **The Basic of Management Theory & Science** - Management & society: social responsibility & ethics.

II) **Planning** – The nature & purpose of planning – objectives – strategies – polices – planning premises.

III) **Organizing** – The nature & purpose of organizing - Basic departmentation - Organisation structure - Forms of Business organization.

IV) **Staffing** – Human resource management & selection - Performance appraisal & career strategy - Manager & organization development.

V) **Leading** – Managing & human factor - Motivation – leadership -Communication.

VI) **Controlling** – The systems & process controlling - Control techniques & information technology - Productivity & operations management - Overall & preventive control.

VII) **Cost Accounting & Control** - Introduction – Elements of Cost - Prime cost – Overheads – Factory cost – Total Cost – Selling price – Nature of cost – Types of cost – Process cost & Cost of production – Allocation of overhead – Control & accounting of material labour & overhead – Depreciation – Breakeven analysis – Breakeven chart.

VIII) **Budget & Budgetary Control** - Budget – Definition – Concept – Budgeting – Budgetary Control – Objectives of Budgets, Budgeting & budgetary Control. Advantages of Budget, Budgeting & Budgetary Control. Limitations of Budget – Types of Budget – Preparation of Budget – Budget as a means of planning, control & co-ordation – operation (working of budgetary control.

IX) **Marketing** - Introduction to marketing function – genesis of marketing the marketing concept – marketing management system – objectives – its interfaces with other functions in the organization.

X) **Marketing Research** - Meaning – Scope, Contributions – Limitations of marketing research – Profile of marketing research in India – Marketing research procedure – Types & techniques.

XI) **Financial Management** - Balance sheet – Profit loss statement – Financial ratio

Reference Books

1) Essential of Management – by Harold Koontz & Heinz, Weihrich – Tata McGraw-Hill Publishing Company Ltd., New Delhi.
2) Advanced Cost & Management Accounting by P.K. Sikdar – Viva Books Pvt. Ltd., New Delhi.
3) Industrial Engineering & Management by O.P. Khanna & A. Sarup, Dhanapat Rai Publications (P) Ltd., Delhi.
4) Dynamics of Entrepreneurial Development & Management by Vasant Desai – Himalaya Publishing House – Delhi.
5) How to Read a Balance Sheet – An ILO Programmed Book – Oxford & IBH Publishing Co. Pvt. Ltd., Delhi.
6) Enterpreneurial Development by S.S. Khanta , S. chand & Company Ltd., Delhi – 110 055.
7) Fundamentals of Marketing by W.J. Stanton, M.J. Etzel B.J. Walker – McGraw-Hill, Inc – New York, St. Laouis etc.
8) Industrial Organisation & Engineering Economics by S.C. Sharma & T.R. Banga – Khanna Publishers – 2-B, Nath Market, Nai Sorak, Delhi – 110 006.
9) Marketing Management By Philip Kotler – Prentice – Hall of India Pvt. Ltd., New Delhi – 110 001.
10) Managing Human Resource by Luis R. Gomer Mejia, D.B. Balkin & R. L. Cardy. Pearson Education (Singapore) Pvt. Ltd., Indian Branch, 482 FIE Delhi, India.
11) Cost Accounting by M.E. Thukaram Rao, New Age Internation (P) Ltd., Publishers – New Delhi.
12) Project Management by K. Nagaraja, New Age Internation (P) Ltd., Publishers – New Delhi, Bangalore etc.
13) Human Resource Management by Barry Cushway – British Library Cataloguing in Publication data – Published in association with Price Water House Coopers.
14) Management of a Small Scale Industry – Vasant Desai, Himalalya Publishing House, Delhi, Nagpur.
15) Project Management the Managerial Process by Gray & Larson, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
16) Advanced Cost & Management Accounting (Problems & Solutions) by V.K. Saxena, C.D. Vashist, Sultan Chand & Educational Publishers, 23, Daryaganj, New Delhi, 110 002.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 FASHION TECHNOLOGY IN APPARELS & MADE-UPS (TT/MMTT/TPE/TC) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Fashion:** Fashion terminology, Origin of fashion, Fashion cycle, Fashion industry, factors affecting fashion, Fashion adaptation theories. Major fashion centers of the world: Brief introduction to world fashion centers- American, European, Japanese and Indian; Fashion houses and designers. Fashion designing, apparel designing and fashion technology.

