



REVISED SYLLABUS W.E.F.01ST JULY, 2010											
F.Y. B.TEXT. (MMTT) SEMESTER-I											
SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
1.1	TT/MMTT/TPE/TC/FT	APPLIED PHYSICS	4	---	---	---	100	---	---	---	100
1.2	TT/MMTT/TPE/TC/FT	TEXTILE MATHEMATICS-I	3	---	---	---	100	---	---	---	100
1.3	TT/MMTT/TPE/TC/FT	ELECTRICAL SCIENCE	3	---	---	2	100	50	---	---	150
1.4	TT/MMTT/TPE/FT	TEXTILE FIBRES	4	---	---	---	100	---	---	---	100
1.5	TT/MMTT/TPE	PRINCIPLES OF YARN MANUFACTURING	4	---	---	2	100	50	---	---	150
1.6	TT/MMTT/TPE	PRINCIPLES OF FABRIC MANUFACTURING	4	---	---	2	100	50	---	---	150
1.7	TT/MMTT/FT	COMPUTER LABORATORY	---	---	---	2	---	50	---	---	50
			22	---	---	8	600	200	---	---	800
L =LECTURES			TP=THEORY PAPER								
T =TUTORIALS			TW=TERM WORK								
DR=DRAWING			OE=ORAL EXAMINATION								
PR=PRACTICALS			PE=PRACTICAL EXAMINATION								

REVISED SYLLABUS W.E.F.01ST JULY, 2010											
F.Y.B.TEXT.(MMTT) SEMESTER-II											
SR. NO.	COMMTTON TO COURSES	SUBJECTS	TEACHING SCHEME				EXAMINATION SCHEME				
			L	T	DR	PR	TP	TW	OE	PE	SUB. TOTAL
2.1	TT/MMTT/TPE/TC/FT	APPLIED MECHANICS	3	---	---	---	100	---	---	---	100
2.2	TT/MMTT/TPE/TC/FT	TEXTILE MATHEMATICS-II	3	---	---	---	100	---	---	---	100
2.3	TT/MMTT/TC	INDUSTRIAL CHEMISTRY FOR TEXTILES	4	---	---	2	100	25	---	---	125
2.4	TT/MMTT/TPE/TC/FT	ENGINEERING GRAPHICS	2	---	2	---	100	25	---	---	125
2.5	MMTT	MAN MADE STAPLE YARN MANUFACTURE- I	4	---	---	2	100	50	---	---	150
2.6	MMTT	MAN MADE FABRIC MANUFACTURE - I	4	---	---	2	100	50	---	---	150
2.7	TT/MMTT	LANGUAGE LABORATORY	---	---	---	2	---	50	---	---	50
			20	---	2	8	600	200	---	---	800
L =LECTURES			TP=THEORY PAPER								
T =TUTORIALS			TW=TERM WORK								
DR=DRAWING			OE=ORAL EXAMINATION								
PR=PRACTICALS			PE=PRACTICAL EXAMINATION								

**FIRST YEAR B. TEXT. – SEMESTER - I****1.1 APPLIED PHYSICS (TT/MMTT/TPE/TC/FT)**

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  $Y$ ,  $\eta$  and  $K$ . Poission's ratio, relation between  $Y$ ,  $k$  and Poission's ratio and the relation between  $Y$ ,  $\eta$  and Poission's ratio  $he$  . Twisting couple on a cylinder, Torsional pendulum
- 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  $\eta$  for a liquid - Poiseuille's method, Motion in a viscous medium, terminal velocity, Stoke's law, Stokes method. 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,  $\theta$  (Theta) is the angle of friction,  $\mu$  is the co-efficient of friction). Mechanism of friction. Applications of friction in textiles.
- 5. 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.

