



SHIVAJI UNIVERSITY, KOLHAPUR

Introduced from June, 2005

FIRST YEAR B.TEXT. – SEMESTER - I

1.1 APPLIED PHYSICS (TT/MMTT/TPE/TC)

Lectures	:	4 Hours / Week.
Theory Paper	:	100 Marks, 3 Hours.
Subject Total	:	100 Marks.

1. **Elasticity** : Load, stress, strain, Hooke's Law of elasticity. Elastic behaviour of solids in general - some peculiar traits, working stress and factor of safety. Factors affecting elasticity. Types of elasticity, work done per unit volume in a strain. Relation between Y , η and K . Poission's ratio, relation between K , η and Poission's ratio. Twisting couple on a cylinder. Bending of beam, bending moment of the beam. The cantilever, resilience.
2. **Viscosity** : Newton's Law of viscosity, streamline & turbulent flow, critical velocity, significance of Reynold's number, Poiseuille's equation for flow of liquid through a tube. Experimental determination of η for a liquid - Poiseuille's method, Motion in a viscous medium (Stoke's law), Ostwald's viscometer, variation of viscosity with temperature. Applications of viscosity in textiles.
3. **Surface Tension** : Molecular theory of surface tension. Free energy of a surface & surface tension. Excess pressure inside a liquid drop & soap bubble. Relation between radii of curvature, pressure & surface tension. Shape of liquid meniscus in a capillary. Energy required to raise a liquid in a capillary tube. Measurement of surface tension. Factors affecting surface tension. Applications of surface tension in textiles.
4. **Friction** : Laws of friction, Angle of friction, Sliding & Rolling friction. Necessity of friction. Derivation of relation $T_2/T_1 = e^{\mu \theta}$ (where T_1 & T_2 are incoming & outgoing tensions respectively, θ (Theta) is the angle of friction, μ is the co-efficient of friction). Mechanism of friction. Applications of friction in textiles.
5. **Sound waves** – Intensity of sound, Echo, reverberation, Absorption coefficient, sound absorbing materials, resonance, noise & its control, ultrasonics : piezoelectric effect, production of ultrasonic waves, its detection and applications.
6. **Optics** : Introduction to reflection, refraction, Laws of refraction, refractive index, total internal reflection, interference & diffraction. Review of simple & compound microscope, expression for magnifying & resolving power.
Electron Microscope: Principle, Construction & working. Scanning & transmission electron microscope, its applications in textiles.

7. **Polarisation** : Polarisation, production of plane, circularly & elliptically polarised light. The colour of crystal plates in polarized light, Quarter & half wave plate. Birefringence and Polarising microscope.
8. **Electromagnetic spectrum** – Nature of electromagnetic radiation, types of electromagnetic radiations and their properties. Use of microwaves, UV and IR radiations in textiles, Laser & its applications.
9. **X-ray** : Origin of continuous & characteristic x-ray spectrum, properties, production of x-rays. x-ray diffraction - Bragg's law, Bragg's spectrometer, Miller indices.
10. **Photoelectric Effect** : Concept, Einstein's equation of photoelectric effect. Factors influencing the photoelectric effect. Study of various photocells. Use of photosensors in the textile field.

REFERENCE BOOKS :-

1. Elements of Properties of Matter by D.S. Mathur
2. Engineering Physics by B.L. Theraja
3. Modern Physics by B.L. Theraja
4. Engineering Physics by R.K. Gour & Gupta
5. Basic Applied Physics by R.K. Gour.
6. Physics for Engineers by M.R. Srinivasan.
7. Text Book of Optics by Brijlal & Subramanyam
8. Optics by A.K. Ghatak

FIRST YEAR B.TEXT. SEMESTER-I

1.2 TEXTILE MATHEMATICS-I (TT/MMTT/TPE/TC)

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

1. Matrix:

Rank of matrix, Normal form of matrix, Inverse of matrix by adjoint method, Solution of simultaneous linear equations. Characteristic equation, eigen values, eigen vectors. Caley Hamilton's theorem.

2. Successive Differentiation:

Introduction, standard results, Leibnitz rule, Radius of Curvature, Evolutes, Involutives.

3. Partial Differentiation:

Introduction, total differentiation, Euler's theorem on homogeneous function. Jacobean, Errors & approximation.

4. Curve Tracing:

Rules & examples of curve tracing in Cartesian, Polar & Parametric forms.

5. Introduction of Statistics:

Definitions of Population, Variable, Attribute, Census Survey, Sample Survey, Simple random sample. Raw statistical data, collection, classification, Frequency distribution, class limits & boundary, class width, mid point. Histogram, Frequency polygon, Frequency curve.

6. Measures of central tendency:

Arithmetic Mean (A.M.), Median, Mode, Combined Mean & Computation.

7. Measures of dispersion:

Range, Quartile deviation, Mean deviation, Standard deviation as Absolute measures of dispersion, Coefficient of range, quartile deviation, mean deviation, coefficient of variation as Relative measures of dispersion, consistency & computation.

8. Measures of Skewness & kurtosis:

Skewness, types, Karl Pearson's & Bow ley's coefficient of skewness & Computation. Kurtosis, types, coefficient of Kurtosis based on moments.

9. Probability:

Random experiment, sample space, event, types of events, Venn diagram
Definition, laws of probability & examples.

REFERENCE BOOKS:

1. A textbook of applied mathematics Vol.-I & II by P.N. & J.N. Wartikar.
2. Higher engineering mathematics by B.S. Grewal.
3. A textbook of applied mathematics by Bali, Saxena & Iyengar.
4. Mathematical Statistics by J.E. Freund.
5. Probability & Statistics for engineers by Johnson.
6. Statistical methods by Kumbhojkar.

FIRST YEAR B.TEXT. – SEMESTER - I

1.3 ELECTRICAL SCIENCE. (TT/MMTT/TPE/TC)

Lectures	:	3 Hours / week.
Practicals	:	2 Hours / Week.
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks.
Subject Total	:	150 Marks.

1. Power System Components :

Brief introduction to thermal ,hydroelectrical,neuclear plants and diesel generating station, single line diagram of power system, types of transmission lines (only theoretical)

2. D.C. Circuits :

Basic electrical quantities ,voltage ,current ,power energy, correlation between electrical and mechanical quantities, ohm's law with its limitation, Kirchoff's current and voltage law Resistance temperature coefficient α_0 (Numerical Problems on with two/three variables)

3. Magnetic Circuits :

Concepts of magnetic circuits ,MMF, Reluctance, Magnetic flux density ,magnetic field strength, definitions and units ,comparison of electrical and magnetic circuits ,Introduction to Ferro magnetic paramagnetic, die magnetic materials, B-H curve leakage and fringing, Self and mutual inductance ,simple problem on series magnetic circuits.

4. A.C. Fundamentals:

Lenz's law ,faraday's law of electromagnetic induction,Genrerion of single and three phase quantity, Concept of R.M.S. and Average value ,peak value ,cycle ,frequency, time period ,phase and phase difference ,star and delta connection and their line and phase value correlation (simple numerical problems)

5. Concept of R L C Circuits :

Concept of inductive reactance ,capacitive reactance,phasor representation of R,L,C & RL RC RLC Circuits ,impedance ,admittance complex notations (problems of RL RC RLC Circuits),

Power triangle ,power factor ,its significance ,factors affecting it and methods to improve the power factor.

6. Transformer :

Operating principle of a transformer types of transformers E.M.F. equation of transformer, concept of K, ideal transformer phasor diagram of ideal transformer on

no load, phasor diagram of actual single phase transformer on no load , loaded condition with Resistive load ,Efficiency and regulation of transformer by direct loading of transformer, types of cooling of transformer

7. Basic Electrical Drives :

Principle, construction ,operation and characteristics of three phase induction motor .D.C. motor ,single phase induction motor,

Speed control of A.C./ D.C. drives, necessity of starters, reasons of burning of motors ,remedies ,class of insulation .Application of A.C./D.C drives in textiles

8. Electrical Wiring :

Types of cable and their selection for various purpose, simple wiring of staircase and godown wiring ,types of earthing ,working of sodium vapour lamp, fluorescent lamp, CFL lamps.

