FIRST YEAR B. TEXT. (FASHION TECHNOLOGY) – SEMESTER – I
1.1   APPLIED PHYSICS

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 $T2/T1 = e^{\mu \theta \text{ (Theta)}}$ (where T1 & T2 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

<u>**FIRST YEAR B. TEXT. (FASHION TECHNOLOGY) – SEMESTER – I**</u>
1.2   TEXTILE MATHEMATICS-I

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, Involutes.

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 & Iyangar.
4. Mathematical Statistics by J.E. Fruend.
5. Probability & Statistics for engineers by Johnson.
6. Statistical methods by Kumbhojkar.

FIRST YEAR B. TEXT. (FASHION TECHNOLOGY) – SEMESTER – I
1.3 ELECTRICAL SCIENCE.

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 αo (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. (FASHION TECHNOLOGY) – SEMESTER – I
1.4   TEXTILE FIBRES

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 :

      Polyacrylonitrile Fibre : Acrylic and modacrylic fibre, the production of acrylic fibre, the physical & chemical properties of acrylic and modacrylic fibres and their application.

      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. (FASHION TECHNOLOGY) – SEMESTER – I
1.5   COMMUNICATION SKILLS

Lecturers	:	4 Hours/week
Theory Paper	:	100 Marks, 3 Hours
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. The communication process: Essential elements, one way and two way communication.
2. Barriers to effective interpersonal communication – Recognizing Barriers to effective interpersonal communication – overcoming barriers to effective interpersonal communication.
3. Communication in organizations – Factors influencing organizational communication – Communication networks within the organization – Vertical communication – lateral and informal communication – Overcoming organizational barriers to communication.
4. Using communication skills: Negotiating to manage conflicts – Negotiation in action – Labour conflict & Communication skills.
5. Oral Communication – Role & importance of oral presentation for Engineering, Techniques of formal speech, meetings, and interviews.
6. Rapid Review of Grammar: - Correction of common errors, Use of Phrases & Idioms – Study of grammatical items in contexts. Nouns, pronouns, adjectives, comparative adjectives, adverbs, gerund, prepositions, voice, tenses, if clauses, direct and indirect speech (reporting verbs), concord Vocabulary – Synonyms, antonyms, homonyms, homophones, hyponyms, affixes, reference words, phrasal verbs and prepositional phrases.
7. Phonetics – Phonetic aspects like – Transcription, Stress & Intonation.
8. Technical Writing – the structure of organized writing – paragraph writing, coherence, cohesion (use of Discourse Markers) and punctuation, Use of titles, nonverbal devices – Layout – Revision strategies – Reading techniques. Letter Writing – Personal/Informal letters: Letters to family members and friends Business / Formal letters: Letters thanking the recipients, announcing functions, extending invitations, congratulating associates on important occasions, letters of application (Resumes), apology and complaint, letters to the editor.
9. Business Correspondence: - Principles of correspondence, Language, style, tone. Type of Business Letters – Application letter, inquiries and Replies, Orders and their execution, complaints and their adjustments.

10. Report writing: - Individual & committee reports, Investigation Reports (Losses, Strikes, Declines), Survey Report. (Examining feasibility of proposals), Inspection Reports, (of department, branch, factory).

TERM WORK:-
1. Sentence pattern should form six home assignments.
2. Remedial grammar may be practiced in tutorial & periods.
3. Importance of group discussion, public speech should be practiced.
4. Home assignments (Minimum ten) on business letters, report writing and technical paragraphs.

5. Oral examination should be conducted at the end.

REFERENCE BOOKS:-
1)   The Structure of Technical English – A.J. Herbert.
2)   Better English Pronunciation – J.D.O. connor.
3)   Living English Structure – Allen Walter.
4)   Professional Communication Skill – Pravil S.R. Bhatia, S. Chand & Co. N. Delhi.
5)   Communication Techniques & Skills – R.K. Chadha, Dhanpat Rai Publication, N.D.

FIRST YEAR B.TEXT. (FASHION TECHNOLOGY) – SEMESTER – I
1.6   INTRODUCTION TO TEXTILE MANUFACTURING-I

Lecturers	:	4 Hours/week
Practicals	:	4 Hours/week
Theory Paper	:	100 Marks.
Term Work	:	50 Marks
Subject Total	:	150 Marks

YARN FORMING :-
1)   Definition of Terms – Textile, fibres, yarns & fabrics. Flow chart of process involved in conversion of fibres into yarns by presently available methods object of each process. Brief introduction of different methods of spinning.
2)   Essential & desirable properties of fibres as textile raw material.
3)   Yarn classification, yarn numbering system and related calculations.
4)   Ginning – Purpose, types of ginners, effect of quality of ginning on fibres and Yarn properties, pressing & baling of cotton.
5)   Objects of blowroom, card, drawframe, speedframe, combing & passage of material through above machines.
6)   Spinning – objects of ring spinning, functioning of ring spinning.
7)   Properties of yarn obtained from different systems of yarn forming.
8)   Density of different package formed in spinning, structure of yarn produced on different spinning systems.

