

S.Y.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
3.1	TT/MMTT/TPE/TC/FT	ADVANCED COMPUTER PROGRAMMING	3	---	---	2	100	25	---	50	175
3.2	TT/MMTT/TPE/TC/FT	TEXTILE MATHEMATICS-III	3	---	---	---	100	---	---	---	100
3.3	TPE	MATERIAL ENGINEERING	3	---	---	---	100	---	---	---	100
3.4	TPE	MANUFACTURING PROCESSES	4	---	---	3	100	25	---	50	175
3.5	TPE	YARN MANUFACTURING MACHINERY-II	4	---	---	2	100	25	---	---	125
3.6	TPE	FABRIC MANUFACTURING MACHINERY-II	4	---	---	2	100	25	---	---	125
			21	---	---	9	600	100	---	100	800
L =LECTURES T =TUTORIALS DR=DRAWING PR=PRACTICALS			TP=THEORY PAPER TW=TERM WORK OE=ORAL EXAMINATION PE=PRACTICAL EXAMINATION								

S.Y.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
4.1	TT/MMTT/TPE/TC	THERMAL AND AIR ENGINEERING	3	---	---	---	100	---	---	---	100
4.2	TT/MMTT/TPE/TC	TEXTILE MATHEMATICS-IV	3	---	---	---	100	---	---	---	100
4.3	TPE	ELECTRICAL TECHNOLOGY	3	---	---	2	100	25	---	25	150
4.4	TPE	PHYSICAL PROPERTIES OF TEXTILES	3	---	---	2	100	25	---	25	150
4.5	TPE	YARN MANUFACTURING MACHINERY-III	4	---	---	2	100	25	---	50	175
4.6	TPE	FABRIC MANUFACTURING MACHINERY-III	4	---	---	2	100	25	---	50	175
4.7	TPE	TEXTILE MACHINE DRAWING	---	---	2	---	---	50	---	---	50
			20	---	2	8	600	150	---	150	900
L =LECTURES T =TUTORIALS DR=DRAWING PR=PRACTICALS			TP=THEORY PAPER TW=TERM WORK OE=ORAL EXAMINATION PE=PRACTICAL EXAMINATION								

SECOND YEAR B. TEXT. – SEMESTER – I**3.1 ADVANCED COMPUTER PROGRAMMING (TT/MMTT/TPE/TC/FT)**

Lectures	:	3 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	50 Marks
Term Work	:	25 Marks
Subject Total	:	175 Marks

1. Networking Concepts:

Introduction to network, use of computer networks, Network Topologies, Network types - LAN, MAN, WAN, Network hardware Components - cables, connectors, NIC, Hub, Switch etc. Network Operating system, Client / Server Architecture, Internet and its applications. Switching and routing in network, The X.25 network & supporting protocols, TCP/IP

2. Database Management

Introduction to database, Records, Relational database management systems, structural query languages (SQL), SQL table creation integrity constraints, insertion of records, select statement, alter command, drop table partitioned table, SQL operator, transaction processing, where clause, like operator, between operator, order by clause, group by clause, having clause, SQL function , commands - Select, Insert, update, delete, joins - inner join, outer join, equijoin.

3. Analysis of Information System:

Types of information, information processing for store- overview, overview of design of an information system, role & attribute system analyst, tool for system analyst

4. Visual Basic Fundamentals:

Introduction, projects in visual basic, project explorer, setting project. Options, Visual Basic code - understanding procedures, subroutines, Functions, comments, code window & its features, controlling program flow, conditional branching, loops.

5. Visual Basic Data Types:

Data types in visual basic, - byte, integer, long, single, double, currency, Boolean, data, string, object, variant, declaring variables, variable scope & life time, data conversion, arrays, constants, user defined data types.

6. Designing User Interface:

Forms, form properties, form events, loading, unloading, showing & hiding Forms controls in visual Basic - label, buttons, text box, list, dropdown Selection list, checkbox, option button, timer control, setting tab order, Menus in visual basic. Message box, input box, common dialog. Data report.

7. Programming Database Access:

Introduction, Record set object - definition, properties, methods & events, Records, working with record set in code, visual basic data control, Introduction to ADO.

8. Introduction To .Net

Need of vb.net, .Net framework, features of and architectures of vb. net, introduction to visual studio, .Net IDE interface and event driven programming. Creating application building projects using simple components running VB.NET application.

9. Introduction of ERP

Evolution of ERP, growth of ERP, Need for system interaction and interface, early ERP packages, various models of ERP, advantages of ERP, Overview of enterprise, integrated management, business modeling ERP for small business, business process for ERP module design, opportunities and problems in ERP selection and implementation, hardware Environment.

List of Experiments:-

1. Study of basic concept of computer network.
2. Study of network System with commands from Novell Network.
3. Creating databases, tables using Ms-access.
4. Creating & manipulating Database using Oracle.

5. Working with SQL Commands like Select, Insert, Update, Delete, etc.
6. Creating simple form in Visual Basic.
7. Writing applications in Visual Basic using multiple forms, various controls (like radio button, list etc.) and database application using data control for
Finding mean, SD, CV% of yarn strength testing machine
Finding twist & its SD, mean & CV%
To calculate production of winding m/c, warping m/c, sizing m/c, looms, (Weaving Machine.), blow room, card, speed frame, ring frame etc (Spinning Machine).
8. Finding % exhaustion of dye bath.
9. Application program using VB ADODC- 2 Programs
10. Application program using VB.Net- 2 Programs

Reference Book:-

1. Computer Network - by Andrew Tanenbaum
2. Database System - by Korth
3. Black Book VB 6.0 - by Holzner
4. Analysis & Design of information System- by Rajaraman

SECOND YEAR B. TEXT. – SEMESTER – I

3.2 TEXTILE MATHEMATICS-III (TT/MMTT/TPE/TC/FT)

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

1) Differential equations of first order & first degree:

Method of solving Exact, Non exact, Linear and Non-linear differential equations.