- 6. Polarisation:** Polarisation, Brewsters law. Double refraction, Nicol prism, production of plane, circularly & elliptically polarised light. The colour of crystal plates in polarized light, Quarter & half wave plate. Birefringence and Polarising microscope.
- 7. X-ray:** Origin of continuous & characteristic x-ray spectrum, properties, production of x-rays and its applications. X-ray diffraction - Bragg's law of X-ray diffraction, Bragg's x-ray spectrometer spectrometer, Miller indices. Determination of crystal structure by X-ray diffraction technique.
- 8. 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
9. College Physics by Bueche Fredrick J
10. Fundamentals of Physics by Halliday Resnick
11. Perspectives of Modern Physics by Arthur Beiser
12. The general properties of Matter by F. H. Newman
13. University Physics by Hugh D. Loung

**FIRST YEAR B. TEXT. – SEMESTER - I**

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

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

**1. Matrix:**

Rank of matrix (Normal form of matrix, Echelon form of Matrix)  
Solution of simultaneous linear equations (Homogeneous & Non Homogeneous) Characteristic equation, eigen values, eigen vectors.  
Caley Hamilton's theorem.

**2. Successive Differentiation:**

Introduction, standard results, Leibnitz rule.

**3. Partial Differentiation:**

Introduction, total differentiation, Euler's theorem on homogeneous function.  
Jacobean ( $J.J'=1$ ) only, Errors & approximation.

**4. Curve Tracing:**

Rules & examples of curve tracing in Cartesian and Polar Equations only.

**5. Introduction of Statistics:**

Definitions of Population, Variable, Attribute, Census Survey, Sample Survey, 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  
Partition values : Quartiles deciles and percentiles & 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 of data & computation

**8. Measures of Skewness & kurtosis:**

Skewness, types, Karl Pearson's & Bowley's coefficient of skewness & Computation. Kurtosis definition and types only. (No Examples of Kurtosis)

**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/FT)**

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

**1. D.C. Circuits:** Units-6

Basic electrical quantities, voltage, current, power energy, co-relation between electrical, mechanical & thermal quantities, ohm's law with its limitation, Kirchoff's current and voltage law, current division rule. Resistance temperature coefficient (Numerical Problems on with two variables).

**2. Magnetic Circuits:** Units-4

Concepts of magnetic circuits, MMF, Reluctance, Magnetic flux density, magnetic field strength, definitions and units, comparison of electrical and magnetic circuits, leakage and fringing, Self and mutual inductance, eddy current & hysteresis loss, material used for core of electrical machines. (Numerical on series magnetic circuits)

**3. A.C. Fundamentals:** Units-4

Faraday's law of electromagnetic induction, Generation of single and three phase quantity, phasor representation, Concept of R.M.S. and Average value, peak value, constructional diagram of three phase alternator. (Simple Numerical).

**4. A.C. Circuits:** Units-5

Concept of inductive reactance, capacitive reactance, phasor representation of pure R, L, C, & series RL, RC, RLC Circuits, impedance, only concept of parallel resonance, (Numerical problems of series RL, RC, RLC Circuits)

**5. Transformer:** Units-5

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, condition of max efficiency. Concept of auto-transformer, On

Load Tap Changing Transformer (OLTC). (Simple Numerical on transformer).  
Testing of transformer, No load test, short circuit test. Concept of percentage impedance.

**6. Electrical Machines:**

Units-6

Principle, construction, operation and characteristics of three phase induction motor, motors used in textile industries, inverter driven motors (VFD), Speed control of three phase induction motor, necessity of starters, Application of three phase induction motor. Power triangle, effect of reactive power on power system, power factor, its significance, causes of low power factor, factors affecting it and methods to improve the power factor, in concern with Energy saving, Introduction to APFC panel & its advantages. (only theoretical treatment), introduction to stepper motors and servo motor.

**7. Luminaries:**

Units-3

Working of sodium vapour lamp, fluorescent lamp, CFL lamps, Calculation of elimination scheme for different purpose, mercury vapour lamp, concept of Energy Efficient lighting system.

**8. Power Quality:**

Units-3

Concept of power quality, advantages of good quality power, harmonics & its effects, method of harmonic elimination., Introduction to electrical tariffs, simple examples on energy calculations.