II) Design: Elements and principles of design: Line, colour and proportion emphasis. Design process: Designers' functions -Inspiration files, sketches, how to interpret designs, story Board / Fabric story; The design studio, sampling.

III) Fashion Theories – Fashion of direct eras. French revolutions.

IV) Psychology of clothing – first impression, role of socio – psychological and economical aspects of clothing.

V) Retailing: Various types of retailers, Franchise retailing, garment retailing, private labels and others, department stores, specialty stores, chain retailers, mail order houses, shopping malls. Designer labels Vs Brands, Analysis of designer’s labels. Licensing and franchising.

VI) Fashion information services: Trend forecasting and auxiliary services. Forecasting trends: Purpose of forecasting trends, how to use forecasting services. Fashion promotion and communications: Trade fairs, Fashion shows.

VII) Definition of merchandising - functions of merchandising division - Role and responsibilities of a merchandiser- different types of buyers - Communications with the buyers - awareness of current market trends – product development - line planning line presentation.

VIII) Anatomy for designers, Human proportion and figure constructions. Head the unit of measurement, methods of determining individual proportions,

Basic drawing of the fashion figure – flat sketching, average proportions methods of determining standards of women's figure.

IX) Drawing the lay figures – Three quarter view of lay figure – proportions of the figure measuring eight heads. Sketching and illustrations of body figures & body shapes.

X) Introduction to historic costumes. Introduction to fashion accessories, history, classification and recent trends. Use of leather in apparel.

XI) Computer application in fashion designing.

Reference Books

1) Elements of fashion and apparel design by Sumathi G.J.
2) Fashion design and product development by Harold Carrl John Pomeror.
3) Instructing fashion by Kathryn Mckelvey and Janine Munsbw.
4) "Art in Every day life" Calcutta - IBH Pub. Co. by Gold Stein & Gold Stein (1972)
5) "Inside Fashion Design" by Tate (1977) Sharon Lee.
6) Clothing of models by Erain Mabel.
7) Michael P. Grover & Computer Aided Design & Manufacturing.
8) Brockman, H.L., " The theory of Fashion ", John Wiley & Sons, (1965).
9) Kawashima, Masazki, " Fundamentals of Men's Fashion Design ", Fairchilds publications (1976).
10) Jarnow, J.A., and Judelle B., " Inside the Fashion Business ", JWS (1974) 2nd edition.
11) Barton, Roger " Advertising Handbook ", Prentice Hall Inc (1956).
12) Swinney, John B, " Merchandising of Fashion ", Ronald press (1942).
13) Jacob Solinger., " Apparel Manufacturing Handbook ", VanNostrand Reinhold Company (1980).

FINAL YEAR B. TEXT - SEMESTER-II

8.5 ORGANIZATIONAL BEHAVIOUR AND HUMANITIES (TT/MMTT/TPE/TC) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Fundamentals of Organizational Behaviour** – The dynamics of people organizations – Models of organizational behaviour – Managing communications – Social systems and organizational culture – Political institution – Society and the state.

II) **Motivation and Reward Systems** – Motivation – Appraising and rewording performance.

III) **Leadership and Empowerment- Leadership** – Empowerment and participation.

IV) **Individual and Interpersonal Behaviour** – Employee attitudes and their effects – Issues between organizations and individuals – Interpersonal behaviour

V) **Group Behaviour** – Informal & formal groups – Teams and team building

VI) **Change and its Effects** – Managing change – Stress and counseling.

VII) **Emerging Aspects of Organizational Behaviour** – Organizational behaviour across cultures.

VIII) **Professional and Business Ethics** – Concept of professional / professionalism – Concept of ethics – Ethics and morals – Business ethics – Professional ethics – Need for professional and business ethics – Importance of ethics – Need for business to be ethical – Ethical dilemmas – Ethical problems in business – Ethics issues – How to make business ethical – Codes of business and professional ethics – Chief provisions of a professional code – Ethics training programs – Communicating ethical values – Role of professional bodies.