Numerical solution of o.d. equations by Euler,s method and Runge Kutta method of fourth order. (6)

2) Applications of ordinary differential equations:

Applications for solving simple electrical circuit problems and mechanical problems (4)

3) Linear differential equations of nth order with constant coefficients:-

Methods of finding Solution of L.D. equations in the form $y = C.F. + P.I$
Cauchy,s homogeneous linear differential equations with constant coefficients and there solution. (7)

4) Applications L. D. equations of nth order with constant coefficients:

Applications for solving simple electrical circuit problems and mechanical problems (4)

5) Testing of hypothesis:-

Introduction, Hypothesis, Statistic, Critical Region, Errors in testing, Level of Significance. (2)

6) Large sample tests:-

Test for population mean, equality of population means population proportion & equality of population proportions. (4)

7) Small sample tests:-

Test for population mean, equality of population means, population variance, equality of population variance. Test for goodness of fit and independence of attributes. Test for significance of population correlation coefficient.

(7)

8) Estimation:-

Point Estimation, types, unbiased estimators of population mean and variance. Interval Estimation, Confidence Interval for population mean based on normal and 't' and X^2 distributions,

(3)

9) Statistical quality Control:-

Process Control: Control_charts, X-chart, R-chart, C-chart, np-chart, P-chart. Lot Control: AQL, LTPD, AOQ, AOQL, O.C. Curve, Single and Double sampling plans.

(4)

Reference Books:-

1. A Text Book of Applied Mathematics: by J.N. & P.N. Watarikar.
2. Higher Engineering Mathematics by B. S. Grewal.
3. A Text Book on Engineering Mathematics by Bali, Saxena & Iyengar.
4. Mathematical Statistics by J.Fruend.
5. Applied Statistics & Probability of Engineers by Montgomeri & Runger
6. Probability & Statistics for Engineers by Johnson.

SECOND YEAR B. TEXT. – SEMESTER – I

3.3 MATERIAL ENGINEERING (TPE)

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

1) Introduction to Material Engineering:-

Definition of engineering materials, classification scope of the subject, structural studies of materials – Types of bonds, atomic and ionic radius, interatomic distances, vander waals forces, formation of engineering materials, Crystal structures, molecular structures, amorphous phases.

2) Properties of Engineering Materials:-

Mechanical – Hardness, Strength (compression, tension), Ductility, Malleability, Machinability, Weldability, Fatigue and Creep.

Thermal – Specific heat, Thermal conductivity, Thermal expansion and Thermoelectric effect.

Chemical – Ionization and Electrolysis.

3) Metallic Materials -

Pig Iron, Wrought iron, Steel & Cast iron, classification, alloying of steel - effect of addition of elements such as Si, C, P, Mn, Ni, Mo, V, Co to steel, Stainless steel, Heat treatment of steels, Non-ferrous metals such as Brass, Bronze, Duralumin, Alnic Nichrome, Solder material.

4) Ceramic Materials :-

Introduction, types, polymorphism, manufacture & types of glass. Properties of refractory material, refractories such as a) Chromates b) Zircon c) High alumina refractories d) Porcelain.e) bricks. Cement, its types, manufacturing process, setting & hardening, uses.

5) Organic Materials :-

Polymers , Polymerisation, types, mechanisms, plastics, types, properties and applications, crystallinity in polymer & its structure, properties and applications of bakelite, Nylon 66, rubber –classification, vulcanisation, protective coatings such as paints, polishes and varnishes.

6) Electrical and Magnetic Materials :-

Factors affecting the resistivity of conductors, properties of materials such as Ag, Cu, Al, Nichrome and Ca as dielectric characteristics, insulating materials such as mineral oil, PVC, Mica fibres, glass and asbestos, Magnetisation, soft and hard magnetic materials such as a silicon iron, Alnico types alloys and ferrites.

7) Corrosion :-

Definition, types, mechanism, factors affecting rate of corrosion. Prevention of corrosion – proper selection of material and proper designing, alloying, metallic coatings – hot dip process, spraying, electroplating, cementation, cladding.

8) Textile materials :-

Various textile materials, their properties and applications. Glass wool, Polyester film, insulation fleets, filters etc. Materials used for textiles – bobbins, picker, leather, wood for shuttles, ring travellers etc.

9) Composite Materials -

Introduction, constituents of composites, types of composites, processing of fibre reinforced composites, failure of fibre reinforced composites.

10) Introduction to Nanotechnology :-

Introduction, methods of synthesis of Nanopartilcles, chemical bath deposition method, electrodeposition method, advantage & disadvantage of nanomaterials, applications.

Reference Books:-

1. Material Science by R.B. Gupta.
2. A Text book of Material Science by V.K. Manchanda.
3. Material Science and Engineering by V. Raghavan.
4. Material Science and Processes by S. K. Hajra Choudhary.
5. Material Science and Metallurgy by V.D.Kodgire.
6. The Nanoscope by Dr. Parag Diwan & Ashish Bharadwaj.

SECOND YEAR B. TEXT. – SEMESTER – I

3.4 MANUFACTURING PROCESSES (TPE)

Lectures	:	4 Hours / Week
Practical	:	3 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	50 Marks
Term Work	:	25 Marks
Subject Total	:	175 Marks

1) Traditional Metal Cutting Processes :-

Principles of Traditional Metal Cutting Processes like Turning, milling, drilling, reaming, boring. Concept of general purpose machine & special purpose machine.

2) Advancement in Machines :-

Requirement of advancement in machinery, Introduction to NC machine, CNC machine – additional features, advantages, dis-advantages, application areas & parts suitable for CNC machines. DNC machine. Classification of CNC machine – according to feedback control, according to control system features, axis identification in CNC machines, ATC & Tool magazine.

3) Non-Traditional Machining Methods (NTMM) :-

Introduction, classification, Information about the processes EDM, ECM, AJM, LBM, Plasma arc cutting – principle, working, advantages, disadvantages & applications of each process.

4) Protection of Machined Surfaces :-

Requirement of protection & information about Electroplating, Galvanizing, Metal Spraying, Tinning, Painting,

5) Mechanical Working of Metals :-

Hot working of metals, Cold working of metals & concept about the processes like Rolling, Extrusion, Drawing, Metal Spinning.