**9. Introduction to switch gear and protection, instruments:**

Concept of ACB, VCB, MCCB, TOD meter

Constraints in electrical control panel

**List of Experiments (Any Eight)**

1. Introduction to Electrical Engg. Lab.
2. Determination of power factor of R L series circuit.
3. Determination of R & L of a choke coil.
4. Study of Phasor Relationship of RLC circuit.
5. Ratio test on single phase transformer.
6. Direct load test on Single Phase Transformer.
7. Reversal of Rotation of Three Phase Induction Motor.
8. Speed control of Three Phase Induction Motor.

9. Direct load test on Three Phase Induction Motor.
10. Study of starters (Any two).
11. Study of Wiring Circuits.
12. Study of lamps (Any two).

**Reference Books:**

1. Elements of electrical Engineering by U.A.Bakshi
2. Electrical Technology by U.A.Bakshi
3. Basic electrical Engineering by B. H. Deshmukh.
4. A text book in electrical technology by B.L.Thareja

**FIRST YEAR B. TEXT. – SEMESTER - I**

**1.4 TEXTILE FIBRES (TT/MMTT/TPE/FT)**

Lectures	:	4 Hours / Week.
Theory paper	:	100 Marks.
Subject Total	:	100 Marks.

**1) Requirements of Fibres:**

Definition of fibre, Difference between staple fibre and filament, Classification of fibres, Essential and desirable properties of apparel grade & technical grade textile fibres, Characteristics of fibre forming polymer, Concepts of molecular weight, Degree of polymerization, Orientation and Crystallinity, Advantages and Disadvantages of natural & man made fibres.

**2) Natural fibres:-**

**Vegetable Fibres:**

- i) Cotton - Development of fibre in seed, Morphological structure, Physical & chemical properties, applications.
- ii) Jute- Retting and extraction process, Structure of jute fibre, Physical & chemical properties, applications
- iii) Introduction to other natural fibres like Hemp, Flax, Ramie, Linen, Banana, Pineapple fibres & their applications.

**Animal Fibres:**

- i) Wool- Types of wool, Grading of wool, Morphological structure, chemical composition, Physical & chemical properties, applications
- ii) Silk - Types of silk, Production of silk, Chemical composition of silk, Physical & chemical properties, applications.

**3) Man Made fibres:-**

Definitions of Regenerated & Synthetic fibres, Introduction to methods of fibre formation – Melt spinning, Dry spinning and Wet spinning.

**Regenerated Fibres:**

- i) Viscose rayon: Raw Material, Physical & chemical properties, applications, Concept of high wet modulus fibres,
- ii) Introduction to Acetate & Triacetate fibres.

**Synthetic fibres:**

- i) Polyamide: Nylon 6 & Nylon 66 fibres – Raw material, Physical & chemical properties, applications.
- ii) Polyester (Polyethylene Terephthalate): Raw material, Physical & chemical properties, applications.
- iii) Polypropylene: Raw material, Physical & chemical properties, applications.
- iv) Polyacrylonitrile Fibre: Acrylic and Modacrylic fibres - Raw material, Physical & chemical properties, applications.
- v) Polyurethane: Raw material, Physical & chemical properties, applications.

**Reference Books:-**

1. Textile Fibres – Vol.-I by V.A.Shenai
2. Fibre Science And Technology by S.P. Mishra
3. Hand book of Textile Fibres Vol. I & II by Garden & Cook.
4. Man Made Fibres – R.W. Moncrieff.
5. Polymer science- V.Gowariker

**FIRST YEAR B. TEXT. – SEMESTER - I**

**1.5 PRINCIPLES OF YARN MANUFACTURING (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. Flow chart of carded & combed yarn.
2. Essential and desirable properties of fibres as textile raw material.
3. Yarn classification, yarn numbering systems and related calculation (English count, tex, denier, woollen & worsted).
4. Mixing & Blowroom – Objects of mixing & blowroom, Types of mixing, Blowroom Machine sequence .
5. Carding – Objects of carding, construction of carding machine,
6. Drawframe – Concept of drafting, requirement of doubling, objectives of drawframe, construction of drawframe machine,
7. Comber Preparatory – Machine sequences used for comber preparatory, objectives of comber preparatory, construction of machine,.
8. Comber: - Objectives of comber , construction of machine.
9. Speedframe – Objectives of speed frame, delivery package, twisting system, construction of machine.
10. Ring Frame – Objectives of ring frame , construction of machine.