IX) **Business & Environment**- Meaning of business – Earlier business objectives – Changing concept and objectives of business – Professionalization – Business ethics – Social responsibility of business – The Indian situation – Meaning of environment – Business firm & its environment – Relationship between business firm and its capital environment – Constituents of business environment – Suppliers – Customers – Competitors – Public – Marketing intermediaries –

Economic environment – Technological environment – Political environment – Social environment – Legal environment

X) **Union and Industrial Labour Relations** – Introduction – Trade unions – Industrial disputes – Strikes – Lock out – Picketing – Gherao – Settlement of industrial disputes – Collective bargaining – Handling of worker's grievances and grievance procedure – Worker's participation in management – Union management relations.

XI) **Industrial Labour Legislation** – Introduction – Importance and necessity of labour acts – Principles of labour legislation – Types of labour laws – The factories act 1948 – The payment of wages act 1936 – The minimum wages act 1948 – The workmen's compensation act 1923 – The industrial dispute act 1947 – The employee's state insurance act 1948

Reference Books

1. Organizational Behaviour – Human Behaviour at Work by J. W. Newstrom & Keitn Davis – Tata Mcgraw – Hill Publishing Company Limited – New Delhi.
2. Industrial Engineering and Management by O. P. Khanna & A. Surup – Dhanpat Rai Publications (P) Ltd., New Delhi
3. Industrial Organization and Engineering Economics by S. C. Sharma and T. R. Banga – Khanna Publishers – New Delhi 110 006
4. Strategic Management and Business Policy by T. L. Wheelen and J. D. Hunger – Addison Wesley, of Addison Wesley Longmen
5. Managing Recruitment Training and Development by Elizabeth M Christopher and Larry E. Smith – Viva Books Pvt. Ltd., - New Delhi – Madras.
6. Target Setting and Goal Achievement – A practical guide for managers by Richard Hale and Peter Whitlam – Kogan Page India Pvt Ltd., 4325/3, Ansari Road, Daryaganj, New Delhi 110 002
7. Basic Managerial Skill for All by E. H. Mcgrath, S. J. Prentice – Hall of India – New Delhi
8. How to Manage Organizational Change – The Sunday times – by D. E. Hussey – Kogan page India Pvt. Ltd., - Daryaganj, New Delhi – 100 002
9. Performance Appraisals – A critical view edited by Sumati Reddy – The ICFAI University press, 52, Nagarjuna Hills, Punjagatta, Hyderabad, India 500 082
10. Management in New Age – Western windows eastern Doors by Subhash Sharma – New age International (P) Ltd., Publishers – New Delhi, Bangalore etc.

FINAL YEAR B. TEXT - SEMESTER-II

8.6 SEMINAR-II (TT/MMTT/TPE/TC)

Lectures	:	2 Hrs / Week
Term Work	:	50 Marks
Subject Total	:	50 Marks

Topic -

In the beginning of the semester, every student individually will be assigned a seminar topic in the emerging / perspective field in the area of textiles such as Spinning, Weaving, Fibres, Testing, Chemical processing and alike.

Seminar Preparation and Presentation -

Students will collect the information on the above subjects and submit the report both soft and hard copy on the dates specified by the concerned faculty. The seminar report will be of minimum 15 pages. The spacing between the lines will be 1.5. The font size will be 12 point with New Times Roman. The list of reference must be given at the end of seminar report. The list of reference should be written as per the Textile Research Journal format.

Term Work Marks –

Seminar Report	-	25 Marks
Presentation	-	25 Marks

FINAL YEAR B. TEXT - SEMESTER-II

8.7 DISSERTATION (TT/MMTT/TPE/TC)

Practical	:	6 Hrs / Week
Term Work	:	50 Marks
Oral	:	100 Marks
Subject Total	:	150 Marks

OBJECTIVE:-

To provide an opportunity to students to work on any topic / problem/ experiment selected by them and to encourage them to think independently. Students are assigned dissertations. Project may be taken up by an individual or a group.

TOPICS: - Project work shall be based on any of the following topics.

1) Fabrication of equipments / gadget.
2) Manufacturing of products, its testing and analysis.
3) Extensive survey of industrial practices.
4) A work on industrial problems and finding out remedial measures.
5) Experimental verification on principles used in textiles.
6) Extensive numerical analysis of some problem may be carried out using computer.