6) Forging :-

Introduction, various tools used, Basic forging operations, Hand forging, machine forging, open-die forging, close-die forging, forging defects & causes.

7) Press Work :-

Press machine and its parts, various press working operations like various cutting operations & forming operations.

8) Welding :-

Principle, equipment & procedure of Gas & Arc welding, Brazing.

Practicals (Mechanical Workshop) : -

1. Fitting Job : Male Female Fitting - 1 Jobs
1. Turning Job : Assembly job containing following operations –
Facing, Step turning, Taper turning, Knurling, Threading, etc. -1 Job
3. Identification of manufacturing processes of textile machine components .

Practical Examination:-

2 Jobs from Fitting & Turning (one each) – Time duration 4 hrs. each

Total - 2 Jobs, 8 hrs.

Reference Books:-

1. Elements of Workshop Practices (Vol. I) by Hazra Choudhary.
2. Production Technology by R. K. Jain.
3. A Course in Workshop Technology by B. S. Raghuwanshi.
4. CNC Machines by Pabla & Adithan.
5. CAD/CAM Principles & Operations by P. N. Rao.

SECOND YEAR B. TEXT. – SEMESTER – I**3.5 YARN MANUFACTURING MACHINERY-II (TPE)**

Lectures	:	4 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

CARDING :

- a) Feed to Card – Principle and concept of chute feed to card. Advantages and limitations. Study of design details of different types of chute feeding systems available in the market.
- b) Carding Machine – Engg. Study and mechanics of design developments in Take in zone, Cylinder Flats Carding Zone – Doffer Zone – Sliver formation.
- c) Study of cards used in the industry – General construction – Driving arrangement, production calculations, draft calculations, stop motions – on line monitoring – Tandem Cards.
- d) Carding Theory – Opening of fiber mass – Carding actions – Web formation and fibre configuration – Blending – Leveling action – Fiber breakage.
- e) Transfer efficiency of card – importance, concept, methods of finding transfer efficiency.
- f) Autolevellers at Card – Basic principles and concept – Types of autolevellers – Principle of working of autolevellers at Card – Setting of autolevellers , sensors used.
- g) Card Clothing – History and Development – Metallic wire – Tooth geometry , material used for wires - Maintenance of Card Clothing – Card wire mounting.
- h) Assessment of performance of card – Cleaning efficiency, Nep removal efficiency, fibre breakage.
- i) . Centralised Waste collection System : Design features, operating principles.

DRAWFRAME :-

- a) Functions of drawframe, principles of drafting and doubling. Study of constructional details and design considerations of a drawframe. Calculations related to speeds, drafts, production etc.

- b) Principles of roller drafting, design details of drafting system, evolution of drafting systems at drawframe (Shirley 4/4 draftings, plats, pressure bar, whitin accu drafting, Rieter polar drafting systems etc. Developments in drawframe drafting.
- c) Suction at drawframe. Automatic can handling. Auto leveling at drawframe ,on-line quality monitoring and control.
- d) Study of drawframes available in the market. Blending at drawframe.
- e) Study of maintenance aspects and design developments such as rollers, roller, roller weightings, drafting systems etc.
- f) Assessment of performance of drawframe. Defective production at drawframe, causes and remedies for the same. Norms for production, sliver quality, waste etc.

List of Experiments:-

- 1) Study of chute feed system
- 2) Study of constructional details of a card.
- 3) Driving arrangement and calculations of carding machine.
- 4) Settings of various parts of feed zone of carding.
- 5) Settings of various parts of carding zone in carding.
- 6) Demonstration of stripping, Grinding, wire mounting, etc. – Mill visit.
- 7) Study of utilities on card & Draw frame.
- 8) Processing of Material on card and evaluating card performance.
- 9) Study of constructional details of draw frame.
- 10) Driving arrangement and calculation of D/F.
- 11) Evaluation of Draw frame performance.
- 12) Study of autolevellers used on card and Draw frame.

Reference Books:-

- 1. The Textile Institute Publication –Manual of Textile Technology-Short Staple Spinning Series Vol I to v by W. Klein
- 2. The characteristics of Raw Cotton by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol II, Part-I.

3. Opening and cleaning by Shirley. The Textile Institute Publication, Manual of Cotton Spinning Vol II, Part II.
4. Opening cleaning and picking by Dr. Zoltan, S. Szaloki, Institute of Textile Technology, Virginia.
5. Fundamentals of Spun Yarn Technology, By Carl Lawrence.
6. Blow room and carding –Training program conducted by NCUTE, IIT Delhi.
7. Carding by F. Charanlay .The Textile Institute publication, Manual of cotton spinning series Vol - III.
8. Essential calculations of practical cotton spinning by T. K. Pattabhiraman.
9. Blow room, Carding, Draw frame-by Prof. A. R. Khare
10. Technology of cotton spinning by J. Janakiram.

SECOND YEAR B. TEXT. – SEMESTER – I

3.6 FABRIC MANUFACTURING MACHINERY-II (TPE)

Lectures	:	4 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Term Work	:	25 Marks
Subject Total	:	125 Marks

1) AUTOMATIC WEAVING:-

- a) Limitations of ordinary looms: - Production, efficiency, quality & allocation, objectives for developing automatic looms, scope for automation.
- b) Design features of automatic looms: - Drives, loom motions, accessories & other critical features of automatic looms.
- c) Weft feelers: - Construction working of side sweep (Cimmco & Ruti-B Type), electrical (Ruti-C Type) & electronic weft feelers, their merits, demerits & applications.
- d) Transfer mechanism: - Cimmco & Ruti-C transfer motion's working & construction, shuttle protector, temple & shuttle eye cutter. Requirement for successful transfer of pirn, reasons of stripping, bottoms & remedies. Shuttle changing mechanism & safety motion, its applications.
- e) Automatic let-off motion: - Principles and requirements of automatic let-off mechanism, types, construction & working of Cimmco, Ruti-B, Ruti-C type let-off motions.
- f) Warp stop motion: - Types, Construction and working of mechanical and electrical warp stop motion, Types of drop pins, specifications & applications.
- g) Centre weft fork: - Construction & working of Ruti-C type center weft fork motion & its advantages.
- h) Operator assisting motions: - Pick finding, heald leveling, light indicators, pick counters need, functions & use.
- i) Auto loom fabric defects, causes and remedies, Calculations.