FABRIC FORMING:-
1)   About Industry: - Definition of Textile, importance of textiles in various fields, importance of textile industry in India.
2)   Nature of textile industry in India :- handloom, power loom sector, organized / composite mills, spinning sector, knitting, non woven, wool & silk sector, man-made fibre / yarn sector, garment industry, machine manufacturer, fashion industry sector.
3)   History & up down in textile industry, transformation & restructuring. Indian scenario vis-à-vis world scenario.
4)   Role & importance of textile / weaving technologist in textile industry, work profile of technologist, opportunities.
5)   Process flow chart for conversion of yarns into woven fabrics, knitted fabric and non-wovens.
6)   Yarn preparation – objects of winding, warping, sizing & drawing-in pirn winding, demonstration of machines to show how the objectives are

achieved, passage of yarn on each machines & brief description of how the objectives are achieved.

7) Fabric forming – classification of looms, drop box, dobby, jacquard loom & their purpose.

8) Demonstration & brief description of mechanism of non automatic powerlooms such as shedding, picking, beatup, let-off & take-up warp protector & weft stop motion.

9) Calculations – warp weight, weft weight, fabric weight in gm/sq.m. fabric production / loom.

10) Cloth Structures –
   a) Constructional details – warp / weft count, thread densities, width, length, selvedges, light, medium & heavy constructions, capability of weaving machine to weave different constructions, warp & weft cover, cloth cover, crimp, contraction in warp & weft way. Introduction to interlacement of thread.
   b) Presentation of weaves, design, draft, peg plan, denting plan, need & importance.
   c) Study of weaves – plain, twill & satin (basics only).

LIST OF EXPERIMENTS:-
1. Study of instruments / tools, used in spinning & weaving.
2. To study the different types of drives & calculation based on the same.
3. Introduction to spinning, sequence, machines (carded / combed).
4. Study of passage of material through blow room.
5. To study the passage of material in carding & drawframe.
6. To study the passage of material in comber & its preparatory.
7. To study the passage of material through speedframe & ringframe.
8. Study of all weaving processes to observe the machines & operation to understands objects of all processes.
9. To study the primary motions to understand their functioning & objectives.
10. To study the secondary motions to understand their functioning & objectives.
11. To study the auxiliary motions to understand their functioning & objectives.
12. To study the object & method of fabric analysis and calculation of crimp, covers & fabric weight.
13. Fabric analysis of fabric samples with plain, twill & satin & sateen weaves.

REFERENCE BOOKS:-
1) Principles of Weaving by Marks A.T.C. & Robinson.
2) Textile Colour & Design by Watson.
3) Weaving by Prof. D.B. Ajgaonkar, Prof. Sriramalu, Prof. M.K. Talukdar.
4) Weaving by N.N. Banerjee.
5) Weaving Calculation by Sengupta.
6) Winding & Warping by M.K. Talukdar.
7) Winding, Warping and Weaving by A.R. Garde.
8) Fundamentals of Spun Yarn Technology by Carl A Lawrence.
9) Cotton Ginning, Textile Progress, The Textile Institute Publication.

10) Blowroom and Carding – Training Programme Conducted by NCUTE, IIT, Delhi.
11) Technology of Cotton Spinning by J. Janakiraman.
12) Blowroom Carding, Drawframe by Prof. A.R. Khare.
13) Essential Calculations of Practical Cotton Spinning by T.K. Pattabhiraman.
14) Introduction of Textile Fibres by Dr. H.V.S. Murthy.

FIRST YEAR B. TEXT. (FASHION TECHNOLOGY) – SEMESTER – I
1.7   COMPUTER LABORATORY - I
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 dirves.