**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.  
Gauges –leaf gauge & filler gauge , Hammer – Nylon ,Brass & Iron hammers , Torque wrench , Pliers- Circlip Plier (outer & inner), Demonstration of all tool & gauges

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.  
Simple examples of speed calculation. Advantages & limitations , Energy consumption (Slipage) , Cross checking the calculated speed by using technometer. Importance of safety gears.
3. Study of various types of bearings used on spinning machines and their lubrication. Plain, Journal, Bush, Ball, Roller, Needle and others.  
Application of each type of bearing is demonstrated on machine  
Preparation of cut models of different bearings, Advantages & limitations
4. Processing of material on Blow Room, Carding, Draw frame ,Comber,Speed Ferame & Ring Frame  
For demonstration of spinning process.  
Testing of out put material for hank calculation
5. Introduction to spinning process, sequence, machines (carded/combed).  
Explanation of objects of each machine by conducting mill visit. Visit should be started from cotton godown and finished in yarn godown.
6. Study of Blowroom line - Flow chart - Machine positioning in Blowroom.  
Mill visit for conventional & modern Blow Room. Also sample collection at feed and delivery stages.
- 7 Study of Card - Dimension, Construction and passage of material .
- 8 Study of Draw Frame - Dimension, Construction and passage of material .
- 9 Study of Comber preparatory - Dimension, Construction and passage of material
- 10 Study of Comber - Dimension, Construction and passage of material .
- 11 Study of Speed Frame - Dimension, Construction and passage of material .
- 12 Study of Ring Frame- Dimension, Construction and passage of material .

**Reference Books :-**

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

4. 'Opening and Cleaning' by Shirley. The Textile Institute Publication, Manual of Cotton Spinning Vol. II, Part-II.
5. 'Opening Cleaning and Picking' by Dr.Zoltan S. Szaloki, Institute of Textile Technology, Virginia.
6. 'Cotton Opening and Picking' by G.R. Merril.
7. 'Cotton Ginning' Textile Progress, The Textile Institute Publication.
8. 'Fundamentals of Spun Yarn Technology' by Carl A. Lawrence
9. 'Cotton Growing and Marketing', J.S. Parmar, Tecoya Trend Publications.
10. 'Cotton Varieties' by Parmar, Tecoya Trend Publication.
11. Blowroom and Carding- Training Programme conducted by NCUTE, IIT, Delhi.
12. Carding by F. Charanlay. The Textile Institute publication, Manual of cotton spinning series Vol-III.
13. Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
14. 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.
15. 'Blowroom', 'Carding', 'Drawframe, Comber -by Prof.A.R.Khare.

**FIRST YEAR B. TEXT. – SEMESTER - I**

**1.6 PRINCIPLES OF FABRIC MANUFACTURING (TT/MMTT/TPE)**

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

**I) INTRODUCTION**

1. Nature of textile industry in India
2. Applications/classification of fabrics
3. Yarn numbering systems: cotton counts, metric count, Tex, denier, calculations
4. Weaving processes: objects of all processes. Different kinds of fabrics: Grey, mono-colour, bi-colour, warp or weft stripes, checks.
5. Process flow charts for various fabrics

**II) ORDINARY 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
2. Machines: - Types of winding machine, precision winding, drum winding, merits and demerits.
3. Machine Details: - Construction and working of winding machine, yarn path, details of machine zones such as creel, knotting, 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.
4. Knotting: types of knots, characteristics of good knot, comparison, applications,
5. 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, calculations

8. Calculations: winding speed, production/spindle & per machine, and efficiency.

### **III) PIRN WINDING**

1. Objectives: - rewind 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 ends 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,
2. Outline of weaving mechanisms: - Classification of weaving machines, Basic motions, primary, secondary and auxiliary, objects,
3. Primary motions: Detailed study of -shedding, picking, and beat-up
4. Secondary motions: Detailed study of take up and negative let-off.
5. Auxiliary motions: - Detailed study of weft fork, anti crack, oscillating backrest, and warp-protecting motions (loose and fast reed), ring and roller, full width temples.
6. Calculations: -warp weight, weft weight, fabric weight / sq. m fabric production/loom, weft consumption per loom /day etc.