2) FABRIC STRUCTURE:-

Study of following weaves (Design, draft & peg plan) & weave characteristics & weaving requirements.

- i) Stripe & check weave combination - selection of weaves, joining of weaves, firmness, classification & construction of designs.
- ii) Colour & weave effect.
- iii) Simple spot designs.
- iv) Backed fabrics - Warp, weft and wadding backed fabrics.
- v) Bedford words - Plain, twill, wadded, Crepon cords,
- vi) Welt & Pique: - Plain, wadded & waved pique.
- vii) Figuring with extra threads: - Principles, extra warp, extra weft figuring, combination, limitation, extra thread effect & weaving.
- viii) Gauze & Leno :- Principles, basic sheds, Leno with flat steel doups & slotted doups, point draft or counter leno, simultaneous top & bottom doubling, application of slotted doups & double slotted doups, easing & shaker motion concept, working & construction.
- ix) Double cloth: - Object, classification, self stitched double cloth; center stitched double cloths, interchanging double cloth, multiplayer fabrics. Selection of face & back weaves type of stitching points & their selection, wadded double cloth.

3) AUTOMATIC WINDING:-

- a) Classification of automatic winding machine P & Q winding, their application.
- b) Technical requirements of winding process :
 - i) Yarn unwinding
 - ii) Yarn take-up
 - iii) Yarn tensioning
 - iv) Wound package requirements for warping, knitting & weaving.
- c) Construction of automatic winding machines
 - i) Design features, i.e. yarn path (Creel, link presenter, booster, unwinding accelerator, pre cleaner, tensioners, waxing cradle etc.)
 - ii) Drive to drums, scroll details, super drums, braking etc. (Autoconer - 238,338,338 0, Savio Espero & Orion, Murata - 21 C, 7 -V.)
 - iii) Special features of all models, blowers, air consumption & power etc.
- d) Yarn Clearing :-
 - i) Technical back ground

- ii) Optimum clearing.
 - iii) Uster Classimat as an aid for yarn clearing.
 - e) Electronic yarn clearers
 - i) Optical & capacitance, Loefe, TK 930F, TK 950H, Quantum-II etc.
 - ii) The capabilities of different yarn clearers.
 - iii) Detailed method of setting of optical & capacitance type clearer (for carded & combed yarns) w.r.t. N,DS, DL,LL,-D,-L,C, Cluster setting, splicer setting, extended splicer setting for various yarn counts and materials.
 - iv) Siro cuts.
 - v) Knot factor & clearing efficiency & its use as an aid to assess the performance of winding machines.
 - f) Splicing :-
 - ii). Types - mechanical & pneumatic, details of construction, parameters, their applications.
 - iii). Electronic checking of spliced joint.
 - iv). Splice quality assessment (strength, appearance, hairiness)
 - v). Maintenance of splicers.
 - g) Study of various delivery packages.
 - h) Package Quality :-
 - i). Details of package faults observed on automatic winding machines causes & remedies.
 - ii). Mechanism for anti patterning, maximum diameter of package, all to doffing & restarting.
 - i) Calculations: - Efficiency, production & allocation.
- 4) MODERN WARPING:-**
- a) Constructional details & features of modern warping machines. Such as Benninger, West Point, Sucker-Muller, Tsudakoma & Karl Mayer with reference to design of creel, pre-tensioners, automatic adjustment of central control of tensioners.
 - b) Types of re creeling - magazine, truck, chain creels, semi - auto & auto creels, creel - master, and auto plan for colour patterns.
 - c) Head Stock - i) Beam warping - Auto leasing, drive, brakes and automatic doffing & donning.

- ii) Sectional warping - Auto leasing, drum traverse & cone angle adjustment, beam traverse & its adjustment.
- iii) MIS systems & its use.

List of Experiments:-

- 1) Dismantling and resetting of under pick motion.
- 2) Dismantling and resetting of Cimmco & Ruti-C weft feeler motion.
- 3) Dismantling and resetting of Cimmco auto let-off motion.
- 4) Dismantling and resetting of pirn change motion.
- 5) Dismantling and resetting of clutch motion.
- 6) Study of Ruti-C loom -drive, centre weft fork, pick finding, take-up drive, back rest, multi pawl drive, shuttle construction, picking, loose reed etc.
- 7) Study of sectional warping drive - warping speed, beaming speed, reed & beam traverse speed, production and efficiency.
- 8) Study of Laxmi and Senmet pirn winding machine. - Spindle speed, traverse speed, coils per double traverse, diameter control, production and efficiency.
- 9) Visit to Auto loom unit.
- 10) Fabric analysis - Extra warp, weft, Bedford, cord, pique, leno, double cloth, pile fabric.
- 11) Fabric analysis - Extra warp, weft, Bedford cord, pique, leno, double cloth, pile fabric.
- 12) Fabric analysis - Extra warp, weft, Bedford, cord, pique, leno, double cloth, pile fabric.
- 13) Visit to Autoconer unit.
- 14) Visit to Automatic loom unit.

Reference Books:-

1. Principles of Weaving by Marks A.T.C. & Robinson.
2. Textile Colour & Design by Watson.
3. Weaving Machines, Materials & Methods by Prof. M.K. Talukdar, Prof.D.B. Ajgaonkar etc.
4. Textile Mathematics - Vol.-I & II by J.E. Booth.
5. Advanced Textile Design by Watson
6. Modern Preparation & Weaving Machines by A. Ormerod.