LIST OF EXPERIMENTS :-

1. Study of various of electrical symbols
2. Verification of ohm's law
3. Verification of kirchoff's voltage and current law
4. Determination of power factor of R L series circuit .
5. Speed control of D.C.motor (Armature control)
6. Speed control of D.C.motor (flux control)
7. Efficiency and regulation of single phase transformer by direct loading
8. Ratio test on single phase transformer
9. Study of various lamps(any two)
10. Study of starters(Any two)
11. Speed torque characteristics of I.M.

REFERENCE BOOKS:

1. Elements of electrical Engineering by U.A.Bakshi
2. Electrical Technology by U.A.Bakshi
3. A text book in electrical techonology by B.L.Thareja
4. Electrical Technology by Edward huges and smith

FIRST YEAR B.TEXT. – SEMESTER - I

1.4 TEXTILE FIBRES - I (TT/MMTT/TPE)

Lectures : 4 Hours / Week.

Theory paper : 100 Marks.

Subject Total : 100 Marks.

- 1) Requirements of Fibres : Definitions of some important terminologies, Requirements of fibre formation, molecular weight, degree of polymerisation, orientation and crystallinity. Characteristics of good textile fibre, essential and desirable properties of apparel grade textile fibres & technical grade textile fibres, classification of fibres, advantages and disadvantages of natural fibres.
- 2) Vegetable Fibres :
 - i) Hair Based Fibres : Cotton, history and development of cotton fibre, cultivation practices, physical and chemical properties and its applications.
 - ii) Bast Fibres : Jute, history and development of jute fibre, cultivation and harvesting practices. Woollenisation of jute, structure of jute fibre, effects of various treatments on jute fibre.

Physical & Chemical properties of jute fibre, applications of jute fibre.

Other bast fibres : Hemp, flax, ramie, linen fibre cultivation practices, physical and chemical properties of these fibres.
 - iii) Leaf fibres : Banana fibres, pineapple fibres, their properties & applications.
- 3) Animal Fibres :
 - i) Keratin type of protein base staple fibres : Wool - types of wool, grading of wool, physical & chemical properties of wool fibre.
 - ii) Non Keratin type of protein base filament fibres : Silk - Silk, types of silk fibre, history & its development, Physical and chemical properties of the silk fibre.
 - iii) Other fibres: Fibres such as camel hairs, spider silk, etc., their physical and chemical properties.
- 4) Advantages and disadvantages of man-made fibres, General principles of manufacturing man-made fibres.
- 5) Regenerated Fibres :

- i) Cellulose Base : Viscose rayon, manufacturing of viscose rayon, polynosic high weight modulus fibre, cupraminium rayon, and acetate & triacetate fibres. The physical and chemical properties of these fibres and their applications. Tencel fibre.
 - ii) Protein Base : Vicara, Caesin, Ardil Fibres. Physical and chemical properties and their applications.
- 6) Synthetic fibres :
- i) Condensation Polymers :
 - a) Polyamide : Nylon fibre and its derivatives, manufacture of Nylon 6 & 6,6 fibres, physical and chemical properties of Nylon 6 & 6,6 fibres and their applications. Speciality fibres such as Kevlar, Nomex, their properties & applications.
 - b) Polyester : Manufacture of polyester fibres. The physical and chemical properties of polyester fibres. The speciality fibres such as flame retardant PET, Hygroscopic PET their properties and applications.
 - ii) Addition Polymers :
 - a) Polyacrylonitrile Fibre : Acrylic and modacrylic fibre, the production of acrylic fibre, the physical & chemical properties of acrylic and modacrylic fibres and their application.
 - b) Polypropylene : Polypropylene and polyethylene their production, physical and chemical properties and applications.
- 7) Other Fibres : Carbon fibre, glass fibres, PVA fibres, Polyurethane (Spandex, Lycra fibre), PVC fibres.

REFERENCE BOOKS :-

1. Hand book of Fibres by Garden & Cook.
2. Fibre Science And Technology by S.P. Mishra
3. Man Made fibre – R.W. Moncriff.
4. Introduction to Textile Fibres by H.V.S. Murthy.

FIRST YEAR B.TEXT. – SEMESTER - I

1.5 PRINCIPLES OF YARN MANUFACTURING - I (TT/MMTT/TPE)

Lectures	:	4 Hours / Week.
Practicals	:	2 Hours / Week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks
Subject Total	:	150 Marks.

1. Definition of terms – ‘Textiles’, ‘Fibres’, ‘Yarns’ and ‘Fabric’, flow chart of process involved in conversions of fibres into yarns by presently available methods, object of each process. Brief introduction of different methods of spinning.
2. Essential and desirable properties of fibres as textile raw material.
3. Yarn classification, yarn numbering systems and related calculation.
4. Ginning – Objects – Study of various types of gins – pre and post ginning equipments. Influence on ginning of cotton fibre properties. Precautions to be taken at ginning. Factors affecting ginning performance. Pressing and baling of cotton. Characteristics of bales of various countries.
5. Blow room – objects – Basic operations in the Blow room – Feed material – A typical conventional blow room installation as a sequence of machines – The need for various types of machines – Components of blow room machines – Feed apparatus – Opening devices – Cleaning arrangements – Installation of feed assembly, opening element and the grid – General factors influencing opening and cleaning – The machines forming an installation – machines in different zones – Transport of material – Control of material flow.
6. Carding – Objects – History and development of carding – basic actions in carding operation of conventional card – operating regions of card – settings in card – card maintenance card doffing – History & developments – driving arrangement of a conventional card – calculation of production, draft and waste.
7. Drawing – Object – Principles of doubling and roller drafting of conventional draw frames – Calculation of drafts and production – setting of drafting rollers – importance of fibre control in draw frame – Concept of autolevelling at draw frame – stop motion in draw frame.

LIST OF EXPERIMENTS :-

1. A study of different types of tools and gadgets used in spinning such as various types of spanners, Calipers, Hammers, gauges, Screw driver, Pliers, Pullers, Oiling and greasing equipment etc.
2. Study of different types of drives and calculations based on the same. Belt drive - Flat and V, Open and Cross, Gear Drive, Simple carrier, compound carrier, Helical, Bevel. Chain and sprocket wheel drive. Worm and worm wheel drive, Timer belts.
3. Study of various types of bearings used on spinning machines and their lubrication. Plain, Journal, Bush, Ball, Roller, Needle and others.
4. Introduction to spinning process, sequence, machines (carded/combed).
5. Study of Blowroom line - Flow chart - Machine positioning in Blowroom.
6. Study of Conventional Bale Opener - Dimensions, Construction, Working, Driving arrangement, calculations.
7. Study of Step Cleaner - Dimension, Construction, Working, Driving arrangement, calculations.
8. Study of Scutcher - Dimension, Construction, Working, Driving arrangement, calculations.
9. Study of constructional details & working of conventional card.
10. Driving arrangement and calculation on conventional card.
11. Study of construction and working of conventional draw frame.
12. Driving arrangements and calculations on conventional draw frame.

REFERENCE BOOKS :-

- 1) The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series
Vol.I – The Technology of short staple spinning by W. Klein.
Vol.-II – A Practical Guide to Opening & Carding by W. Klein.
Vol.III – A Practical Guide to Combing & Drawing – 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)‘ 6)‘Cotton Opening and Picking’ by G.R. Merril.
- 6) ‘Cotton Ginning’ Textile Progress, The Textile Institute Publication.
- 7)‘Fundamentals of Spun Yarn Technology’ by Carl A. Lawrence
- 8)‘Cotton Growing and Marketing’, J.S. Parmar, Tecoya Trend Publications.
- 9)‘Cotton Varieties’ by Parmar, Tecoya Trend Publication.
- 10)Blowroom and Carding- Training Programme conducted by NCUTE, IIT, Delhi.
- 11) Carding by F. Charanlay. The Textile Institute publication, Manual of cotton spinning series Vol-III.
- 12) Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
- 13) Principles of Roller drafting & Irregularity of the drafted sliver by G A R Foster. The Textile Institute publication, Manual of cotton spinning vol-IV part I.
- 14)‘Blowroom’, ‘ Carding’, ‘Drawframe-by Prof.A.R.Khare.