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. (FASHION TECHNOLOGY) – SEMESTER – II
2.1 APPLIED MECHANICS

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. Equillibrium 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. (FASHION TECHNOLOGY) – SEMESTER – II
2.2 TEXTILE MATHEMATICS-II

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

1. Integral Calculus:
    Reduction formulae for $\int_0^{\pi/2} \sin^n x \, dx$, $\int_0^{\pi/2} \cos^n x \, dx$, 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.
    Trapazoidal 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 & Iyangar.
4. Mathematical Statistics by J.E. Fruend.
5. Probability & Statistics for engineers by Johnson.
6. Statistical methods by Kumbhojkar.

FIRST YEAR B. TEXT. (FASHION TECHNOLOGY) – SEMESTER – II
2.3 INDUSTRIAL CHEMISTRY FOR TEXTILES

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

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 inhibitiors.

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 Hexametaphospate.
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. (FASHION TECHNOLOGY) – SEMESTER – II
2.4 ENGINEERING GRAPHICS

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. (FASHION TECHNOLOGY) – SEMESTER – II
2.5   INTRODUCTION TO TEXTILE MANUFACTURING – II

Lecturers	:	4 Hours/week
Practical	:	2 Hours/week
Theory Paper	:	100 Marks.
Term Work	:	50 Marks
Subject Total	:	150 Marks

1. Doubling - Objects, properties, applications of doubled yarns – Study of Ring doubling process – Wetarddry doubling – Study of working principle of TFO Twister.
2. Modern spinning method – Introduction to principle of working of Rotor spinning, Airjet spinning, Vortex spinning and Friction spinning.
3. Comparison of yarns produced with different spinning systems.
4. Weft patterning – Study of systems available, types of box motions, introduction to Weft patterning on modern weaving machines, card saving
5. Loom drives – V belt drive and clutch drive, their comparison, introduction to drive on modern weaving machines.
6. Warp and cloth control – cloth formation, fell position, bumping conditions, pick spacing and causes of variation, direct and indirect takeup, constant of takeup, change wheel, principle of positive let off , details of Ring temples and their specifications.
7. Tore present following weaves on graph paper with design, draft, per plan and dealing order.
   a. Derivative of plain weave, warp and welt rib matt (regular and irregular)
   b. Derivatives trill – Pointed, herringbone, various types of diagonals, different types of broken and rearranged trills, transposed trill, trill chocks, curved trills, combined trill, diamond, twist and trill interaction.
   c. Derivatives of satin / sateen weave irregular satin, satin cheeks.
   d. Toweling structures, ordinary and Brighton Honeycombs, Huckaback.
   e. Mock leno, Creps by Various methods.

8. The requirements of weaving for all above mentioned constructions, practical aspects of weaving, fabric and weave characteristics and properties of fabric and their applications.
9. 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.
10. Need for chemical processing of textiles – Important unit processes involved in conversion of gray fabric to finished fabric. Object of each processes such as desiring, scouring, bleaching, mercerization, dyeing, printing and finishing.
11. Introduction to Garment processing.

LIST OF EXPERIMENTS:-
1. Study of Ring doubler – Passage and calculations.
2. Study of construction and passage of material on rotor spinning.
3. Study of construction and passage of material on airjet spinning.
4. Operating the plain and auto loom to weave the good fabric.
5. To study different fabric defects.
6. Fabric Analysis (Derivatives of plain : Warp Rib, Welt Rib, Matt weave)
7. Fabric Analysis (Trill derivatives : Broken, Transposed, Herringbone)
8. Fabric Analysis (Satin and Sateen)
9. Fabric Analysis (Mack leno, Honeycomb, Huckaback.
10. Study of important processing operations.
11. Study of various finishes used for textiles.
12. Mill Visit.

REFERENCE BOOKS:-
1. The textile Institute publication – Manual of Textile Technology – Short Staple Spinning series.
   Vol. V: New Spinning System by W. Klein.
   Vol. I: The Technology of Short Staple Spinning by W. Klein.
2. Essential Calculations of practical cotton spinning by T. K. Pattabhirerman.
3. Elements of Ring frame and doubling by A. R. Khare.
4. Spun Yarn Technology by Eric Oxtoby.
5. TFO Technology and Technique for spun yarn by M. S. Kulkarni and H. V. S. Murthy.
6. Fundamentals of Spun Yarn Technology By Carl A. Lawrence.
7. Principles of Weaving by Marks ATC and Robinson.
8. Textile Color and design by Watson.
9. Weaving by Prof. D. B. Ajgaonkar, Prof. Sriramalar & M. K. Takkdar
10. Weaving Mechanism by K. T. Aswani.
11. Pretreatment of Cotton fabrics by R. S. Prayag.
12. Technology of Textile Processing by Prof. V. A. Shenai.