FORMAT OF THE PROJECT REPORT

The project report should be typed with 1.5 spacing on demi – size bond paper and in neatly bound form. The total number of typed pages should not be more than 70 and not less than 25. The project report should be written in the following format.

1) Title Sheet
2) Certificate
3) Acknowledgement
4) Content
5) Abstract
6) Introduction
7) Literature survey
8) Design of Experiment / Plan of Work.
9) Observations / Results.
10) Discussion of results and conclusion

11) References: These references should be given in the standard format as that of international technical journals.

12) Annexures, apparatus, etc if any.

Two copies of report should be submitted to the institute / department and one copy should remain with every student of the group.

Assessment of Dissertation Work:-

Term work of 50 marks are assigned for dissertation work. A dissertation committee will observe the progress of the work by arranging two progress reviews and based on the performance the term work marks will be assigned.

Oral Examination:-

One internal and one external examiner from industry / research organization / academia in each of the spinning, weaving & processing disciplines will be conducting oral examination.

FINAL YEAR B. TEXT - SEMESTER-II

8.1 FLUID FLOW SYSTEMS & CONTROLS (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Oral Exam	:	50 Marks
Subject Total	:	175 Marks

I) Introduction to hydraulic and pneumatic systems, Areas of applications, relative merits and demerits, comparison of above systems with electrical, mechanical and hybrid systems.

II) ISO / JIC symbols used in pneumatics and properties of compressed air for pneumatic systems, advantages of compressed air.

III) Fluid conditioning elements – filter, lubricator, dryers, heat exchangers and pressure regulators.

IV) Study of control valves in pneumatics – Pressure control, direction control and flow control valves & special valves.

V) Air compressors – Terminology, Types and selection.

VI) Study of actuators – Linear and rotary actuators in pneumatics.

VII) Pneumatic circuits and applications – Speed control, sequencing, time delay, actuation of pneumatic motor.

VIII) Maintenance and trouble shooting in pneumatic system.

IX) Hydraulic Systems – Introduction in brief, properties of fluid, types and selection of fluids.

X) ISO / JIC symbols for elements used in hydraulic systems.

XI) Fluid conditioning components – Strainers, filters, heat exchangers.

XII) Study of control valves used in hydraulic system, pressure control, direction control and flow control valves.

XIII) Study of pumps used in hydraulic system and hydraulic power pack.

XIV) Study of actuators – Linear and rotary actuators in hydraulics.

XV) Hydraulic circuits and applications – Speed control, sequencing, counter balancing, study of systems in Textile machines.

XVI) Maintenance and troubleshooting in hydraulic systems.

List of Experiments

1) Study of direction control valves.
2) Study of meter – in flow circuit.
3) Study of meter – out flow circuit.
4) Operation of DAC – Unidirectional Control.
5) Operation of DAC – Bidirectional Control.
6) Study of circuits using sequence valve & time delay valve.
7) Study of pneumatic circuits on Textile Machines.

Reference Books

1) Pneumatics and Hydraulics – Harry L. Stewart.
2) Hydraulics & Pneumatics – Andrew Parr.
3) Pneumatic systems (Principles & Maintenance) – S. R. Majumdar.
4) Oil Hydraulics – S. R. Majumdar.
5) Industrial Hydraulics – John Pippenger & Tyler Hicks.

FINAL YEAR B. TEXT - SEMESTER-II

8.2 INSTRUMENTATION & METROLOGY (TPE)

Lectures	:	3 Hrs / Week
Practicals	:	3 Hrs / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Practical Exam	:	50 Marks
Subject Total	:	175 Marks

I) **Measurement:-** Introduction, Need of measurement, Methods of Measurement, International standards of Measurement - a) Line standards 3) End standards c) Wavelength standards, System of measurement. Accuracy & precision of measurement

II) **Study of Instruments:-** Vernier Calliper, Micrometer, Height gauge, Depth gauge, Slip gauges, Grades of Slip gauges, application, Universal measuring machine.

III) **Limit, Fits, Tolerances: -** Introduction to limit, fits, allowances, Tolerances, - Unilateral, bilateral tolerances, Interchangeability, types of fits, Systems of fits. Introduction to limit gauges, GO-NOGO gauges. Taylor's Principle.