FIRST YEAR B.TEXT. – SEMESTER - I

1.6 PRINCIPLES OF FABRIC MANUFACTURING - I (TT/MMTT/TPE)

Lectures	:	4 Hours / Week.
Practicals	:	2 Hours / Week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks
Subject Total	:	150 Marks.

I) ABOUT INDUSTRY

1. Definition of textile, Importance of textiles in various fields, Importance of textile industry to India,
2. Nature of textile industry in India:- Handloom sector, power loom sector, organized /composite mills, spinning sector, knitting, Non-woven, wool and silk sector, man-made fibre/yarn sector, garment industry , machine manufacturing, applications/classification of fabrics.
3. History and ups and down in Textile Industry, transformation and restructuring, Indian Scenario vis-à-vis world scenario.
4. Role and importance of textile /weaving technologist in textile industry, work profile of technologist, opportunities.
5. Yarn numbering systems, yarn quality parameters in brief.

II) WINDING

1. Need: - Limitation of ring spinning to make big packages and good yarn, yarn faults in spinning, their consequences on subsequent processes and fabric quality, objects of winding process (big package, fault removal, special packages etc.)
2. Achieving the objects on winding machine.
3. Machines: - Types of winding machine, precision winding, drum winding, merits and demerits of there w. r. t. performance and material processed.
4. Machine Details: - Construction and working of winding machine, yarn path, details of machine zones such as creel, knotting/splicing, clearing, winding, functions and details of important accessories such as unwinding accelerator, pre-clearers, tensioners, yarn clearers, kink remover, cradle weighting, drum drive, types of packages produced.
5. Yarn joints: - knotting, splicing, types of knots, characteristics of good knot, comparison, applications, method of splicing/mechanism, importance of splicing, Classimat classification of yarn faults, its use.
6. Common package faults:- patterning, conditions for patterning, anti patterning devices, soft packages, wild yarn, snarls etc.

7. Geometrical aspects: - Cone angle, angle of wind, wind per double traverse, surface speed, traverse speed, winding speed, importance of all.
8. Automatic winding - Introduction – need, points of automation/scope, general features of automatic winding machines, makes, spindle capacity etc.
9. Calculations: winding speed, production/spindle & per machine, and efficiency.

III) PIRN WINDING

1. Objectives: - rewound weft, its advantage, need
2. Details semi automatic and automatic pirn winding machines w. r. t drive to spindles, traverse, tensioning yarn path.
3. Pirn build: - length of wind, chase length, diameter, bunch, tail end etc their importance during weaving process.
4. Calculations: - Average pirn diameter, winding speed, production / spindle / & per machine, efficiency, number of looms fed by spindle.

IV) FABRIC FORMING

1. Various methods of fabric forming: - Weaving, knitting, braiding, non-woven, brief description of all methods and processes involved in it. Applications of fabrics from various methods, Classification of fabrics based on material & use, other textile products like ropes, cables, hose, nets etc and their uses.
2. Weaving: - The processes required for weaving, objects of all processes. Different kinds of fabrics: Grey, monocolour, bicolour, warp or weft stripes, checks, the process flow charts for weaving of these fabrics.
3. Outline of weaving mechanisms: - History of developments. Classification of weaving machines, Basic motions, primary, secondary and auxiliary, objects,
4. Motion of heald, sley, and shuttle: factors effecting slay motion, slay eccentricity and its effects (crank and crank arm length), cam motion to slay, motion to healds, acceleration of shuttle,& elastic properties of picking motion, inertia effect.
5. Principles of basic motions: - shedding: scope of tappet, doobby, jacquards, positive and negative tappet shedding, geometrical aspects of positive negative cams, lift of tappet and geometry of warp shed, profile of the plain twill tappets, matched cams.

Picking: principles of conventional picking mechanism, over pick, side lever under pick, cone under pick, power required for picking, checking of shuttle.

Timing of primary motions, introduction to pick insertion systems of shuttle less looms, Checking of shuttle, power of picking.
6. Principles of secondary motions:-Warp and cloth control (negative take up,let off).
7. Principles of auxiliary motions:- need, warp stop, weft stop, and brake, anti crack, oscillating backrest, and warp-protecting motions, ring and roller temples etc.

8. Calculations:-warp weight, weft weight, fabric weight / sq.m fabric production/loom, weft consumption per loom /day etc.

V) CLOTH STRUCTURE

1. Constructional details: - Warp /weft count, thread densities, width, length, selvages; light, medium, & heavy constructions, capability of weaving machines to weave different constructions, warp and weft cover, cloth cover, crimp, contraction in warp and weft way during weaving, introduction to interlacement of thread.
2. Presentation of weaves: - Design, draft & cts types, peg plans, need, importance, and precautions, practice.
3. Study of weaves: - plain, twill and satin (basic only)

LIST OF EXPERIMENTS :-

1. Study of all Weaving Processes, to observe the machines in operation, to understand objects of all processes.
2. Study of instruments of all types and using them on machines.
3. Study of different types of Reed, Healds, Heald Frames, Shuttles, Pickers and their applications
4. To study object and method of Fabric Analysis, and calculations of crimp, covers, and fabric weight.
5. To study construction and working of Winding Machine on Autoconer 338, & Savio.
6. To study all **primary** motions to understand their functioning and objectives.
7. To study all **secondary** motions to understand their functioning and objectives.
8. Fabric Analysis of fabric samples with plain and twill weaves.
9. To study all **auxiliary** motions to understand its functioning and objectives.
10. Practice of knotting and Drawing of the Ends Through Healds and Reed for different drafts.
11. To study the different drives on machines of various processes.
12. Fabric Analysis of fabric samples with Satin and sateen weaves
13. Visit to winding and weaving units.

Term Work - Term work assessment will be on the basis of regularity of attendance, satisfactory completion of experiments, regular submission of journal and tests conducted.

REFERENCE BOOKS :-

1. Principles of weaving By Marks A.T.C. & Robinson.
2. Textile Colour and Design By Watson.
3. Weaving By Prof.D.B.Ajgaonkar, Prof.Sriramalu & Prof.M.K.Talukdar.
4. Weaving By Fox.
5. Weaving Mechanism by N.M. Banerjee.
6. Weaving Mechanism by K.T. Aswani.
7. Winding, Warping & Weaving – A.R. Garde (ATIRA Publication)
8. Weaving Mechanism by Chakrabarty.
9. Winding & Warping by Talukdar M.K.
10. Yarn Preparation-Vol-I by Sengupta.
11. Weaving Calculation by Sengupta.
12. Textile Mathematics-Vol.I by J.E. Booth.
13. Winding by BTRA.
14. Weaving by Unsenko.
15. Fibre to Fabric by P.R. Lord.

FIRST YEAR B.TEXT. – SEMESTER - I

1.4 ORGANIC CHEMISTRY-I (TC)

Lectures	:	4 Hours / week
Practicals	:	2 Hours / week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks.
Subject Total	:	150 Marks.

1. Aliphatic Hydrocarbons:
 - a) Alkanes: Nomenclature, classification, sources, Important methods of preparation properties and uses of alkenes & applications.
 - b) Alkenes: Nomenclature, classification, sources, Methods of preparation properties and uses of alkenes & applications.
 - c) Acetylenes: Nomenclature, Occurrence, preparation, properties and uses of acetylene & applications.
2. Halogen derivatives of aliphatic hydrocarbons: Nomenclature, classification, sources, important methods of preparation, important properties & applications of methyl chloride & ethyl chloride. Preparation properties & uses of chloroform, carbon tetrachloride & vinyl chloride.

Aliphatic hydroxyl compounds and their derivatives: Nomenclature, classification, sources, important methods of preparation, important properties of methanol, ethanol, ethylene glycol, glycerin, diethanol amine, triethanol amine.

Acids and their derivatives: Nomenclature, classification, sources, Composition of natural oils., important methods of preparation, important properties & applications of acetic acid, citric acid, formic acid, tartaric acid, acryl amide. Role of fatty acids in manufacturing of textile auxiliaries.

Amines : Nomenclature, classification, sources, important methods of preparation, important properties & applications of ethyl amine, Dicyandiamide, ethylene diamine, urea, quaternary ammonium salts.

Aldehydes and Ketones: Nomenclature, classification, sources, important methods of preparation, important properties & applications of Formaldehyde, glyoxal, acetone.