FIRST YEAR B.TEXT. (FASHION TECHNOLOGY) – SEMESTER – II
2.6   TESTING OF FIBRES AND YARNS

Lecturers	:	4 Hours/week
Practical	:	2 Hours/week
Theory Paper	:	100 Marks.
Term Work	:	50 Marks
Subject Total	:	150 Marks

FIBRE TESTING:-
1. **Sampling for determination of fibre properties:-** Importance, General requirements – Random sample, Biased sample, Numerical and Length biased samples – Extent bias, Avoidance of extent bias, Sampling technique – Squaring method, Cut square method, Zoing techniques,.
2. **Longitudinal dimensions (Fibre Length):-** Technical significance of fibre length, Staple length of cotton, Fibre length measurement – Oil plate method, Comb sorter method, Digital fibre graph.
3. **Transverse Dimensions (Fineness & Maturity):-** Fineness – Terms & Definations, Technical significance of fibre fineness, Measures of fineness, Measurement of fineness – Gravimetric, Airflow method, Fiberscope method, Maturity of cotton, Technical significance, Measurers of fibre maturity, Methods of measurement – differential dyeing method, Microscope Method.
4. **Fibre Strength: -** Importance, terminology, Stress-strain curve & its importance, Factors influencing fibre strength, Measurement of fibre strength – Single fibre strength – Instron, Bundle strength – Stelometer.
5. **Modern Testing Instruments: -** HVI & AFIS.
6. **Moisture Relations & Testing:-** Terms & definations – Absolute & relative humidity, Moisture content & regain, Standard atmospheric condition for testing, Measurement of humidity by dry & wet bulb hygrometer, Effect of

regain on fibre properties, Measurement of regain by moisture testing oven & methods based as resistance & capacitance principles.

7. **Fibre Quality Index & Significance, Cotton Grading.**
8. **Neps: -** Defination, Importance, Testing of neps in card web by Shirley Template Method.
9. **Identification of Fibres:-** Cotton, Wool, Silk, Viscose Rayon, Nylon, Polyester & Acrylic fibre, Solubility test, burning test, cross sectional & longitudinal views of fibres.
10. **Linear density of yarn: -** Count or Yarn number, Direct & Indirect system of yarn numbering, Measurement yarn number or count.
11. **Twist & Twist Measurement:-** Defination, Twist Direction, Amount of Twist, Twist multiplier / factor, functions of twist in yarn structure, Twist & yarn strength, Effect of twist in yarn on fabric properties, Measurement of twist – Untwist – Twist method, Take-up Twist Tester.
12. **Yarn Strength:-**
    a) **Single Thread Strength:-** Effect of fibre properties on yarn strength, factors affecting tensile properties, Different principles of Tensile Testing of Yarn, Pendulum lever principle, Strain gauge transducer principle, Machine working on these principles.
    b) **Lea Strength:** - The Lea CSP or Break factor & its significance, Description of Lea Strength tester. Comparison of Lea & Single thread test results, Ballastic test & its importance.
13. **Evenness of Yarn:-** Classification of variations, Expression of irregularity, Basic irregularity, Index of irregularity, Measurement of yarn irregularities – Visual examination, electronic capacitance principle, Analysis of irregularity – spectrogram analysis, causes of irregularity, Importance of irregularity, Imperfections & Classimat faults, Principle & working of Uster Classimat Hairiness in spun yarn, causes & reduction of Hairiness, Measurement of hairiness.

LIST OF EXPERIMENTS
1. Determination of C. V. % of Roving & Sliver samples.
2. Identification of Textile fibres by Microscopy Method.
3. Fibre maturity, Measurement by Caustic Soda (NaOH method)
4. Fibre fineness by Cut – Weight Method.
5. Measurement of fineness & maturity by airflow instrument.
6. Determination of fibre parameters by HVI.
7. Determination of yarn number & its variation.
8. Determination of Twist of Single & Double Yarn.
9. Determination of Single Thread Strength
10. Determination of Lea Strength & Ballastic st.
11. Determination of yarn evenness by Premier Quali Center.

LIST OF EXPERIMENTS
1. Textile Testing by Angappan & Gopal Krishnan
2. Physical Testing of Textiles by J. E. Booth.
3. Manuals of HVI, AFIS & Qualicenter.
4. Textile Testing by Skinkle.
5. Handbook of Indian Standards.

FIRST YEAR B.TEXT. (FASHION TECHNOLOGY) – SEMESTER – II
2.7   COMPUTER LABORATORY - I I

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.