IV) **Comparators :-** Study of Mechanical, Electrical, Pneumatic, Optical comparators

V) **Surface Finish: -** Roughness, Wavyness, lay, methods of measuring roughness, Ra value, Rz value, RMS value, CLA value, ten point height methods. Instrument for measuring surface Texture, Profilometer.

VI) **Straightness & Flatness: -** Inspection of straightness & Flatness by using instruments straight edge, spirit level, Auto-collimator, Beam comparator, Tests to check squareness, parallelism of the axes.

VII) **Interferometry: -** Principles, optical flat, Typical applications of optical flat.

VIII) **Measurement of Angle: -** Measurement of angle by using instruments like, Bevel protractors, Clinometer, Angle dekkor. Angle gauges, Auto collimator, case studies of measurement of an unknown angle by using Sine bar, Standard balls & Rollers etc.

IX) **Measurement of External Threads: -** Thread geometry, different errors in screw threads, measurement of form of thread with profile projector, pitch measurement, measurement of thread diameter with standard wires. Screw thread micrometer.

X) **Measurement of Spur Gears: -** Gear Geometry, Runout checking, pitch measurement, profile checking, tooth thickness measurement, lead checking.

List of Experiments

Five experiments based on below refered areas in combination.

1) Study & use of various instruments.
2) Use of comparators.
3) Screw thread measurement.
4) Gear Inspection.
5) Use of optical profile projector.
6) Use of sine bar.
7) Use of optical flat.
8) Use of standard ball & roller for angle measurement.

Reference Books

1) Engineering Metrology – I.C. Gupta
2) Engineering Metrology – R.K. Jain
3) Practical Engineering Metrology – Sharp K.W.B. Pitman, London.

FINAL YEAR B. TEXT - SEMESTER-II

8.4 MAINTENANCE MANAGEMENT (TPE)

Lectures	:	4 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

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

II) **Condition based maintenance** – Importance, subjective & objective inspections, types of condition monitoring techniques, Detailed study of (NDT) non-destructive testings, performance evaluation, debris analysis, dynamic analysis.

III) **Performance Evaluation of maintenance function** – Control – Methods of control and use of various indices.

IV) **Failure Analysis** – Classification of failures, method of failure analysis, use of trouble shooting charts & other techniques.

V) Planning, scheduling, maintenance organisation, performance evaluation of maintenance function, PERT, CPM and other techniques for planning.

VI) **Value Analysis & value Engineering** – concept and techniques of value analysis & value engineering

VII) **Lubrication management** – Importance, measures for economy in lubrication management.

VIII) **Spare parts management** – Importance & means of inventory control.

IX) **Maintenance budgeting** – Methods of budgeting, selective budgeting control, techno economics of maintenance.

X) **Equipment Replacement** – Need for replacement, Selection of appropriate alternative of replacement.

Reference Books

1) Maintenance Management volumes 1 to 20, by IMME Delhi

FINAL YEAR B. TEXT - SEMESTER-II

8.5 CONDITION BASED MONITORING TECHNIQUES (TPE) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Introduction to Condition Monitoring** - Subjective & objective assessment, advantages of condition based maintenance over preventive maintenance. Types of inspections in condition based maintenance.

II) **Non Destructive Testings** - Ultrasonic testing, Radiography, Thermography, eddy current testing, Magnetic particle test, Acoustic, emission testing, Temperature measurement, stroboscope, optical inspection techniques.

III) **Special Purpose Inspection Methods** - Crack detection, leak detection, corrosion monitoring, Contaminant examination – magnetic plug test, SOAP, Particle count method.

IV) **Performance Monitoring** - Concept, On line monitoring techniques in Textile machine – Ring data system, Varioset, Classimat, Autolevellers at carding and drawframe, Uster spectrogram.

V) **Dynamic Analysis** - Fundamentals of vibration & noise. Concept of Dynamic analysis, vibration measurement methods, applications. Case study of shock pulse monitoring of antifriction bearing, Machinery noise & analysis.

VI) **Lubrication Monitoring** - Objects, Methods, Laboratory tests & spot tests for oils & greases.

VII) **Study of transducers used for vibration and noise measurement** – LVDT - Peizo crystal – inductive - condenser mic - peizo mic - electrets microphone, etc.