Ethers & epoxides: Nomenclature, classification, sources, important methods of preparation, important properties & applications of ether, epoxide & crown ethers.

Unit processes in aliphatic organic chemistry: Nitration, amination, halogenation, sulfonation and sulfation, oxidation.

Reaction mechanism: Benzidine rearrangement, Reimer-Tiemann reaction, Claisen ester condensation, Michael addition, Reformatsky reaction.

Stereochemistry: definition, Optical isomerism of compounds containing one asymmetric carbon atom, Enantiomers, Distereoisomers, Meso form, racemic mixture. Fischer projection formula, Relative configuration(D&L), Absolute configuration(R&S). Geometrical isomerism: Necessary conditions for a compound to exhibit geometric isomerism, E & Z nomenclature.

LIST OF EXPERIMENTS :-

Study of some simple reactions:

1. Nitration
2. Sulfonation.
3. Halogenation.

Study of some purification techniques:

4. Sublimation.
5. Filtration.
6. Crystallization.
7. Distillation.
8. Soxhlet extraction.

Estimations:

9. Estimation of glucose.
10. Estimation of ester.

Study of some simple preparations:

11. Preparation of benzene azo - β - naphthol.
12. Preparation of p- nitroacetanalide from acetanilide.

REFERENCE BOOKS

1. Organic Chemistry by Morrison & Boyd.
2. Organic Chemistry - Vol. I, The Fundamental Principles by I.L. Finar.
3. Organic Chemistry by N.L. Allinger, M.P.Cava, Donc DE Jongh, C.R. Johnson, N.A. Lebel, C.L. Stevens.
4. Mechanism in Organic Chemistry by Peter Sykes.
5. A text book of Organic Chemistry by P.L. Soni.
6. A text book of Organic Chemistry by B.S. Bahl and Arun Bahl.
7. Reaction Mechanism & Reagents in Organic Chemistry by Gurdeep R. Chatwal.
8. Advanced Organic Chemistry Vol. I, by V.S.Kulkarni, L.P.Ghalsasi, A.S.Arora.

9. Advanced Organic Chemistry by Jerry March.

FIRST YEAR B.TEXT. – SEMESTER - I

1.5 PHYSICAL CHEMISTRY (TC)

Lectures	:	3 Hours / Week.
Practicals	:	2 Hours / Week.
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	25 Marks.
Subject Total	:	125 Marks.

1. Dilute Solutions and Colligative Properties :- Concentration units (Normality, Molarity, Molality, mole fraction), Solutions of solids in liquids, Factors influencing solubility, solution of liquid in liquid, Lowering of vapour pressure of solutions and its measurement, Elevation of boiling point and its measurement, Depression of freezing point of solution, Osmosis.
2. Chemical Kinetics : - Order of reaction and methods to determine the same. Zero, first, second and third order reactions with their examples. Rate equations for simple and complex reactions. Heterogeneous reactions & reversible reactions.
3. Electrolytic Conductance and Transference :- Strong and weak electrolytes, Electrolytic conductance, Equivalent conductance and concentration, Kohlraush law of independent migration of ions, Ionic mobilities.
4. Phase Rule :- The phase rule, phase diagram. Application of phase rule to one component, two component and three component system. Efflorescence and deliquescence.
5. Thermochemistry :- Heat changes in chemical reaction, Heat of reaction at constant pressure and constant volume. Heat of formation, Heat of combustion, Heat of neutralization, Heat of dilution, Effect of temperature on heat of reaction, Kirchhoff's equation.
6. Thermodynamics:- Zeroth law of thermodynamics, First law of thermodynamics, Internal energy, work and heat changes, Heat changes at constant pressure and constant volume, Maximum work in isothermal expansion of a gas, Internal energy of an ideal gas, Heat capacities at constant pressure and constant volume, adiabatic changes.
Second Law of Thermodynamics, Entropy, The Physical significance of entropy, Entropy change in chemical reaction, Third law of thermodynamics.
7. Catalysis and Adsorption:- Introduction to Catalysis, General Characteristics of catalyzed reactions, Types, Enzyme catalysis, Theories of catalysis, Catalyst poisoning, Autocatalysis, Adsorption, Types and applications of adsorption.
8. Ionic Equilibrium:- Acids and Bases - Concepts of acids and bases, Common ion effect, Ionic product of water, pH, Buffers and indicators, Choice of indicators, Solubility product.

LIST OF EXPERIMENTS :-

1. Determination of Heat of solution.
2. Determination of heat of reaction.
3. Determination of heat of neutralization for the reaction between strong acid & strong base.
4. Determination of the value of rate constant for the hydrolysis of ethyl acetate catalysed by hydrochloric acid.
5. Study of the chemical kinetics of hydrogen peroxide decomposition.
6. The concept of pH & determination of pH.
7. Determination of molarity of acid solution pH metrically.
8. Study of the effect of change in temperature on the rate of reaction between sodium thiosulphate & hydrochloric acid.
9. Conductometric analysis.
10. Determination of Density of liquids.
11. Determination of Viscosity of liquids by using Ostwald's viscometer.
12. Determination of solubility product.

REFERENCE BOOKS :-

1. A Text book of Physical Chemistry by Samuel Glasstone.
2. Principles of Physical Chemistry by Maron & Prutton.
3. Colloid Chemistry by S. Voyutsky.
4. Essentials of Physical Chemistry by Bahl and Tuli.
5. A Text book of Physical Chemistry by L.K. Sharma.
6. Physical Chemistry by P.C. Rakshit.
7. Problems and Exercises in Physical Chemistry by Karetnikov & Kudryashov.
8. Physical Chemistry by G.M. Barrow.
9. Thermodynamics by P.K. Nag.

FIRST YEAR B.TEXT. – SEMESTER - I

1.6 INORGANIC CHEMISTRY (TC)

Lectures	:	3 Hours / Week.
Practicals	:	2 Hours / Week.
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	25 Marks.
Subject Total	:	125 Marks.

1. Theory of Bonding : Valency, Chemical bond, Types of bonds and examples of bonds in textiles, characteristics of ionic, covalent & co-ordinate compounds, Other intermolecular attractive forces, Van der Waals forces, Polar and non-polar bonds, Electronegativity and nature of bonds, Hydrogen bond, Dipole moment, Bond length, Bond angle, Bond energy.
2. Compounds used in textiles- preparation, properties and uses of Ammonium Chloride, Ammonium Sulphate, Ferric chloride, Ferrous sulphate, Ferric ammonium sulphate, Zinc oxide, Zinc sulphoxylate formaldehyde, Sodium Carbonate, Sodium Hydroxide, Glauber's Salt, Sodium Perborate, Sodium Hydrosulphite, Hydrogen Peroxide, Peracetic acid, Potassium Permanganate.
3. Stoichiometry - Atomic weights, Dulong and Petits rule, Molecular weight, Equivalent weight of an acids & bases, Equivalent weight of oxidising and reducing agents, Determination of equivalent weight by hydrogen displacement method, Oxide Method, Chloride method. Problems based on weight - weight relationship, Symbol and formulae, Equation, Deduction of formulae, Laws of Stoichiometry and Stoichiometric calculations.
4. Chromatography – Paper chromatography, Thin layer chromatography, Ion exchange chromatography, Gas liquid chromatography.
5. Inorganic components of detergents, builders and other additives.
Introduction – Phosphates, Silicates, Zeolites, Carbonates, Oxygen Releasing Compounds, Sundry Inorganic Builders.
6. Complex Ions and Co-ordination Compounds : Introduction to co-ordination compound, Werner's theory of co-ordination compounds. Electronic interpretation of co-ordination. The nature of the linkage in complex ions and co-ordination compounds, complexes resulting from electrostatic forces between constituents, Complexes resulting from the formation of co-ordination bonds, Factors affecting the stabilities of complex ions and co-ordination compounds, Chelates, classification of Chelates, The importance of Chelates.

LIST OF EXPERIMENTS :-

1. Paper Chromatography.
2. Estimation of Strength of Hydrogen Peroxide.
3. Determination of Percentage purity of Hydrose powder.
4. Determination of Percentage purity of NaOH.
5. Determination of Percentage purity of Na_2CO_3
6. Determination of Percentage purity of Na_2S
7. Determination of Percentage purity of NaOCl
8. Determination of Percentage purity of sodium silicate / meta silicate.
9. Gravimetric estimation of Barium as barium sulphate.
10. Gravimetric estimation of chloride as silver chloride.
11. Quantitative Analyser of mixture containing two acidic and two basic radicals.
12. Quantitative Analysis of mixture containing three acidic and three basic radicals.