SECOND YEAR B. TEXT. – SEMESTER – II**4.1 THERMAL AND AIR ENGINEERING (TT/MMTT/TPE/TC)**

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

1. Introduction – Laws of Thermodynamics – Zeroth Law, First Law, Second law of Thermodynamics. Thermodynamic Processes – constant volume, constant pressure, constant temperature, adiabatic, polytropic & throttling process with P-V & T-S diagrams and numericals..
2. Air Standard Cycle – Introduction, Assumptions in thermodynamic cycles, Important terms used in thermodynamic cycles, efficiency of a cycle, representation of Carnot cycle, Otto cycle, Diesel cycle, on P-V and T-S diagram and numericals.
3. Properties of Steam – Formation of steam at constant pressure – Enthalpy, Enthalpy of water, Enthalpy of evaporation, Enthalpy of dry saturated steam, Wet steam, Superheated steam, Specific volume of steam, Steam table, External work done during evaporation, Internal energy of steam, difference between Gas & Vapour.
Use of steam in textiles – Sizing, Wet processing and numericals based on properties of steam.
4. Steam Boilers – Introduction, Classification of boilers, Study & construction of fire tube boilers such as Cochran boiler, Lancashire boiler, Study & construction of water tube boiler such as Babcock & Wilcox boiler, equivalent evaporation, efficiency of boiler & numericals.
5. Study of boiler mountings & accessories – Safety valve – Dead weight safety valve, Lever safety valve, Spring loaded safety valve, Combined high pressure steam & low water safety valves, Water level indicator, Fusible plug, Steam pressure gauge, Feed check valve, Stop valve, Blow off cock, Accessories – Feed water pump, Injector, Economizer, Superheater.

6. Thermic Fluid Heating System – Introduction, Thermic heating system, Expansion & Deviation, Selection of Tanks, Requirements of Fluids, Deterioration of fluid, Consequences, Cleaning of the system, Application in Textile industry.
7. Refrigeration – Units of refrigeration, C.O.P., Difference between heat engine, Refrigerator, heat pump. Air refrigerator working on reversed Carnot cycle on P-V & T-S diagram, expression for C.O.P.
8. Air Conditioning – Introduction to air conditioning, psychrometric terms, Dalton's law of partial pressure, Psychrometric relations, Enthalpy of moist air, Thermodynamic wet bulb temperature, Psychrometric chart, Psychrometric processes, - Sensible heating & cooling, bypass factor of heating & cooling coil, Humidification & dehumidification, methods of humidification in textile industry, methods of dehumidification, sensible heat factor, cooling & dehumidification, cooling with adiabatic humidification by steam injection, Adiabatic chemical dehumidification, Adiabatic mixing of two air streams, Object of a/c & proper humidification in textile mills, Effect of moisture on textile fibres, Sling psychrometer, Humidistat.
9. Compressor – Classification, Reciprocating, Rotary vane compressor, Screw compressor, Centrifugal compressor, Axial flow compressor. Pumps – Reciprocating, Centrifugal (working and principle only).
10. Introduction to Pneumatics –
 - (a) Pneumatic Circuits – Symbols of cylinder, control valves, check valves.
 - (b) Air treatment – Symbols for Air filter, Refrigerated dryer, Lubricators.
 - (c) Control valves – Symbols for Poppet valve, Pilot operated check valve and spool valve.
 - (d) Application of Pneumatic circuits in Textile machines.

Reference Books:-

1. A Textbook of Engineering Thermodynamics by R.K. Rajput.
2. Thermal Engineering by R.S.Khurmi & Gupta.
3. Elements of Heat Engines (Vol. I & II) by Patel, Karamchandani.
4. A course in Refrigeration & Air conditioning by Arora & Domkundwar.
5. Pneumatic Systems by Majumdar.
6. Hydraulics & Pneumatics by Andrew & Parr.
7. Humidification & Air conditioning by S. P. Patel.
8. Textile Humidification by K. G. Vaze.

SECOND YEAR B. TEXT. – SEMESTER – II**4.2 TEXTILE MATHEMATICS-IV (TT/MMTT/TPE/TC/FT)**

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

1. Laplace Transforms: -

Definition, transforms of standard functions, transforms of derivatives, and integrals. Inverse Laplace transforms by partial fraction and convolution method. (6)

2. Applications of Laplace Transforms for solving L.D. equations:-

Method of solving L. D. equations with initial conditions (Boundary Values) with the help of Laplace Transforms. (3)

3. Vector differentiation:-

Differentiation of vector valued function of scalar 't', gradient, divergence, curl, directional derivative. Solenoidal and irrotational vector fields. (5)

4. Fourier Series:-

Definition, Euler,s formulae, Conditions for fourier expansions. Full range fourier series and half range expansions and their examples. (6)

5. Analysis of Multivariate Data:-

Multiple and Partial correlation coefficients. Plane of regressions. (4)

6. Analysis of Variances:-

Introduction, One-way Classification, Two-way Classification with and without repetition. (5)

7. Design of Experiments:-

Introduction, Basic principles, Basic Designs (CRD, RBD & LSD). (7)

8. Factorial Experiments:-

Introduction & types, 2^n factorial experiments, 2^2 & 2^3 factorial experiments. (4)

Reference Books:-

1. A Text Book of Applied Mathematics : by J.N. & P.N. Wattikar.
2. Higher Engineering Mathematics : by B.S. Grewal.
3. A Text Book on Engineering Mathematics :by Bali, Saxena & Iyengar.
4. Mathematical Statistics : by J.Fruend.
5. Applied Statistics & Probability of Engineers : by Montgomeri & Runger
6. Probability & Statistics for Engineers : by Johnson.
7. Design and Analysis of Experiments : by Montgomeri.
8. A Text Book of Engineering Mechanics : by R.S. Kurmi.

SECOND YEAR B. TEXT. – SEMESTER – II**4.3 ELECTRICAL TECHNOLOGY (TPE)**

Lectures	:	3 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	25 Marks
Term Work	:	25 Marks
Subject Total	:	150 Marks

1. D.C. MOTORS:

Principle, working, types, performance, characteristics and applications, speed control methods. Starters. Modern methods of speed control using thyristor, [Torque calculation and simple numerical based on speed control methods].

2. A.C MOTORS:

Three induction motors, principle, working , types, performance, characteristics, efficiency, modern methods of speed control using Electronics devices like thyristor invertors. Modern methods of starting of A.C. motors.