VIII) **Methods of vibration and noise isolation** - Fundamentals of isolation of vibration and noise - Materials used for isolation of noise.

Reference Books

1) Maintenance Management Vol. 12, IMME Pub.
2) Summer School on Maintenance Engineering – S.J.C.E. Mysore.
3) Measurement System – E.O. Doeblin, McGrawhill International Pub.
4) Theory & application of Digital Signal Processing – Ranbiner L.R. & Gold B.
5) Mechanical Measurements – Beckwith T.G. and Lewis Buck N.
6) Machinery Noise Measurement – S.J. Yang and A.J. Ellison, Oxford New York.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 ENVIRONMENTAL ENGINEERING IN TEXTILES (TPE) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) Definition of environment, ecology, pollution.

II) Types of pollution of textiles & their effects of stages of textiles on environment.

III) General waste categorization.

IV) Effective pollution prevention programme.

V) Air Pollution

- Classification and properties of air pollutants.
- Sources of emission.
- Green house gases
- Behaviour and fate of air pollutants.
- Effects of air pollution on human health, vegetation, animals, materials and structures, atmosphere, soil water bodies.
- Air pollution laws and norms.
- Plume behaviour
- Analysis of air pollutants
- Control measures of gaseous pollutions.

VI) Air Pollution in Spinning, Classification of pollutants and their levels and the effects on human health.

VII) Air pollution in wet processing, sources of air pollution in wet processing, their levels and toxicity and effects on human health.

VIII) Norms of the lighting in textile industry.

IX) Optical pollution – causes, and remedies.

X) Different between sound and noise.

XI) Noise levels and their ill effects on human health of various processes including textile activities.

XII) What are the measure noise sources in textile industry, their levels and their ill effects.

XIII) Environmental impact assessment ISO-14000 series.

XIV) Water Pollution :-

- Sources of water, their nature and use pattern.

- Types of water pollutants and their effects

XV) Factors polluting water in textile wet processing in each unit operation like desizing, scouring, bleaching, dyeing, printing & finishing. The volume of waste generated and nature of the wastewater.

XVI) Effects of wet processing effluent parameters on the environment.

XVII) Basic processes of wastewater treatment.

XVIII) Basic factors to be considered for waste water or effluent treatment.

XIX) A typical design for effluent treatment plant to meet the norms laid down by Pollution Control Board.

XX) Measures to reduce the textile effluent quantity.

XXI) Measures suggest to improve the quality of the effluent generated either by substitution, eco-friendly processing etc.

XXII) Advancement – in the effluent treatment like reverse osmosis, plasma technology, removal of dissolved solids, removal of heavy metals etc.

Reference Books

1) Environmental pollution control engineering – C.S. Rao.
2) Best management practices for pollution prevention in the textile industry – Textiles committee, 1997.
3) Fundamentals of air pollution – Richard W. Boubel, D. Fox etal.
4) Environmental issues – technology options for textile industry – Book of papers published by R.B. Chavan et.al of IIT, New Delhi.
5) Ecology and textiles – V.A. Shenai.
6) Treatment of textile processing effluents – N. Manivaskan.
7) Water & effluents in textile mills – P.B. Jhala et.al. ATIRA.
8) Textiles energy and waste seminar – proceedings from textile institute, 1997.

FINAL YEAR B. TEXT - SEMESTER-II

8.5 INDUSTRIAL TEXTILES (TPE) (ELECTIVE-II)

Lectures	:	3 Hrs / Week
Theory Paper	:	100 Marks
Subject Total	:	100 Marks

I) **Introduction To Industrial Textiles** - Definition, Textile materials in technical applications

Fibres – Natural & man made fibres suitable for technical applications & their relevant properties (Eg. Kevlar, Nomex, Carbon, Ceramic, Optical, Poly Ethylene, PBO, Power Fibre) - Inorganic Fibres & Their Products, Asbestos, Boron Fibre, Ceramic Fibre, Glass Fibre, Metal Fibre, Heat Resistant Fibres & Steel Fibres

II) **Textiles for Filtration** - Introduction, Principles and some mathematical models of wet & dry filtrations. Characteristic, properties of fibres & fabrics.