REFERENCE BOOKS :-

1. Fundamental concepts of Inorganic Chemistry by E.S. Gilreath.
2. A New Concise Inorganic Chemistry by J.D. Lee.
3. Inorganic Chemistry by Cotton & Wilkinson.
4. A text book of Quantitative Inorganic Chemistry by A.I. Vogel.
5. Fundamental Inorganic Chemistry by P.L. Soni.
6. Modern Approach Elementary Inorganic Chemistry by Bahl & Sharma.
7. Modern Inorganic Chemistry by Mellor and Parkes.
8. Inorganic Chemistry by P.K. Dutta.

FIRST YEAR B.TEXT. – SEMESTER - I

1.7 COMPUTER LABORATORY - I (TT/MMTT/TPE/TC)

Practical	:	2 Hours/week
Term Work	:	50 Marks
Subject Total	:	50 Marks.

1. Computer Fundamentals :
Basic organization of computer and its functional units. Computer peripherals such as different types of printers, scanners, plotters, keyboards, monitors, mouse, joysticks, light pen, tracker ball, tablet, digitizer, modems, CD-writers, DVD, multimedia devices such as CD-ROM drive, speakers, microphones, web camera.
2. Hardware :
Processors : Pentium series.
Memories : units of memories, SRAM, DRAM, ROM, EROM, EEPROM,
Ports : Serial, Parallel, USB.
Secondary storage devices : FDD, HDD-IDE, SCSI; CTD, Zip drives.
3. Software :
System Software : operating systems – DOS, Windows, Unix/Linux,
Editors, Compilers, Assemblers, Linkers, Loaders.
Presentation Software, DBMS and others – like virus cleaning softwares.
4. Data Representation :
Binary, octal, Hexadecimal, BCD, ASCII, EBCDIC, Unicode.
5. Language :
Introduction to C-programming language with algorithm and flowcharts.

Term work : It should consist if minimum 10 experiments based on the following topics.

LIST OF EXPERIMENTS :-

1. DOS – Internal and external commands
2. Batch file creation.
3. Scanning and printing of documents and images.
4. Study of multimedia devices and computer peripherals.
5. Study of desktop environment on windows and Linux.
6. Create any profile with presentation software.
7. Study and demonstration of anti-virus software.

8. Write a C Program to solve problems like – finding minimum, maximum, average, summation, etc. on a given set of numbers.
9. Write a C Program to perform mathematical expression like – finding, factorial of given number of generate Fibonacci series etc.
10. Write a C Program using functions to solve problems like – performing operations on matrices, complex numbers, etc.
11. Study of Internet, Email, Search Engines.

REFERENCE BOOKS :

1. Computer fundamentals – Dr.V. Rajaram
2. Programming with C – Schaum, Outline series (TMGH)
3. User's Manuals for DOS, Windows, Unix / Linux.
4. Let us C++ by Yashwant Kanitkar.

FIRST YEAR B.TEXT. – SEMESTER - II

2.1 APPLIED MECHANICS (TT/MMTT/TPE/TC)

Lectures : 3 Hours / Week.

Theory Paper : 100 Marks, 3 Hours.

Subject Total : 100 Marks.

1. Statics, dynamics, Fundamental units of measurements, Metric system of units, SI. System, Scalar quantities, Vector quantities.
Force, system of forces, principle of transmissibility of force, moment of force. Couple, resultant, parallelogram of forces, triangle of forces, polygon of forces, Varignons theorem, Composition and resolution of Coplanar concurrent and non-concurrent forces. Analytical and graphical method.
2. Equilibrium of Coplanar forces. Conditions of equilibrium, Free body diagram, Lami's theorem, Support reactions of for simply supported beams.
3. Centre of gravity, Centroid of a uniform lamina, Centroid of composite areas, Moment of inertia of sections, parallel axis theorem, perpendicular axis theorem.
4. Lifting Machines : Mechanical advantage, velocity ratio, efficiency, law of machine, effort lost in friction, load lost in friction, Simple machines such as smooth inclined plane, screw jack, simple and differential axle and wheel, worm and worm wheel, single and double purchase crab.
5. Friction: Static friction, dynamics friction, laws of friction, coefficient of friction, angle of friction, angle of repose. Friction of a body lying on an inclined plane.
6. Motion: Equations of linear motion with constant acceleration, variable acceleration, motion under gravity.
Angular motion, relation between angular motion and linear motion, equations of angular motion.
7. Force and motion of translation : Mass, momentum, inertia, Newton's laws of motion, impulse, principle of conservation of momentum, work, power, energy. Principle of conservation of energy.
8. Couples and Motion of rotation : Angular momentum, mass moment of inertia, radius of gyration, kinetic energy of rotatory flywheels.
9. Transmission of motion and power by belt, rope, chain, gears. Type of gears.
Types of gear drive : Gear trains, velocity ratio, advantages of gear drives, uses in textile machines. Concept of epicyclic gearing.
10. Friction in journal bearings, types of bearings, ball, roller, needle bearings, & their uses in textile machines.

REFERENCE BOOKS :-

1. Applied Mechanics by S. Ramamrutham.
2. Applied Mechanics by Junnarkar.
3. Applied Mechanics by S.N. Saluja.
4. Applied Mechanics by Beer & Jonhstan.
5. Applied Mechanics by R.S. Khurmi.

FIRST YEAR B.TEXT. – SEMESTER - II**2.2 TEXTILE MATHEMATICS-II (TT/MMTT/TPE/TC)**

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

1. Integral Calculus: $\int_0^{\pi/2} \sin^n x \, dx$, $\int_0^{\pi/2} \cos^n x \, dx$, Gamma function, Beta function Elliptic integral, Error function.
2. Multiple integral:
 - Introduction, solution, change of order & change of variables method.
 - Application of integration for length, area, & volume.
3. Interpolation & Fitting of curves:
 - Introduction of operators Δ, ∇, E, D .
 - Newton's forward & backward formulae, Sterlings's formula.
 - Fitting of curves $y=a+bx$, $y=a+bx+cx^2$, $y=ax^b$ by least square method.
4. Numerical Differentiation & Integration:
 - Newton's forward & backward formulae, Sterling's formula. Newton's divided difference formula.
 - Trapezoidal rule, Simpson's one third & three eighth rule.
5. Bivariate data:
 - Correlation: types, coefficient of correlation, properties. Rank correlation coefficient & computation.
 - Regression: lines of X on Y & Y on X, regression coefficients, properties & computation.
6. Probability distribution:
 - Random variable: types, introduction & types of probability distribution, pmf & pdf, expectation of random variable. MGF of random variable.
7. Standard discrete probability distributions:
 - Binomial probability distribution: Definition, properties, fitting & examples.
 - Poisson probability distribution: Definition, properties, fitting & examples.
8. Standard continuous probability distributions:
 - Normal probability distribution: Definition, properties, standard normal distribution & examples.
 - Chi-square probability distribution (χ^2): Definition & properties.
 - t-probability distribution: Definition & properties.
 - F-probability distribution: Definition & properties.

REFERENCE BOOKS:

1. A textbook of applied mathematics Vol.-I & II by P.N. & J.N. Wartikar.
2. Higher engineering mathematics by B.S. Grewal.
3. A textbook of applied mathematics by Bali, Saxena & Iyengar.
4. Mathematical Statistics by J.E. Freund.
5. Probability & Statistics for engineers by Johnson.
6. Statistical methods by Kumbhojkar.

FIRST YEAR B.TEXT. – SEMESTER - II**2.3 INDUSTRIAL CHEMISTRY FOR TEXTILES (TT/MMTT/TC)**

Lectures	:	4 Hours / week.
Practicals	:	2 Hours / week.
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	25 Marks.
Subject Total	:	125 Marks.