Selection & study of motors for various textile machineries like let off motor, take off motor, accumulator motor, main motor. Motors in humidification plant. Energy efficient motors (EEM) and ISI standards for motors used in Textile industries, possible faults in Textile motors and remedies.

3. SERVO MOTORS:

Construction, principle, working, types, applications of A.C. /D.C. servo motors, stepper motors.

4. POWER QUALITY & POWER FACTOR IMPROVEMENT:

Concept of power quality, harmonics & methods of harmonics elimination, Concept of power triangle, active power, apparent and reactive power, various modern methods of improving power factor and its importance in industries, APFC panel (mathematical treatment is necessary for power factor improvement), disadvantages & advantages of P.F. improvement.

5. TARIFF & ENERGY AUDITING:

Different types of tariffs, load Management, concept of Energy Auditing in textile industry, Measurement of active power using two wattmeter method. Simple problems based on two wattmeter method, calculation of electricity bill of different textile mills and industries. [Simple problems on two-part tariff.]

6. SUBSTATION & ITS COMPONENTS:

Fuses, Relays, Circuit breakers, ratings of circuit breaker, Substation & different components of substation.

7. Renewable Energy Sources:

Concept of renewable energy sources, types of energy resources like solar energy & solar cell, wind energy, tidal energy, ocean thermal energy, geo-thermal energy, photovoltaic, biomass. Concept of co-generation plant.

List of Experiments: (Any eight)

- 1) Speed control of D.C .Shunt motor by flux control method.
- 2) Speed control of D.C. Shunt motor by Armature voltage control method.
- 3) Load test on D.C. Shunt motor.
- 4) Reversal of D.C. Shunt motors
- 5) Study of starter for D.C. motors.
- 6) Reversal of three phase A.C .induction motors
- 7) Speed control of three phase of induction motors by voltage control method.
- 8) Speed control of three phase of induction motors by pole changing method.
- 9) Measurement of three-phase power by two-watt meter method.
- 10) Load test on three phase induction motors
- 11) Study of stepper motors.
- 12) Study of starter for three phase induction motors.

Reference Books:-

1. Electrical Technology- by Prof. B.L. Theraja.
2. Electrical Technology- by Prof.H. Cotton
3. A.C Machines – by Prof. M.G. Say
4. Electrical Measurement and Instrumentation by Prof. A.K, Sawhny

5. Electrical Power Systems by Prof. S.L Uppal.
6. Switch Gear and Protection by Prof. S.Rao.
7. Modern Electric Traction System by Prof. H. Pratap.
8. A first course in Electrical drive –by- Prof.F.K.Pillai
9. Modern Industrial Electronics by Prof T.J. Maloney
- 10 Utility Engineering in Textile -(JET)Research Paper
- 11 Electrical Technology by Prof,U.A Bakshi.---- Text Book

SECOND YEAR B. TEXT. – SEMESTER – II

4.4 PHYSICAL PROPERTIES OF TEXTILES (TPE)

Lectures	:	3 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	25 Marks
Term Work	:	25 Marks
Subject Total	:	150 Marks

INTRODUCTION TO TESTING: Objectives of testing

A) FIBRE TESTING:-

1) Fibre Length

Technical significance, fibre length measurement - comb sorter, fibro graph.

2) Fibre Fineness

Terms & definitions, technical significance of fibre fineness, measurement of fineness, - Gravimetric method, Airflow method – Micronaire Instrument .

3) Maturity of Cotton

Technical significance, measurement of maturity – Microscopic method, polarized light method

4) Study of Modern Fibre Testing Instruments like HVI & AFIS.

B) YARN TESTING:-

1) Twist & Twist Measurement

Definition, Twist direction, amount of twist, TM / TF, twist & yarn strength, measurement of twist in single & double yarn – Twist contraction method, Take Up Twist Tester.

2) Yarn Evenness

Importance, classification of variation, causes of irregularity, Measurement of yarn irregularities – cutting & weighting method, Evenness tester – Uster Tester, Analysis of spectrogram, Comparison between imperfection and classimat faults.

C) FABRIC TESTING:-

- 1) Air permeability: – Concept, measurement & factors affecting air permeability.
- 2) Water permeability: – Concept, terms measurement:- wetting time test, spray test, drop penetration test, bundesmann tester, static head test.
- 3) Fabric stiffness & Drape: – Concept, Shirley stiffness tester, Drapemeter.
- 4) Crease resistance & Crease recovery: -measurement of crease recovery.
- 5) Serviceability, wear & abrasion resistance :- Concept - Serviceability, wear & abrasion, testing of Abrasion Resistance - Martindale Abrasion tester.
- 6) Pilling of fabric – Importance, testing of pilling properties of fabric.

D) TENSILE STRENGTH TESTING OF TEXTILE MATERIALS

1) Tensile Strength

Introduction, terminology, stress strain curve, factors affecting tensile properties.

2) Measurement of Fibre Strength

Single fibre strength - Instron, Bundle Strength-Stelometer

3) Measurement of Yarn Strength

Pendulum lever principle: single thread strength tester, lea strength tester, strain gauze transducer principle : Instron Tester, Ballastic Tester.

4) Measurement of Fabric strength

Cut strip test, Raveled strip test, Grab test, tearing strength testing, Ballistic strength testing, bursting strength testing.

List of Experiments:-

1. Comb Sorter method for estimation of fibre length parameters
2. Determination of fibre fineness by air flow method
3. Determination Fibre Length & Nep On AFIS
4. Study of fibre parameters on HFT-9000
5. Determination of twist in single & double Yarn.

6. Study of yarn evenness.
7. Mill Visit : Yarn Evenness and analysis of Spectrogram Testing
8. Determination of Single yarn strength
9. Determination of Lea strength
10. Fabric strip Strength Test
11. Fabric Tearing Strength
12. Fabric Abrasion
13. Fabric Stiffness

Reference Books:-

1. Physical Testing of Textiles by J.E. Booth.
2. Manuals of HVI, AFIS
3. Textile Testing by Skinkle.
4. Handbook of Indian Standards.
5. Physical properties of Textile Fibre by J.W.S. Hearle & Morton.
6. Quality control and Testing by V.K.Kothari
7. Textile Testing by Angappan & Gopalkrishnan.