### **V) FABRIC 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 & its types, peg plans, need, importance, and precautions, practice.
3. Study of weaves: - plain, twill and satin (basic weaves)

**List of Experiments:-**

1. Study of Weaving preparatory and weaving Processes
2. Study of various types of tools and gauges used in weaving
3. To study different principles of transmission of motion in weaving (Drives)
4. General study of ordinary weaving machine
5. To Study method of fabric analysis
6. General study of precision and drum winding machine
7. To study, dismantling and resetting of tappet shedding mechanism
8. To study, dismantling and resetting of cone over pick mechanism
9. To Study, dismantling and resetting of negative let-off and take-up mechanism
10. Study of weaving accessories and drawing-in
11. Fabric analysis of given fabric sample
12. Fabric analysis of given fabric sample
13. Visit to ordinary weaving machine unit

**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**

**1.7 COMPUTER LABORATORY (TT/MMTT/FT)**

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

**1. Computer Fundamental :-**

Basic organization of computer & its functional unit, Memories, System Software, Application Software.

**2. 'C' Programming:-**

Introduction, Algorithm & flowchart, keywords, statements, Loops.

**3. Array:-**

Introduction, Array representation, one dimensional array, two dimensional arrays.

**4. Structure:-**

Introduction, define structure, define structure variable, accessing structure member, array of structure, union.

**5. Pointer:-**

Introduction, application of pointer, pointer arithmetic, pointer & array.

**6. Introduction of 'C++' programming:-**

Basic concept of OOP, Application of OOP & C++, characteristic of OOP language.

**7. Classe & Object:-**

Class type, Data member, Member function, Constructor, Destructor.

**8. Function in 'C++':-**

Function prototype, inline function, friend function.

**9. Inheritance:-**

Basic Concept of inheritance, types of inheritance, Virtual function.

**Term Work (Minimum 12 Program)**

**List of Experiments:-**

1. One programs each on Loops, Array, Structure, Pointer, Union.
2. Class & Object
3. Constuctor & Destrucure
4. Function
5. Inheritance & virtual function.

**Reference Books:-**

1. C++ Programming- Robert Lafore
2. Let us C – Yashwant Kanitkar.
3. Let C++ - Yashwant Kanitkar
4. Fundamental of computer- Rajaraman

**FIRST YEAR B. TEXT. – SEMESTER - II**

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

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.

**Reference Books:-**

1. Engineering Mechanics by S. Ramamrutham.
2. Engineering Mechanics by Junnarkar.
3. Applied Mechanics Satya Prakashan, New Delhi by S.N. Saluja.
4. Vector Mechanics for Engineers Vol – I & II, Tata Mc-Graw Hill Publication by Beer & Jonhstan.
5. Engineering Mechanics by R. K. Bansal and Sanjay Bansal
6. Applied Mechanics by R.S. Khurmi.
7. Engineering Mechanics, New Age International Pvt. Ltd. By S. S. Bhavikattis,

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

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

**2. Multiple integrals:**

Introduction, solution, change of order & change of variables method.

**3. Applications of integration:**

Area, Mass of lamina using double integrals only. Volume using triple integral only.

**4. Numerical Differentiation & curve fitting:**

Newton's forward & backward formulae, Sterling's formula. Newton's divided difference formula.

Fitting of curves  $y=a+bx$ ,  $y=a+bx+cx^2$ ,  $y=ax^b$  by least square method.

**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 ( $\chi^2$ ) : Definition & properties only.

t-probability distribution: Definition & properties only.

F-probability distribution: Definition & properties only.

Examples of t,  $\chi^2$ , & F are not expected.

**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:-**

Scope of topic in textiles Introduction, sources of water, impurities in natural water, quality parameters like pH, hardness, total solids, alkalinity, BOD & COD, oil & grease. Types of hardness (temporary/permanent), Calcium carbonate equivalents of hardness, units of hardness and numerical based on hardness, ill effects of hard water in textile industry, industrial treatment of water by lime-soda process, zeolite process and ion exchange process, domestic treatment of water. disinfection of water. Boiler feed water: Norms for boiler feed water. Definition causes & disadvantages of priming, foaming, scale, sludge and caustic embrittlement.