1. Water :-

Introduction, sources of water, impurities in natural water, quality parameters like pH, hardness, Types of hardness (temporary/permanent), Calcium carbonate equivalents of hardness, units of hardness and its calculation, ill effects of hard water, industrial treatment of water by lime-soda process, zeolite process and ion exchange process, domestic treatment of water. Sterilization, disinfections of drinking water. Boiler feed water : Norms, definition, causes & disadvantages of priming, foaming, scale, sludge and caustic embrittlement.

2. Surface Active Agents : Preparation, properties of uses of

- a) Ionic - Anionic surfactants and cationic surfactants.
- b) Non-ionics and amphoteric surfactants.

3. Carbohydrates :

- a) Introduction, b) Classification of carbohydrates, c) Manufacture of starch, d) Constitution of starch, e) Properties of starch paste, f) Chemical properties of starch, g) Soluble starch and dextrin, h) Action of enzymes on starch, I) Cellulose - occurrence and separation, j) Constitution of cellulose, k) Properties of cellulose.

4. Amino Acids and Proteins :

- a) Introduction, b) Nature of proteins, c) Separation of proteins, d) amino acids, e) Nature of amino acids and classification, f) Chemical properties of amino acids g) Classification proteins, h) Denaturing of proteins, i) Isoelectric point,

5. Corrosion:

Electrochemistry, Nernst theory, electrode potential, electrochemical series, galvanic series, types of cells (electrolytic & electrochemical), causes of corrosion, classification, atmospheric corrosion (oxygen & other gases), factors influencing dry corrosion, electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors influencing wet corrosion, Testing and measurement of corrosion by weight loss method & electrical resistance method.

Prevention of Corrosion – Introduction, metallic coatings (anodic and cathodic), methods of application of metal coatings such as hot dipping, metal cladding, electroplating, metal, saraying, organic coatings, paints, vanishes. Protection from corrosion by proper design, material selection, Cathodic / Anodic protection, modifying the environment, use of inhibitors.

6. Fuels :

- a) Definitions and units, b) Classification of fuels, c) Solid fuels : Properties and analysis of fuels, d) Coals : lignite, bituminous, anthracite, e) Analysis of fuels, f) Liquid fuels: petroleum, cracking, reforming, g) Gasoline, octane number, h) Gaseous fuels from petroleum & coal.

7. Alloys –

Necessity of making alloys, classification, brass, bronze, duralumin, stainless steel.

LIST OF EXPERIMENTS :-

- 1) Determination of pH value of given sample of water.
- 2) Determination of total solids & suspended solids of given sample of water.
- 3) Determination of dissolved oxygen of given sample of water.
- 4) Determination of chemical oxygen demand of given sample of water.
- 5) Determination of alkalinity of given sample of water.
- 6) Determination of total hardness of given sample of water.
- 7) Determination of rate of corrosion.
- 8) Estimation of copper in given sample of bronze.
- 9) Analysis of starch.
- 10) Determination of proximate analysis of fuel.
- 11) Identification of proteins.
- 12) Estimation of Chelating power of given chelating agent (Sodium Hexametaphosphate).
- 13) Determination of Ionic nature of surfactants.

REFERENCE BOOKS :-

- 1. Industrial Chemistry by Reigel.
- 2. Engineering Chemistry by Jain and Jain.
- 3. Industrial Chemistry Lecture Notes by Prof.V.R. Wadekar.
- 4. Chemistry of Organic Textile Chemicals by Dr. V.A. Shenai.
- 5. Text Book of Engg. Chemistry by Shashi Chawla.

FIRST YEAR B.TEXT. – SEMESTER - II

2.4 ENGINEERING GRAPHICS (TT/MMTT/TPE/TC)

Lectures	:	1 Hour / Week.
Drawing Practical	:	3 Hours / Week.
Theory Paper	:	100 Marks, 3 Hours
Term Work	:	25 Marks.
Subject Total	:	125 Marks.

1. Introduction and use of instruments - Line - Lettering - I.S. conventions for External and Internal Threads, Bearing, Gears, Knurling, end of shaft. I.S. conventions for various materials.
2. Orthographic Projections - General Principles - First angle method - Third Angle method - Dimensioning.
3. Sectional Orthographic Views: Cutting plane - Types of sections. Making sectional drawings of machine components.
4. Isometric Projections : Principle, Isometric scale, Isometric views, Making Isometric drawings of simple objects from orthographic views.
5. Development of Surfaces: Introduction to solids. Making the drawings of development of lateral surfaces of cubes, prisms, cylinders, pyramids.
6. Free hand sketches: Making free hand sketches of -
 - i. Screwed Fastenings - Nuts, Bolts, Set screws, Studs, Eye bolts, Foundation bolts etc.
 - ii. Bearings, Couplings, Keys & Pulleys, Riveted Joints.
 - iii. Mechanisms in textile machines – picking motion mechanism, let-off motion mechanism, Take-up motion mechanism, Three blade beater, TWO BOWL MANGLE, Immersion roller drive in sizing plaiting mechanism, P-I V. drive for sizing.
7. Introduction to ‘Auto-Cad’ - Commands for drawing lines, circles.

TERM WORK :-

Submission of 08 drawing sheets of half imperial size, on the following topics.

- a) Conversion of pictorial view into orthographic projects.
- b) Conversion of pictorial view into sectional orthographic projections.
- c) Isometric projections.
- d) Development of surfaces.
- e) Free hand sketches of I.S. conventions for threaded parts, khurling, materials etc.

- f) Free hand sketches of couplings, pulleys, bearings, Riveted joints, Foundation bolts.
- g) Free hand sketches of Nuts, bolts, studs, Locking arrangements keys, etc.
- h) Free hand sketches of Textile machines mechanisms.

REFERENCE BOOKS :-

1. The Fundamental of Engineering Drawing & Graphic Technology by French & Virek
2. I.S. : 696 (1972) Code of Practice for General Engineering Drawing by I.S.I, New Delhi.
3. Engineering Drawing by N.D. Bhat.
4. Machine Drawing by N.D. Bhat.
5. Engineering Graphics by Narayana K.L. & Kannaiah P.
6. Principles of Weaving by Marks & Robinson.
7. Engineering Drawing by Venugopal.

FIRST YEAR B.TEXT. – SEMESTER - II

2.5 PRINCIPLES OF YARN MANUFACTURING - II (TT/MMTT/TPE)

Lectures	:	4 Hours / Week.
Practicals	:	2 Hours / Week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks
Subject Total	:	150 Marks.

Combing – Objects – Importance of lap preparation – Types of lap preparation methods – Brief study of conventional sliver lap ribbon lap and super lap machines - Study of principle of operation of a Nasmith comber – Driving plan of Nasmith comber – Index cycle – Calculation of drafts, production, noil, etc. – Comber setting and their importance – Types of feed – types of combing.

Speed Frame – Objects – History & development – Principle of working of a conventional speed frame – drafting arrangement – Twisting and winding – Spindle and flyer – Driving arrangement – Builder motion – Calculation of draft, twist and production.

Ring Frame – Objects – History and development – Principle of operation – Study of conventional ring frame – driving arrangements – Calculation of twist, draft production etc. – Drafting twisting and winding at ring frame – Brief study of spindles used, ring and traveller assembly types of drives.

Doubling – Objects – Properties application of doubled yarns – Study of ring doubling machine – wet and dry doubling – Study of working principle of two for one twister.

Modern Spinning Method – Introduction to principle of working of rotor spinning, air jet spinning, vortex spinning and friction spinning.

LIST OF EXPERIMENTS :

1. Study of passage of material, construction, working & gearing arrangement of lap former machine. Calculation of speeds and related parameters.
2. Study of passage of material, construction & working of conventional Sliver lap machine
3. Gearing arrangement of conventional Sliver lap machine. Calculation of production ,speeds, draft etc.
4. Study of passage of material, construction & working of conventional Ribbon lap machine.
5. Gearing arrangement of conventional Ribbon lap machine. Calculation of production ,speeds, draft etc.
6. Study of passage of material & constructional aspects of conventional comber.

7. Study of gearing plan of conventional comber. Calculation related to comber production, speeds, drafts, etc.
8. Study of construction and passage of cotton on conventional Speed frame.
9. Driving arrangement and calculation related to production, constants, draft, twist, etc. on conventional speed frame.
10. Study of construction and passage of cotton on conventional Ring frame.
11. Driving arrangement and calculation related to production, constants, draft, twist, etc. on conventional Ring frame.
12. Study of Ring doubler – passage, gearing, calculation.