SECOND YEAR B. TEXT. – SEMESTER – II

4.5 YARN MANUFACTURING MACHINERY-III (TPE)

Lectures	:	4 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	50 Marks
Term Work	:	25 Marks
Subject Total	:	175 Marks

1 . COMBER :-

COMBER PREPARATORY:

- A. Requirements of good lap – importance of number of passages, importance of good lap, linear density of lap, etc.
- B. Methods of comber lap preparation – Different sequences of comber lap preparation, study of sliver lap machine, ribbon lap machine, unilap machine. Developments in combing preparatory machines.
- C. Maintenance & Assessment of combing preparatory machines.

COMBING:

- A. Objects of combing process. Study of combing cycle.
- B. Constructional details of Comber- feeding, nipper assembly, cylinder and detaching rollers, cylinder needles, web and sliver transport, drafting and coiling at comber.
- C. Semi combing, normal combing, super combing and double combing. Forward and backward combing.
- D. Maintenance of comber. Index Cycle, Comber Settings.
- E. Assessment of performance of comber – Norms for production, speed. Combing efficiency, Fractionating efficiency of comber. Influence of combing operation on quality.
- F. Automatic and centralized noil extraction. Automatic materials handling. Stop motions in comber.
- G. Technical specifications of modern combers available in the world market.

2. SPEEDFRAME :-

- A. Objects of speed frame. Concept of drafting, twisting and winding process.
- B. Constructional aspects of Speedframe – Creel, Top arm apron drafting system, Spindle & Flyer assembly, Bobbin building at speed frame, stop motions.
- C. Study of mechanisms like – differential motion, swing motion, building mechanism, semi-automatic and automatic doffing, etc.
- D. Assessment of performance of Speedframe - Productivity and Quality norms of speed frame, Zero break concept, block creeling.
- E. Materials handling. Transport of bobbins to ring spinning machines.
- F. Maintenance of speed frame.
- G. Features of modern speed-frame machines available in the market.

List of Experiments:-

- 1. Driving arrangement & calculations of Sliver lap machine. Roller settings in Sliver lap machine.
- 2. Driving arrangement & calculations of Ribbon lap machine. Roller settings in Ribbon lap machine.
- 3. Study of constructional aspects, combing cycle & index chart of modern comber.
- 4. Driving arrangement & calculations in modern comber.
- 5. Comber setting.
- 6. Driving arrangement & calculations related to production, constants, draft twist etc. of modern speed frame.
- 7. Study of coils per inch of speed frame & differential gearing.
- 8. Study of building mechanism of speed frame.
- 9. Mill visit to study modern Comber, Speed frame.
- 10. To study the utilities required for Comber preparatory, Comber, Speed frame

Reference Books:-

- 1. The Textile Institute Publication –Manual of Textile Technology–Short Staple Spinning Series Vol I to V by W. Klein Vol III-A Practical training guide to Combing & Drawing by W.Klein
- 2. Practical guide to combing by W.Klein, Textile Institute publication Vol.3

3. Fundamentals of Spun Yarn Technology, By Carl Lawrence.
4. Essential calculations of practical cotton spinning by T.K.Pattabhiraman
5. Technology of cotton spinning by J.Janakiram.
6. Drawing, Combing and roving and speed frame by Zoltan, S.Szaloky, The Institute of Textile Technology, Verginia
7. Draw frame, combing and speed frame by J.H.Black; The Textile Institute publication, Manual of cotton spinning Vol-Iv part II.
8. Combing by Moor.
9. Spun Yarn Technology by Eric Oxtoby.
10. Elements of combing by A.R.Khare.
11. Cotton Drawing and Roving by G.R.Merril.
12. Manual of cotton spinning series, vol3, part 2 by J.Black et al Textile Institute Publication.

SECOND YEAR B. TEXT. – SEMESTER – II

4.6 FABRIC MANUFACTURING MACHINERY-III (TPE)

Lectures	:	4 Hours / Week
Practical	:	2 Hours / Week
Theory Paper	:	100 Marks
Practical Exam	:	50 Marks
Term Work	:	25 Marks
Subject Total	:	175 Marks

- 1) **SIZING:-** Study of modern sizing machine element.
 - 1) Creel - construction, braking arrangement & positive drive.
 - 2) Size Box - various size boxes, 1 nip 1 dip, 2 nip 2 dip, dressing rollers, Zell, Sucker, West point, Benninger, Tsudakoma size box constructions various roller constructional details.
 - 3) Drying Cylinders - Heating arrangement, coating ,temperature & its control, pressure of steam, thermal performance of drying cylinders, steam traps & its types & importance.
 - 4) Head Stock - Dry splitting, measuring motion, drag roller, comb & drive to weavers beam, pressuring device.
 - 5) Control Systems- Importance, consequences of moisture, temperature, size level, on line size percentage, Stretch control systems.
 - 6) Factors affecting size pick up & size add-on, migration.
 - 7) Assessment of sizing performance - laboratory & practical methods.
 - 8) Concept of single end sizing & various methods.
 - 9) Concept of dyeing cum sizing.
 - 10) Automation and MIS on modern machines.
 - 11) Concept of recycling of sizes.
 - 12) Calculations - Related to size concentration, size pick up, stretch, drying, count of warp production etc.

- 2) **FABRIC STRUCTURE:-**
 - a) Study of following weave on weave characteristics & weaving requirements.
 - 1) Warp pile - wire method, face to face weaving & terry pile.
 - 2) Introduction to tufted carpets.