**2. Surface Active Agents:**

Scope of topic in textiles, concept of HLB & wetting Preparation, properties and applications in textiles of

- Ionic - Anionic surfactants and cationic surfactants.
- Non-ionics
- Amphoteric surfactants.

**3. Carbohydrates:**

Scope of topic in textiles Introduction, Classification of carbohydrates, Manufacture of starch, Constitution of starch, Properties of starch paste, Chemical & physical properties of starch, Soluble starch and dextrin, Action of enzymes on starch, Cellulose – sources, methods of pulp making, Constitution of cellulose, Chemical & physical properties of cellulose

**4. Amino Acids and Proteins:**

Scope of topic in textiles Introduction, Nature of amino acids, Classification of amino acids, Chemical properties of amino acids Nature and classification of proteins, Chemical properties of proteins, Denaturing of proteins, isoelectric point, Composition & chemical structure of protein fibres like wool & silk.

**5. Corrosion:**

Scope of topic in textiles Electrochemistry, electrode potential, electrochemical series,, 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 spraying, organic coatings, paints, varishes. Protection from corrosion by proper design, material selection, Cathodic protection, modifying the environment, use of inhibitors.

**6. Fuels:**

Scope of topic in textiles, Definitions and units, Classification of fuels, characteristic of good fuel

Solid fuels : Properties and analysis of fuels, wood, Coals : classification of coal by ranking, Calorific value of fuel.

Liquid fuels: petroleum, cracking, synthetic petrol, reforming, Gasoline, knocking, Gaseous fuels from petroleum & coal.

**7. Alloys:**

Scope of topic in textiles, Necessity of making alloys, classification, composition, properties and application of brass, bronze, duralumin, stainless steel.

**8. Colloids:**

Scope of topic, applications in textiles, true solutions, colloidal solutions ,suspensions, classifications of colloidal, lyophilic and lyophobic colloids, preparations of sols, properties of colloidal solution, Tyndall effect and its applications, electrical properties of colloids, spontaneous aging of colloids, coagulation, factors affecting on coagulation

**List of Experiments:-**

- 1) Determination of total hardness 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 chlorides in given water sample.
- 7) Determination of pH by using pH paper, Litmus paper, Universal Indicator and pH meter.
- 8) Determination of oil & grease in given sample of water.
- 9) Estimation of copper in given sample of bronze.
- 10) Analysis of starch.
- 11) Determination of rate of corrosion of metal.
- 12) Determination of ash content & moisture content of given solid fuel.

**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.
6. Profiles in chemical analysis by N.F. Desai.

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

Lectures	:	2 Hour / Week.
Drawing Practical	:	2 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 : A) Introduction to solids (Types of solids only) B) Development of lateral surfaces of cubes, prisms, cylinders, pyramids.
6. Free hand sketches: Making free hand sketches of -
  - i. Mechanisms in textile machines – Picking motion mechanism, Let-off motion mechanism, Take-up motion mechanism, Three blade beater, Immersion roller drive in sizing plaiting mechanism, Sewing needle, Throat plate, Sewing machine table, Cutting machine parts
7. Introduction to 'Auto-Cad' - Commands for drawing lines, circles, polygons.

**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 Textile machines mechanisms.

**Reference Books:-**

1. Engineering Drawing by N.D. Bhat.
2. The Fundamental of Engineering Drawing & Graphic Technology by French & Virek
3. I.S.: 696 (1972) Code of Practice for General Engineering Drawing by I.S.I, New Delhi.
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.