REFERENCE BOOKS :-

- 1) The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series
Vol. I – The Technology of short staple spinning by W. Klein.
Vol. III – A Practical Guide to Combing & Drawing – W. Klein.
Vol. IV – A Practical Guide to Ring Spinning by W. Kelin.
Vol. V – New Spinning System by W. Klein.
- 2) Drawing, Combing and Roving by Zoltan. S. Szaloky, The Institute of Textile Technology, Virginia.
- 3) Draw frame, combing and speed frame by J.H. Black; The Textile Institute publication, Manual of cotton spinning Vol-IV part II.
- 4) Cotton Drawing & Roving by G.R. Merril.
- 5) Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
- 6) Elements of ring frame & doubling by A.R. Khare.
- 7) Elements of combing by A.R. Khare.
- 8) Manual of Cotton spinning series, Vol.3, Part.2 by J.Black et al, Textile Institute Publication.
- 9) Technology of cotton spinning by J.Janakiram.
- 10) Combing by Moor.
- 11) ‘Spun Yarn Technology’ by Eric Oxtoby.
- 12) Two-for-One Technology and Technique for spun yarn by H.S. Kulkarni & H.V.S. Murthy.
- 13) ‘Fundamentals of Spun Yarn Technology’ by Carl A. Lawrence
- 14) ‘Textile Mathematics’ by J.E.Booth Vol.I

FIRST YEAR B.TEXT. – SEMESTER - II

2.6 PRINCIPLES OF FABRIC MANUFACTURING - II (TT/MMTT/TPE)

Lectures	:	4 Hours / Week.
Practicals	:	2 Hours / Week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks
Subject Total	:	150 Marks.

I) WARPING (Introduction)

1. Need:-Objectives, precautions to be considered in the process, classification of warping process- (beam warping, sectional warping, ball warping)
2. Warping machine: - construction and working: -
 - a. Creel: - framing (requirements, length, height, pitch, etc.) pegs, tensioning arrangements guides, blow fan, types of creels (parallel, V, V-nose etc.)
 - b. Principles of operation of beam warping and sectional warping.
 - c. Head stock: - Leasing reeds, Drum, speed, stop-motion, brake, comb, beam pressing, beam handling, sett length, drums for sectional warping cone angle (its geometrical aspects, traverse, section width and sections, beaming process and speed).
 - d. Calculations: -production of warping machine, efficiency based on speed and stoppages, weight of yarn on warper's beam, organizing the set (based on cones available, creel capacity, fabric construction etc) Calculation of number of sections, section width.

II) SIZING (Introduction)

1. Need: Objectives (abrasion resistance, strength, smoothness, lubrication, fiber lay etc), achieving the objectives through size paste constituents size application.
2. Properties of material to be sized: - Physical and chemical properties of: cotton, viscose, polyester from sizing point of view.
3. History and development of sizing process: hank sizing, ball warp sizing, slasher sizing, and classification of sizing machines.
4. Principles of operation of conventional sizing size pick-up, size add on, optimum add-on,
5. Ingredients-Types (natural, synthetic), their functions, examples, features.
6. Size cooking: - need, equipments available, method of addition of ingredients and its importance, gelatinizing, bursting, homogenizing, concentration, viscosity, (measuring methods and importance)
7. Properties of size paste like: -congealing and keeping etc with reference to ingredients used

8. Sizing machine: -Various zones, their functions, creel and the types with comparison, elements in sow box and their functions, various drying arrangements and drying mechanism in each.
9. Head stock: - various functions in head stock, their importance in weaving (dry splitting, measuring, marking, winding, beam pressing etc)
10. Moisture and stretch: - Importance and their control
11. Calculations: -Production and efficiency of machine.

II) WEAVING

1. Construction and working of stop motions: - loose reed, fast reed, weft fork, brake etc.
2. Weft patterning: - study of systems available, types of box motions, introduction to weft patterning on modern weaving machines, card saving.
3. Loom drives: V-belt drive and clutch drive, their comparison, Introduction to drive on modern weaving machines.
4. Warp and cloth control: cloth formation, fell position, bumping conditions, pick spacing and causes of variation, direct and indirect take up, constant of take up, change wheel. Principle of positive let off. Details of ring temples and their specifications.

IV) FABRIC STRUCTURE

1. To represent following weaves on graph paper with design, draft, peg-plan and denting order.
 - a. Derivative of plain-warp and weft rib, matt (regular and irregular)
 - b. Derivatives of twill: pointed, herringbone, various types of diagonals, different types of broken and rearranged twills, transpired twill, twill checks, curved twills, combined twill, diamond, twist and twill interaction
 - c. Derivatives of satin/sateen weave, irregular satin, satin checks.
 - d. Toweling structures: Ordinary and brightened honeycomb, huckaback.
 - e. Mock leno, crepes by various methods.
2. The requirements of weaving for all above mentioned constructions, practical aspects of weaving, fabric and weave characteristics and properties and their applications.
3. Constructional details, characteristics and properties of following fabrics. Poplin, long cloth, semi and full voile, cambric, denim, dhoti, sari, sheeting, shirting, suiting, gabardine, dress material.

LIST OF EXPERIMENTS :-

1. To set clearer and tensioner on winding machines for different counts and study of cradle & its pressure.
2. To study the geometry of the warp shed by measuring the dimensions of parts in shedding motion on given loom and analyze it.
3. To study the construction and geometrical aspects of the positive shedding motion.
4. Fabric Analysis (Derivatives of Plain: Warp / Weft Rib, Matt)
5. To Operate the Pirm Winding Machines and adjust the diameter, length of wind, bunch.
6. To operate the Sectional Warping machine to make the beam: (Creeling, threading, tensioning, reeding, and winding the sections.
7. Construction of the Tappet for plain and twill weaves on the drawing paper to the scale by noting the particulars of Shedding Motion for the given loom.
8. Fabric Analysis (twill derivatives: broken, transposed, herringbone)
9. Operating the Plain and automatic loom to weave the good fabric.
10. To study different fabric defects.
11. Dismantling, Fitting and Setting of side lever under picking.
12. Fabric Analysis (Mock Leno, Honey Comb , huck-a back Samples)
13. Visit to warping and sizing unit

REFERENCE BOOKS :-

1. Principles of Weaving by Marks and Robinson.
2. Weaving Mechanism by Fox.
3. Weaving by D.B. Ajagaonkar, Sriramulu and Talukdar.
4. Sizing by D.B. Ajagaonkar.
5. Weaving Mechanism by Chakraborty.
6. Weaving Mechanism by N.M. Banerjee.
7. Weaving by BTRA.
8. Fancy Weaving by K.T. Aswani.
9. Textile colour and design by Watson.
10. Woven cloth construction by Marks and Robinson.
11. Winding and Warping by M.K. Talukdar.
12. Yarn Preparation by Mr. Sengupta.
13. Weaving Technology & Operations by Ormerod.

FIRST YEAR B.TEXT. – SEMESTER - II

2.5 ORGANIC CHEMISTRY-II (TC)

Lectures	:	4 Hours / week
Practicals	:	2 Hours / week
Theory Paper	:	100 Marks, 3 Hours.
Term Work	:	50 Marks.
Subject Total	:	150 Marks.

- 1) Aromatic Hydrocarbons :
 - A) Benzene :
 - a) Orbital picture of benzene.
 - b) Resonance structure of benzene.
 - c) Isomerism of benzene derivatives.
 - d) Substitution in benzene nucleus, reactivity and orientation.
 - B) Aromatic aliphatic hydrocarbons :

Arenes : Preparation, properties & uses of toluene, ethylbenzene, o-, m-, p-xylenes.
 - C) Polynuclear aromatic hydrocarbons : Preparation, properties & uses of
 - a) Polynuclear aromatic hydrocarbons with isolated benzene rings : Biphenyl, Benzidine, Diphenylmethane, Triphenylmethane.
 - b) Polynuclear aromatic hydrocarbons with condensed benzene rings : Naphthalene, Anthracene, Anthraquinone.
 - D) Electrophilic substitution in aromatic compounds : Study of some important reactions like : i) Nitration, ii) Sulfonation, iii) Halogenation, iv) Friedel-Crafts reaction.