- 3) Weft pile - velveteens & velours
 - b) Fabric Engineering:-
 - 1) Peirce's yarn diameter formula & its limitations.
 - 2) Fabrics cover & crimp factors.
 - 3) Cloth geometric of plain, twill and combination weave.
 - 4) Concept of Tightness factor.
 - 5) Practical application of cloth geometry & cover factor.
 - c) Construction & Development of Jacquard Designs:-
 - 1) Elements of Jacquards shedding - Double lift, Jacquard with single & double cylinder working, Jacquard sizes, Harness tie, Harness drawing - in, card cutting & card lacing.
 - 2) Harness & design calculation - Setting of harness, number of harness cords to each hook, casting out, size of repeat, count of design paper.
 - 3) Development of Jacquard Designs - Construction of square paper designs, Process of drafting a sketch design, drafting designs from woven fabrics.
 - 4) Development of figures - Prevention of long floats, bold & flat development, Development of large figures, use of warp & weft float, figure shading.
 - 5) Insertion of ground weavers.
 - 6) Factors influence woven designs.
- 3) SHUTTLELESS WEAVING:-**
- a) Limitations of shuttle loom with respect to weaving process, engineering aspects & environmental aspects.
 - b) Classification of shuttle less weaving machines.
 - c) Projectile weaving machine - History of shuttle less weaving machine; Projectile machine models TW-II To P7300 ; Machine drive, various motions timing, shedding Cam motion, Beat-up motion, limitations of shuttle loom picking motion; Projectile picking concept, picking motion, picking phases, Projectile acceleration & retardation, torsion rod details, Projectile preparation for picking, selvedge motion, Receiving unit, Selvedge weaves, Let-off motion (Mechanical & power), Take-up motion, their advantages in relation to shuttle loom motions,

specifications of projectiles & grippers for various applications, Machine speed, timings, power specifications for various widths, all auxiliary motions such as brake, clutch, oiling, cleaning, MIS, General electronic circuit, pick finding, Multi colour weft insertion, weft stop, warp stop, whip roller, weft brake etc. Fabric defects & remedies

d) Rapier Weaving Machine -

Various rapier weaving machines such as Picanol, Smit, Somet, Vamatex, Dornier, Sulzer, Panther etc. Various machine models available of above make & their brief history.

Study of weft velocity curves for looms with different methods of weft insertion. Concept of Dewas & Gabler rapier systems, their comparison with other weft insertion systems from weft acceleration & retardation point. Study of effect of reed width on loom speed Principles of different single & double rapier weft insertion systems (Drive), their comparison. Study of rapier heads.

Smit rapier machine models, machine drive, Timings of various motions, cam shedding & beat up motion, Rapier motion drive details, Details of rapier tape, head, sely construction , guiding elements, Gripper openers, cutters, stroke adjustment. Selvage forming elements & adjustments.

Let-off & take up motion (Mechanical & power), their adjustments for various pick density range, specifications of rapier & head for various applications. Specifications speed, power & machine timing for various widths.

All auxiliary motions such as brake, clutch oiling, cleaning, MIS, General electronic circuit, pick finding, multi colour weft insertion, weft-stop, warp stop, whip roller, weft brake etc.

Fabric defects & remedies, weft waste during selvage formation.

Detailed study of Dornier rapier weaving machine on above line.

List of Experiments:-

1. Dismantling and resetting of warp stop motion.
2. Study of shuttle change motion and silk loom features.
3. Loom operating - starting, stopping, knotting, & drawing -in & study of fabric defects.

4. General study of projectile machine and drive arrangements for various motions.
5. General study of flexible Rapier machine & drive arrangements for various motions.
6. General study of rigid Rapier machine & drive arrangements for various motions.
7. Study of positive cam motions of Sulzer & Ruti-C machine.
8. Study of Rotary mechanical & electronic dobby.
9. Study of electronic jacquard motion.
10. Fabric analysis of advanced structures.
11. Fabric analysis of advanced structures.
12. Fabric analysis of advanced structures.
13. Visit to Jacquard unit.

Reference Books:-

1. The Technology of Warp Sizing by J.B. Smith.
2. Modern Preparation & Weaving by A. Ormerod.
3. Textile Maths Vol.III by J.E. Booth
4. Principles of weaving by Marks & Robbinson.
5. Weaving machines & methods by Dr. Talukdar, Prof. D.B. Ajgaonkar.
6. Sizing by Sydel.
7. Shuttleless weaving by Svaty.
8. Modern Methods of Weaving by Duxburng.
9. Hand Book of Weaving - Sulzer Publication.

SECOND YEAR B. TEXT. – SEMESTER – II

4.7 TEXTILE MACHINE DRAWING (TPE)

Drawing	:	2 Hours / Week
Term Work	:	50 Marks
Subject Total	:	50 Marks

- 1) Study of IS conventions essential for machine drawing.
- 2) Study of electrical, electronic , hydraulic and pneumatic symbols used.
- 3) Drawing sketches of couplings, cotter joint, knuckle joint, pipe joint, bearings, springs, pulleys, gears and gear drives.
- 4) Free hand sketches of
 - a) Primary loom motions
 - b) Gearing plan of spinning machines
 - c) Differential gearing
 - d) Comber index chart
 - e) Detaching roller mechanism
 - f) Drafting system of draw frame
 - g) Coiler drive
- 5) Details and assembly drawings of machines / mechanisms assemblies containing 6-8 components.
- 6) Computer aided drafting used for layout of industrial units.

TERM WORK

Eight submission sheets are to be drawn based on above syllabus . Every year two different drawings may be given to students to avoid repeatability.

- 1) One sheet on IS convensions.
- 2) One sheet on free hand sketches of textile mechanism.
- 3) one sheet based on weaving cam design.
- 4) Assembly & details drawing of flanged coupling,bearings, joints(knuckle or cotter joints), pulleys, springs, or gears consisting of 6-8 components.
- 5) Assembly and details drawing of following
Single plate clutch, tailstock, feed chuck valve, etc.
- 6) Assembly and details of textile mechanism
Picking shaft assembly , feed roller of carding machine, lap roller drive at comber.
- 7) Sheet representing hydraulic, pneumatic, Electrical , Electronic symbols and circuits, pipe joints.

- 8) Sheet on machinery and plant layout with help of computer drafting.

Reference Books:-

1. M/c Drawing : N.D. Bhatt
2. M/c Drawing : N. Sidheshwar
3. M/c Drawing : V.V. Shastri & P.P. Kanhaiya
4. M/c Drawing : M.B. Shah
5. Hand Book : IS 696, IS 969.
6. Elements of w/s Technology : Hazra Choudhary
7. Machine manuals of textile machines.