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**2.5 MAN MADE STAPLE YARN MANUFACTURE- I (MMTT)**

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

**1. Cotton Cultivation & Harvesting in India:-**

- Indian Cotton Production
- Cotton producing regions in India
- Evolution in Indian Cottons
- Cotton varieties produced in Indian
- Some foreign Cottons varieties

**2. Cotton Ginning :-**

- Introduction of ginning process.
- Functions of Cotton ginning machines
- Types of Ginning machines
- Pre and post ginning machines used and their objects. Lay out of modern ginning factory.
- Factors affecting ginning performance:-
  - Type of harvesting - Moisture content of seed cotton- Feed rate of seed cotton at ginning machine-Fibre attachment to seed-Storage & transportation (Storage time of seed cotton , Transportation )-Atmospheric conditions at ginning – Effect of conditions on ginning performance - static electricity generation-conditioning equipment
- Influence of ginning on fibre, yarn and fabric quality
  - Number and types of Pre- ginning equipment –Type of Ginning machinery-Influence of process parameters on performance of saw-gin (Rate of feeding , saw speed & Seed roll density)- Influence of setting & speeds on performance of roller gin -Lint cleaners-Effect of no. of lint cleaners on fibre properties.
- Pressing and bailing of Indian and foreign cotton.
- Dimensions of bales of various countries.

### 3. Blow room :-

Objects of blow room machines, Various components of blow room machines, Different zones in blow room, Conventional blow room machines e.g. bale breaker - hopper feeder - step cleaner – porcupine opener – Creighton opener – scutcher with bladed / krishner beaters, Reasons of developments in blow room machinery, Research findings for developments of modern blow room,

Modern blow room machines

- Automatic bale opener
- Mild openers– Maxi-flow/ Uni-clean/Vario-clean
- Blenders
- Fine openers, cleanomat, flexiclean

Method used for - material transport in modern blow room- Waste removal- Dust removal- Contamination removal. Utilities required for various blow room machines like Electricity, Compressed air, etc. Humidification system used in blow room, Waste recycling machines and methods, Fire protection / Safety arrangements in blow room.

#### List of Experiments:-

1. Study of Bale Opening machine - Dimensions, Driving arrangement, speed calculations.  
Demonstration of different setting between Inclined spike lattice –Evener roller, Evener to Stripper, Grid bar - Beater and its effect on waste collection
2. Dimension and driving arrangement study of Coarse cleaning machines., Speed calculations.  
Demonstration of Grid bar, Baffle plate setting.  
Machine Cleaning efficiency calculation.
3. Study of mixing machine. Working, Dimension, Driving arrangement, calculations.  
Mill visit, e.g. Unimix .
4. Study of Fine cleaning machine – Dimension, Driving arrangement used, Speed calculations. Demonstration of different setting like deflector plate. , ERM (Fine opener)

5. Study of De-dusting machines – Working, Dimension, Driving arrangement and calculations.
6. Study of chute feed system. Different chute feed systems, Demonstration of chute feed system, setting of feed batt weight (gms / mt)
- 7 Cleaning efficiency calculation of mild & intensive cleaners.  
Processing the material and checking the cleaning efficiency for both mild & intensive cleaners.
- 8 Mill visit to study Blow room machine sequence used and the material flow.
- 9 Ginning Mill visit to study the working of ginning machinery.
- 10 Study of pre & post ginning equipments and their working.
- 11 Study of ginning machine - Dimension, Construction, Working, Driving arrangement, calculations.

**Reference Books :-**

- 1) The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein.
- 2) 'The Characteristics of Raw Cotton' by P. Lord. The Textile Institute Publication, Manual of Cotton Spinning Vol.II, Part-I.
- 3) 'Opening and Cleaning' by Shirley. The Textile Institute Publication, Manual of Cotton Spinning Vol. II, Part-II.
- 4) 'Opening Cleaning and Picking' by Dr.Zoltan S. Szaloki, Institute of Textile Technology, Virginia.
- 5) '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) Essential calculations of practical cotton spinning by T.K. Pattabhiraman.
- 12) 'Mixing & Blowroom' -by Prof.A.R.Khare.
- 13) Advances in technology of yarn production-NCUTE
- 14) Rieter Machine Manuals

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**2.6 MAN MADE FABRIC MANUFACTURE - I (MMTT)**

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

**I) WARPING**

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, set length, drums for sectional warping, 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**