Dust Filtration - General, Protective Masks, High Temperature filtration, Purification & Separation of Gases, Cigarette Filtras, Liquid Filtration. Solid liquid - filtration, liquid – liquid filtration, Application of ion-exchange materials in the purification of Industrial effluents, the application of hollow filters in filtration by Reverse osmosis.

III) **Medical Textiles** - Textiles in various medical applications, absorbency of textile materials & methods of sterilization, application oriented designing of typical medical textile (e.g. porous graft or a transient tube) e.g. Heat value replacement by textile prosthesis. Materials used and design procedures for protecting wound, cardiovascular application, submerses etc.

IV) **Flexible Composites** - Typical production methods of tyres, belts & hoses. Interactions of raw material & structure with functional properties, advances in design. The role of textiles in pneumatic tyres.

V) **Rigid Composites** - Three dimensional fabrics & triaxially braided materials for composites.

VI) **Ropes, Twines, Sewing Threads & Cordages** - Methods of production & application oriented structure & ropes, cordages & twines. Properties & applications.

VII) **Protective Clothing** - Thermal protection, Ballistic protection, Protection from electro – magnetic radiation & static hazards. Protection against micro-organism, chemicals & pesticides. Accident simulation test.

VIII) **Geo Textiles** - Soil characteristics. Mechanism of reinforcement, filtration & drainage of soils by geo textiles. Typical applications. Determination of relation between soil particle size & pore size distribution for hydraulic applications. Methods of long terms prediction of survivability of geo textiles in soil.

IX) **Coated Fabrics** - Introduction, Coated fabrics in Civil Engg., Inflatable structures, coated fabrics for the disposal & reuse coated Textiles in Agriculture, Tarpaulin & covers seats.

X) **Miscellaneous Industrial Uses** - Miscellaneous – Characteristic features of textile materials in footwear, defence, transport, agriculture & marine applications Papermakers felt, Civil Engg., Synthetic Turf & sport surfaces. Bearing of Sealing Materials, Sound Insulation, Thread Insulation, Battery Separations, Electrical Insulation, Structural Application, Fishing Industry, Parachute textiles, Falt & V Belt.

Reference Books

1) Electrostatic Charging of Textiles Textile Progress Vol.28, No.1 BY I. Holme, The Textile Institute Publication.
2) High Performance Fibres Textile Progress, Vol.25, No.3/4, By S.K. Mukhopadhyay, Textile Institute Publication.
3) Medical Textiles 96, Conference Proceeding, by Bolton UK, Woodhead Publication Ltd.,
4) The Production & Properties of Narrow Fabrics Textile Progress, Vol.8, No.4, By – J.P. Turner, The Textile Institute Publication.
5) Protective Clothing Textile Progress, Vol.22, No.2/3/4, By P.W. Harrison, The Textile Institute Publication.
6) Needle Punching by A.T. Purdy The Textile Institute Publication.
7) Barrier Fabrics for Protection Against Aerosols' The Textile Progress, Vol. 26, No.1, By S.M. Maini, The Textile Inst. Publication.
8) Automotive Textiles, Textile Progress, Vol.29, No.1/2 by S.K. Mukhopadhyay & J.F. Partridge, The Textile Inst. Publication.
9) The Thermal Insulation Properties of Fabrics Textile Progress, Vol.24, No.4, J.O. Ukponmwan, The Textile Inst. Publication.
10) Thermal Bonding of Non woven fabrics Textile Progress, Vol.26, No.2, The Textile Inst. Publication

11) Industrial Application of Textile : Textiles for Filtration and Coated fabrics Textile Progress, Vol.14, No.1, By Pushpa Bajaj & A.K. Sengupta, The Textile Inst. Publication.
12) Developments in Non-woven fabrics Textile Progress Vol.12by A.T. Purdy, Textile Institute Publication.
13) Journal of The Textile Institute Vol.81, No.4 By P.W. Harrison, The Textile Inst. Publication
14) Tiwc96 Niches in the world of Textile Vol, World Conference by TTI, The textile institute publication.
15) Industrial Application of Textiles by K.L. Floyd, Textile Progress Vol.6 No.2 The Textile Institute Publication.
16) Medical Textile – International Conference, Bolton UK.
17) Handbook of Technical Textiles Edited by A.R. Horrocks and S.C. Anand Published by Woodhead Pub. Ltd., Cambridge, England.