Preparation of following dye intermediates. H-acid, J-acid, Naphthionic acid, Gamma acid.
- 2) Aryl Halides : Chlorobenzene :
 - a) Preparation b) Properties c) Uses.
- 3) Hydroxy compounds and their derivatives :
 - A) Phenols : Preparation, properties & uses of phenol, o-, m-, p- cresols, resorcinol.
 - B) Naphthols : Preparation, properties and uses.
- 4) Aromatic carboxylic acids :

Preparation, properties and uses of - i) benzoic acid ii) phthalic acid iii) Anthranilic acid iv) Terephthalic acid
- 5) Aromatic sulphonic acids

- a) Preparation, properties and uses of- i) Benzene sulphonic acid ii) Sulphanilic acid metamilic acid.
- 6) Aromatic Nitro compounds
Preparation, properties and uses of - Nitrobenzene
- 7) Aromatic Amines :
a) Structure b) Classification c) Industrial sources, preparation, properties and uses of - i) Aniline ii) o-, m- & p- Toluidines. iii) Phenylene diamines iv) Diphenyl amine v) Triphenyl amine.
- 8) Diazonium Salts : a) Preparation of - i) Benzene Diazonium Salts ii) Aniline yellow iii) Azoxybenzene iv) Azobenzene.
b) Reactions of diazonium salts in which the nitrogen atoms are replaced :
i) by halogen ii) by -CN iii) by -OH iv) by -H.
c) Coupling reactions of diazonium salts.

LIST OF EXPERIMENTS :-

Separation of organic binary mixtures and identification of the components of the following types :

- 1) Acid + Base components.
- 2) Acid + Phenol components.
- 3) Acid + Neutral components.
- 4) Base + Phenol components.
- 5) Phenol + Neutral components.
- 6) Base + Neutral components.
- 7) Estimation of resist salt.
- 8) Estimation of ethylene glycol.
- 9) Estimation of acetone.
- 10) Estimation of urea.

REFERENCE BOOKS :-

1. Organic Chemistry by Morrison & Boyd.
2. Organic Chemistry - Vol. I, The Fundamental Principles by I.L. Finar.
3. Organic Chemistry by N.L. Allinger, M.P.Cava, Donc DE Jongh, C.R. Johnson, N.A. Lebel, C.L. Stevens.
4. Mechanism in Organic Chemistry by Peter Sykes.
5. A text book of Organic Chemistry by P.L. Soni.
6. A text book of Organic Chemistry by B.S. Bahl and Arun Bahl.
7. Reaction Mechanism & Reagents in Organic Chemistry by Gurdeep R. Chatwal.
8. Advanced Organic Chemistry Vol. I, by V.S.Kulkarni, L.P.Ghalsasi, A.S.Arora.
9. Advanced Organic Chemistry by Jerry March.

FIRST YEAR B.TEXT. – SEMESTER - II

2.6 CHEMISTRY OF TEXTILE FIBRES-I (TC)

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

1. INTRODUCTION :

Introduction to fibre, yarn, fabrics, Sequence of operations for conversion of natural and manmade fibres into finished fabrics. Fabric construction technology : knitting, weaving & production of non-wovens. Fabric to garment. Importance of Design.

Processing and finishing of fabrics and garments. Definition of fibre, filament, degree of polymerisation. Classification of fibres according to their chemical nature and origin. Essential and desirable properties of fibres. Concept of crystalline, mesomorphous and amorphous regions and their importance.

2. NATURAL CELLULOSIC FIBRE : COTTON :

Chemistry of cellulose. Chemical constitution, chemical formula and structural formula of cellulose-I & cellulose-II, concept of chemical bonding in cotton, physical properties of cotton. Influence of structure of cotton cellulose on its properties. Chemistry of oxycellulose and hydrocellulose. Chemical methods of detection of oxycellulose and hydrocellulose. Effect of acids, alkalies, electrolytes, drycleaning solvents, oxidising agents, reducing agents & light on cotton. Thermal and optical properties of cotton.

3. BAST FIBRES :

Chemical constitution, chemical formula, structural formula of Jute and Ramie. Concept of hemicellulose, lignin and such other cementing components in these fibres. Chemistry of hemicellulose and lignin. Retting and physical properties of jute and ramie. Effect of acids, alkalies, drycleaning, solvents, oxidising agents, reducing agents & light on jute and ramie.

4. REGENERATED CELLULOSE :

Essential requirements of wet spinning. Concept of extrusion and spinning. Manufacturing process of viscose rayon. The functions of various additives used in the manufacture of viscose rayon. Concept of press weight ratio and its significance. Chemical crimp in viscose rayon. Various physical and mechanical properties of viscose rayon. Effect of acids, alkalies, drycleaning solvents, oxidising agents, reducing agents, heat & light on viscose rayon.

Raw materials, manufacturing process, physical and chemical properties and uses of polynosic rayon, H.W.M.F., Tencel & Cuprammonium rayon.

5. **MODIFIED CELLULOSE :**

Concept of Dry spinning. Essential requirements of dry spinning. Concept of heterogeneous and homogeneous acetylations. Raw materials, manufacturing process, physical and chemical properties of cellulose acetate and triacetate.

6. **ANIMAL PROTEIN FIBRES :**

Chemical composition and chemical formula of wool and silk. Physical and chemical properties of wool and silk.

LIST OF EXPERIMENTS :-

1. Determination of C.V.% of roving and Sliver Sample.
2. Zoning Cut-Squaring Methods of Sampling.
3. Identification of Textile Fibres by Microscope Method.
4. Fibre Maturity Measurement by Caustic Soda (NaOH) Method.
5. Comb Sorter (Fibre Length Measurement).
6. Fibre Fineness by Cut-Weight Method.
7. Fibre Length Measurement by using Grease Plate Method.
8. Measurement of Convolution and Ribbon Width using Microscope.
9. Fibre Fineness and Maturity by ATIRA.
10. Determination of Trash % in Fibre Sample using Trash Analyser.
11. Measurement of Crimp in Synthetic Fibres.
12. Determination of Neps in Card-Web.
13. HVI testing.

REFERENCE BOOKS :-

1. Chemical Technology of Fibrous materials by F. Sadov.
2. Textile Fibres Vol -I by Dr. V. A. Shenai.
3. Man Made Fibres by R.W. Moncrieff.
4. Handbook of Textile Fibres by Jordon Cook.
5. Silk Production, Processing and Marketing by Mahesh Nanavaty.
6. Introduction to Textile Fibres by Dr. H.V. Sreenivas Murthy.
7. Textiles Fibre to Fabric by Corbmann, New York Mc Garw Hill Book Co.1983.
8. Cotton Spinning “ ATIRA Publication, Ahmedabad.
9. Plain Weaving Motions by Aswani K.T., Mahajan Book Publishers, 1996.
10. Fundamental Principles of Textile Processing by V.A. Shenai, Sevak Publisher

FIRST YEAR B.TEXT. – SEMESTER - II

2.7 COMPUTER LABORATORY - I (TT/MMTT/TPE/TC)

Practical	:	2 Hours/week
Term Work	:	50 Marks
Subject Total	:	50 Marks.

1. Review of C programming : Array, structures, union, pointers and pointer arithmetic.
2. Library functions, user defined functions, call by reference and call by value, recursive functions.
3. sequential and random access file operations, graphics function.
4. Introduction of C++ programming, basic concepts, of object oriented programming, applications of OOP and C++, dynamic initialization of variables.
5. Functions in C++; function prototype, inline functions, function overloading, friend functions.
6. Classes and objects : Class types, data members, member functions, operator functions, pointers to class members, constructors, destructors.
7. Inheritance : Derived classes, types of inheritance, virtual base classes, virtual functions.
8. Introduction to data structures.

Term work (Minimum 12 Programs)

LIST OF EXPERIMENTS :-

1. One program each on array, structure, union, pointer and pointer arithmetic.
2. Functions.
3. Creating, opening, writing and reading file.
4. Constructor and destructor.
5. Inheritance and virtual functions.

REFERENCE BOOKS :

1. C++ Programming – Robert Lafore
2. Object Oriented Programming with C++ - E Balagurusamy.
3. Programming with C++ - Ravichandran.
4. Let us C++- Yashwant Kanitkar.

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