1. Need: Objectives (abrasion resistance, strength, smoothness, lubrication, fiber lay etc), achieving the objectives through size paste constituents size application.
2. Concepts of sizing process: hank sizing, ball warp sizing, slasher sizing, and classification of sizing machines.
3. 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.
4. Head stock: - various functions in head stock, their importance in weaving (dry splitting, measuring, marking, winding, beam pressing etc)
5. Moisture and stretch: - Importance and their control

6. Ingredients-Types (natural, synthetic), their functions, examples, features.
7. Size cooking: - need, equipments available, method of addition of ingredients and its importance, gelatinizing, bursting, homogenizing, concentration, viscosity, (measuring methods and importance)
8. Calculations: -Production and efficiency of machine.

## **II) WEAVING**

1. Study of dobby: Keighly, cam dobby, paper pattern, cross border dobby, method of pegging, heald reversing motions, Keighly dobby settings
2. Study of Jacquard: Parts of jacquards, sizes and figuring capacities of jacquard, harness ties, design ties, casting out, card cutting and lacing, Double lift single cylinder, Double lift double cylinder, cross border jacquards, high pitch jacquards.
3. Weft patterning: - Eccle's and Zang's drop box motions, pattern chain, card saving, fabric defects.

## **IV) FABRIC STRUCTURE**

1. To represent following weaves on graph paper with design, draft, peg-plan and denting order.
  - a. Derivative of plain weave-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, transposed 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 of fabric 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. Study of Auxiliary motions – construction, working and functions of various parts in each system.
2. Study, dismantling and resetting of side weft fork motion.
3. Study, dismantling and resetting of Keighley dobby.
4. Study, dismantling and resetting of Cam dobby.
5. Weaving of fabric on dobby by pegging and card cutting.
6. Study of mechanical jacquard and fabric weaving by card cutting for four picks.
7. Study, dismantling and resetting of drop box mechanism.
8. Study of sectional warping machine details and beam preparation.
9. Study of Automatic pirn winding machine, preparation of pirns with different diameter and bunch length.
10. Fabric Analysis of Mock Leno, Honey Comb.
11. Fabric Analysis of huck-a back.
12. 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**

**2.7 LANGUAGE LABORATORY (TT/MMTT)**

Practicals	:	2 Hours/week
Term Work	:	50 Marks

**I) Communication**

Nature and Importance of Communication  
Process and Barriers to Communication  
Forms of Communication

**II) Techniques of Communication.**

Techniques of Formal Speech.  
Verbal Communication  
Non Verbal Communication – Body Language.

**III) Issues in English**

Getting started – questions – Cloze – Spelling – Diction – Listening – Word – Sentences – Vocabulary – Pictures & Words – Opposite Meaning – Word order- Grammar – Simple present – Simple Past – Present continuous – Future Tense – Personal Pronouns – Pronunciation – words sentences – writing – punctuation – questions – opinions – different genres.

**IV) Pronunciation**

The phonemic alphabet in English  
Similar sounds  
Word and phrasal stress  
Stress and Rhythm  
Rhythms from Rainland

**V) Study skills success**

Listening – Speaking – Reading – Writing – Vocabulary – Visuals.

**VI) Tense Buster**

Articles – Reported speech – Passives – Phrasal verbs – How to learn faster.

**VII) Business English**

A formula for clear writing – Formal or Informal – Which words – written communication

**Reference Books:-**

- 1) Communication Skills for Engineers – Sunita Mishra – Pearson Education
- 2) Language Software's (1 to 22 Software's)

**List of Software's**

1. Ease one
2. Click info English
3. Tense Buster
4. Study Skills Success
5. Author Plus with result Manager
6. Sky Pronunciation Suite
7. Pronunciation Power
8. Test Preparation for TOEFL
9. Let's do Business Presentation
10. Let's Do Business Meetings
11. Let's Do Business Negotiations
12. Let's do Business Telephoning
13. Report Writes – Technical Report
14. Report Writers Business Report
15. Report Writers – Letters Faxes, E-Mails
16. Connected Speech
17. Vocabulary Builder
18. Business Territory
19. Error & Terror
20. A Taste for English
21. Issues in English
22. Voice Books